

# Publication List

Oliver Gutsche

December 1, 2024

- A. Hayrapetyan et al., **Angular analysis of the  $B^0 \rightarrow K^*(892)^0 \mu^+ \mu^-$  decay in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2411.11820>, arXiv:2411.11820 [hep-ex]
- A. Hayrapetyan et al., **Search for rare decays of the Z and Higgs bosons to a  $J/\psi$  or  $\psi(2S)$  meson and a photon in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2411.15000>, arXiv:2411.15000 [hep-ex]
- A. Hayrapetyan et al., **Reweighting simulated events using machine-learning techniques in the CMS experiment**, (2024). <http://arxiv.org/abs/2411.03023>, arXiv:2411.03023 [hep-ex]
- V. Chekhovsky et al., **Constraints on standard model effective field theory for a Higgs boson produced in association with W or Z bosons in the  $H \rightarrow b\bar{b}$  decay channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2411.16907>, arXiv:2411.16907 [hep-ex]
- A. Hayrapetyan et al., **Search for a heavy resonance decaying into a Z and a Higgs boson in events with an energetic jet and two electrons, two muons, or missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2411.00202>, arXiv:2411.00202 [hep-ex]
- A. Hayrapetyan et al., **Study of same-sign W boson scattering and anomalous couplings in events with one tau lepton from pp collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2410.04210>, arXiv:2410.04210 [hep-ex]
- A. Hayrapetyan et al., **Measurements of inclusive and differential cross sections for top quark production in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2410.23475>, arXiv:2410.23475 [hep-ex]
- A. Hayrapetyan et al., **Search for heavy long-lived charged particles with large ionization energy loss in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2410.09164>, arXiv:2410.09164 [hep-ex]
- A. Tumasyan et al., **Correlations between azimuthal anisotropy and mean transverse momentum in pp, pPb, and peripheral PbPb collisions**, (2024). <http://arxiv.org/abs/2410.04578>, arXiv:2410.04578 [nucl-ex]
- A. Hayrapetyan et al., **Search for excited tau leptons in the  $\tau\tau\gamma$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2410.21137>, arXiv:2410.21137 [hep-ex]
- A. Hayrapetyan et al., **Search for pair production of heavy particles decaying to a top quark and a gluon in the lepton+jets final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2410.20601>, arXiv:2410.20601 [hep-ex]
- A. Hayrapetyan et al., **Measurement of the Higgs boson mass and width using the four-lepton final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2409.13663>, arXiv:2409.13663 [hep-ex]
- A. Hayrapetyan et al., **Energy-scaling behavior of intrinsic transverse momentum parameters in Drell-Yan simulation**, (2024). <http://arxiv.org/abs/2409.17770>, arXiv:2409.17770 [hep-ph]
- A. Hayrapetyan et al., **Measurement of inclusive and differential cross sections of single top quark production in association with a W boson in proton-proton collisions at  $\sqrt{s} = 13.6$  TeV**, (2024). <http://arxiv.org/abs/2409.06444>, arXiv:2409.06444 [hep-ex]
- A. Hayrapetyan et al., **Bottom quark energy loss and hadronization with  $B^+$  and  $B_s^0$  nuclear modification factors using pp and \PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, (2024). <http://arxiv.org/abs/2409.07258>, arXiv:2409.07258 [nucl-ex]
- A. Hayrapetyan et al., **Search for light long-lived particles decaying to displaced jets in proton-proton collisions at  $\sqrt{s} = 13.6$  TeV**, (2024). <http://arxiv.org/abs/2409.10806>, arXiv:2409.10806 [hep-ex]

- A. Hayrapetyan et al., **Pseudorapidity distributions of charged hadrons in lead-lead collisions at  $\sqrt{s_{NN}} = 5.36$  TeV**, (2024). <http://arxiv.org/abs/2409.00838>, arXiv:2409.00838 [hep-ex]
- A. Hayrapetyan et al., **Measurements of polarization and spin correlation and observation of entanglement in top quark pairs using lepton+jets events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2409.11067>, arXiv:2409.11067 [hep-ex]
- A. Hayrapetyan et al., **Search for bottom quark associated production of the standard model Higgs boson in final states with leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2408.01344>, arXiv:2408.01344 [hep-ex]
- A. Hayrapetyan et al., **Measurement of the inclusive cross sections for W and Z boson production in proton-proton collisions at  $\sqrt{s} = 5.02$  and 13 TeV**, (2024). <http://arxiv.org/abs/2408.03744>, arXiv:2408.03744 [hep-ex]
- A. Hayrapetyan et al., **Measurement of the Drell–Yan forward-backward asymmetry and of the effective leptonic weak mixing angle in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2408.07622>, arXiv:2408.07622 [hep-ex]
- A. Hayrapetyan et al., **Search for dark matter produced in association with a pair of bottom quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2408.17336>, arXiv:2408.17336 [hep-ex]
- A. Hayrapetyan et al., **Test of lepton flavor universality in semileptonic  $B_c^+$  meson decays in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2408.00678>, arXiv:2408.00678 [hep-ex]
- A. Hayrapetyan et al., **Constraints on the Higgs boson self-coupling from the combination of single and double Higgs boson production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2407.13554>, arXiv:2407.13554 [hep-ex]
- A. Hayrapetyan et al., **Measurement of boosted Higgs bosons produced via vector boson fusion or gluon fusion in the  $H \rightarrow b\bar{b}$  decay mode using LHC proton-proton collision data at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2407.08012>, arXiv:2407.08012 [hep-ex]
- A. Hayrapetyan et al., **Measurement of the  $t\bar{t}H$  and  $tH$  production rates in the  $H \rightarrow b\bar{b}$  decay channel using proton-proton collision data at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2407.10896>, arXiv:2407.10896 [hep-ex]
- A. Hayrapetyan et al., **Search for long-lived heavy neutral leptons in proton-proton collision events with a lepton-jet pair associated with a secondary vertex at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2407.10717>, arXiv:2407.10717 [hep-ex]
- A. Hayrapetyan et al., **Model-independent search for pair production of new bosons decaying into muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2407.20425>, arXiv:2407.20425 [hep-ex]
- A. Hayrapetyan et al., **Search for nuclear modifications of  $B^+$  meson production in pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, (2024). <http://arxiv.org/abs/2407.05402>, arXiv:2407.05402 [nucl-ex]
- A. Tumasyan et al., **Search for resonant pair production of Higgs bosons in the  $b\bar{b}b\bar{b}$  final state using large-area jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2407.13872>, arXiv:2407.13872 [hep-ex]
- A. Hayrapetyan et al., **Multiplicity dependence of charm baryon and baryon meson production in pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, (2024). <http://arxiv.org/abs/2407.13615>, arXiv:2407.13615 [nucl-ex]
- A. Hayrapetyan et al., **Search for flavor-changing neutral current interactions of the top quark mediated by a Higgs boson in proton-proton collisions at 13 TeV**, (2024). <http://arxiv.org/abs/2407.15172>, arXiv:2407.15172 [hep-ex]
- A. Hayrapetyan et al., **Measurement of inclusive and differential cross sections for  $W^+W^-$  production in proton-proton collisions at  $\sqrt{s} = 13.6$  TeV**, (2024). <http://arxiv.org/abs/2406.05101>, arXiv:2406.05101 [hep-ex]
- A. Hayrapetyan et al., **Review of searches for vector-like quarks, vector-like leptons, and heavy neutral leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV at the CMS experiment**, (2024). <http://arxiv.org/abs/2405.17605>, arXiv:2405.17605 [hep-ex]
- A. Hayrapetyan et al., **Stairway to discovery: a report on the CMS programme of cross section measurements from millibarns to femtobarns**, (2024). <http://arxiv.org/abs/2405.18661>, arXiv:2405.18661 [hep-ex]
- A. Hayrapetyan et al., **Search for  $CP$  violation in  $D^0 \rightarrow K_S^0 K_S^0$  decays in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2405.11606>, arXiv:2405.11606 [hep-ex]

- A. Hayrapetyan et al., **Overview of high-density QCD studies with the CMS experiment at the LHC**, (2024). <http://arxiv.org/abs/2405.10785>, arXiv:2405.10785 [nucl-ex]
- A. Hayrapetyan et al., **Study of WH production through vector boson scattering and extraction of the relative sign of the W and Z couplings to the Higgs boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2405.16566>, arXiv:2405.16566 [hep-ex]
- A. Hayrapetyan et al., **Search for new resonances decaying to pairs of merged diphotons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2405.00834>, arXiv:2405.00834 [hep-ex]
- A. Hayrapetyan et al., **Search for a standard model-like Higgs boson in the mass range between 70 and 110 GeV in the diphoton final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2405.18149>, arXiv:2405.18149 [hep-ex]
- A. Hayrapetyan et al., **Girth and groomed radius of jets recoiling against isolated photons in lead-lead and proton-proton collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, (2024). <http://arxiv.org/abs/2405.02737>, arXiv:2405.02737 [nucl-ex]
- A. Hayrapetyan et al., **Dark sector searches with the CMS experiment**, (2024). <http://arxiv.org/abs/2405.13778>, arXiv:2405.13778 [hep-ex]
- A. Hayrapetyan et al., **Review of top quark mass measurements in CMS**, (2024). <http://arxiv.org/abs/2403.01313>, arXiv:2403.01313 [hep-ex]
- A. Hayrapetyan et al., **Searches for Higgs Boson Production through Decays of Heavy Resonances**, (2024). <http://arxiv.org/abs/2403.16926>, arXiv:2403.16926 [hep-ex]
- A. Hayrapetyan et al., **Enriching the Physics Program of the CMS Experiment via Data Scouting and Data Parking**, (2024). <http://arxiv.org/abs/2403.16134>, arXiv:2403.16134 [hep-ex]
- A. Hayrapetyan et al., **Search for baryon number violation in top quark production and decay using proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2402.18461>, arXiv:2402.18461 [hep-ex]
- A. Hayrapetyan et al., **Search for fractionally charged particles in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2402.09932>, arXiv:2402.09932 [hep-ex]
- A. Tumasyan et al., **Differential cross section measurements for the production of top quark pairs and of additional jets using dilepton events from pp collisions at  $\sqrt{s} = 13$  TeV**, (2024). <http://arxiv.org/abs/2402.08486>, arXiv:2402.08486 [hep-ex]
- A. Hayrapetyan et al., **Measurement of the double-differential inclusive jet cross section in proton-proton collisions at  $\sqrt{s} = 5.02$  TeV**, (2024). <http://arxiv.org/abs/2401.11355>, arXiv:2401.11355 [hep-ex]
- A. Hayrapetyan et al., **Measurement of multidifferential cross sections for dijet production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, (2023). <http://arxiv.org/abs/2312.16669>, arXiv:2312.16669 [hep-ex]
- A. Hayrapetyan et al., **Search for Charged-Lepton Flavor Violation in the Production and Decay of Top Quarks using Trilepton Final States in Proton-Proton Collisions at  $\sqrt{s} = 13$  TeV**, (2023). <http://arxiv.org/abs/2312.03199>, arXiv:2312.03199 [hep-ex]
- A. Hayrapetyan et al., **Elliptic anisotropy measurement of the  $f_0(980)$  hadron in proton-lead collisions and evidence for its quark-antiquark composition**, (2023). <http://arxiv.org/abs/2312.17092>, arXiv:2312.17092 [nucl-ex]
- A. Apresyan et al., **Detector R&D needs for the next generation  $e^+e^-$  collider**, (2023). <http://arxiv.org/abs/2306.13567>, arXiv:2306.13567 [hep-ex]
- M. Atif et al., **Evaluating Portable Parallelization Strategies for Heterogeneous Architectures in High Energy Physics**, (2023). <http://arxiv.org/abs/2306.15869>, arXiv:2306.15869 [hep-ex]
- B. Bockelman et al., **IRIS-HEP Strategic Plan for the Next Phase of Software Upgrades for HL-LHC Physics**, (2023). <http://arxiv.org/abs/2302.01317>, arXiv:2302.01317 [hep-ex]
- V.D. Elvira et al., **The Future of High Energy Physics Software and Computing**, in: **Snowmass 2021**, 2022. <http://arxiv.org/abs/2210.05822>, arXiv:2210.05822 [hep-ex]
- G. Cerati et al., **Snowmass Computational Frontier: Topical Group Report on Experimental Algorithm Parallelization**, (2022). <http://arxiv.org/abs/2209.07356>, arXiv:2209.07356 [hep-ex]
- M. Bhattacharya et al., **Portability: A Necessary Approach for Future Scientific Software**, in: **Snowmass 2021**, 2022. <http://arxiv.org/abs/2203.09945>, arXiv:2203.09945 [physics.comp-ph]

- J. Amundson et al., **Response to NITRD, NCO, NSF Request for Information on “Update to the 2016 National Artificial Intelligence Research and Development Strategic Plan”**, (2019). <http://arxiv.org/abs/1911.05796>, arXiv:1911.05796 [astro-ph.IM]
- Z. Ahmed et al., **New Technologies for Discovery**, in: **CPAD Instrumentation Frontier Workshop 2018: New Technologies for Discovery IV**, 2019. <http://arxiv.org/abs/1908.00194>, arXiv:1908.00194 [physics.ins-det]
- M. Bellis et al., **HEP Software Foundation Community White Paper Working Group Visualization**, (2018). <http://arxiv.org/abs/1811.10309>, arXiv:1811.10309 [physics.comp-ph]
- D. Berzano et al., **HEP Software Foundation Community White Paper Working Group – Data Organization, Management and Access (DOMA)**, (2018). <http://arxiv.org/abs/1812.00761>, arXiv:1812.00761 [physics.comp-ph]
- L. Bauerdick et al., **HEP Software Foundation Community White Paper Working Group - Data Analysis and Interpretation**, (2018). <http://arxiv.org/abs/1804.03983>, arXiv:1804.03983 [physics.comp-ph]
- V. Khachatryan et al., **Exclusive and semi-exclusive  $\pi^+\pi^-$  production in proton-proton collisions at  $\sqrt{s} = 7$  TeV**, (2017). <http://arxiv.org/abs/1706.08310>, arXiv:1706.08310 [hep-ex]
- S. Habib et al., **ASCR/HEP Exascale Requirements Review Report**, (2016). <http://arxiv.org/abs/1603.09303>, arXiv:1603.09303 [physics.comp-ph]
- T. LeCompte et al., **High Energy Physics Forum for Computational Excellence: Working Group Reports (I. Applications Software II. Software Libraries and Tools III. Systems)**, (2015). <http://arxiv.org/abs/1510.08545>, arXiv:1510.08545 [physics.comp-ph]
- G.L. Bayatian et al., **CMS expression of interest in the SLHC**, (2007)
- G. Aad et al., **Evidence for the Higgs Boson Decay to a Z Boson and a Photon at the LHC**, *Phys. Rev. Lett.* 132 (2024) 021803, doi:10.1103/PhysRevLett.132.021803, arXiv:2309.03501 [hep-ex]
- A. Hayrapetyan et al., **Combination of Measurements of the Top Quark Mass from Data Collected by the ATLAS and CMS Experiments at  $\sqrt{s}=7$  and 8 TeV**, *Phys. Rev. Lett.* 132 (2024) 261902, doi:10.1103/PhysRevLett.132.261902, arXiv:2402.08713 [hep-ex]
- A. Tumasyan et al., **Measurements of azimuthal anisotropy of nonprompt D0 mesons in PbPb collisions at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Lett. B.* 850 (2024) 138389, doi:10.1016/j.physletb.2023.138389, arXiv:2212.01636 [nucl-ex]
- A. Tumasyan et al., **Measurement of the production cross section for a W boson in association with a charm quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 84 (2024) 27, doi:10.1140/epjc/s10052-023-12258-4, arXiv:2308.02285 [hep-ex]
- A. Hayrapetyan et al., **Search for Inelastic Dark Matter in Events with Two Displaced Muons and Missing Transverse Momentum in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 132 (2024) 041802, doi:10.1103/PhysRevLett.132.041802, arXiv:2305.11649 [hep-ex]
- A. Hayrapetyan et al., **Search for Scalar Leptoquarks Produced via  $\tau$ -Lepton Quark Scattering in pp Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 132 (2024) 061801, doi:10.1103/PhysRevLett.132.061801, arXiv:2308.06143 [hep-ex]
- A. Hayrapetyan et al., **Search for flavor changing neutral current interactions of the top quark in final states with a photon and additional jets in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 109 (2024) 072004, doi:10.1103/PhysRevD.109.072004, arXiv:2312.08229 [hep-ex]
- A. Tumasyan et al., **Search for a new resonance decaying into two spin-0 bosons in a final state with two photons and two bottom quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2024) 316, doi:10.1007/JHEP05(2024)316, arXiv:2310.01643 [hep-ex]
- A. Tumasyan et al., **Higher-order moments of the elliptic flow distribution in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 2024 (2024) 106, doi:10.1007/JHEP02(2024)106, arXiv:2311.11370 [nucl-ex]
- A. Hayrapetyan et al., **Search for dark matter particles in  $W^+W^-$  events with transverse momentum imbalance in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2024) 134, doi:10.1007/JHEP03(2024)134, arXiv:2310.12229 [hep-ex]
- A. Tumasyan et al., **Study of azimuthal anisotropy of (1S) mesons in pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *Phys. Lett. B.* 850 (2024) 138518, doi:10.1016/j.physletb.2024.138518, arXiv:2310.03233 [hep-ex]



- A. Hayrapetyan et al., **Muon identification using multivariate techniques in the CMS experiment in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JINST.* 19 (2024) P02031, doi:[10.1088/1748-0221/19/02/P02031](https://doi.org/10.1088/1748-0221/19/02/P02031), arXiv:[2310.03844](https://arxiv.org/abs/2310.03844) [hep-ex]
- A. Hayrapetyan et al., **Search for an exotic decay of the Higgs boson into a Z boson and a pseudoscalar particle in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B.* 852 (2024) 138582, doi:[10.1016/j.physletb.2024.138582](https://doi.org/10.1016/j.physletb.2024.138582), arXiv:[2311.00130](https://arxiv.org/abs/2311.00130) [hep-ex]
- A. Tumasyan et al., **Study of charm hadronization with prompt  $\Lambda_c^+$  baryons in proton-proton and lead-lead collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 01 (2024) 128, doi:[10.1007/JHEP01\(2024\)128](https://doi.org/10.1007/JHEP01(2024)128), arXiv:[2307.11186](https://arxiv.org/abs/2307.11186) [nucl-ex]
- A. Hayrapetyan et al., **Development of the CMS detector for the CERN LHC Run 3**, *JINST.* 19 (2024) P05064, doi:[10.1088/1748-0221/19/05/P05064](https://doi.org/10.1088/1748-0221/19/05/P05064), arXiv:[2309.05466](https://arxiv.org/abs/2309.05466) [physics.ins-det]
- A. Hayrapetyan et al., **Search for  $W'$  bosons decaying to a top and a bottom quark in leptonic final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2024) 046, doi:[10.1007/JHEP05\(2024\)046](https://doi.org/10.1007/JHEP05(2024)046), arXiv:[2310.19893](https://arxiv.org/abs/2310.19893) [hep-ex]
- A. Hayrapetyan et al., **Observation of Enhanced Long-Range Elliptic Anisotropies Inside High-Multiplicity Jets in pp Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 133 (2024) 142301, doi:[10.1103/PhysRevLett.133.142301](https://doi.org/10.1103/PhysRevLett.133.142301), arXiv:[2312.17103](https://arxiv.org/abs/2312.17103) [hep-ex]
- A. Hayrapetyan et al., **Search for the lepton flavor violating  $\tau 3\mu$  decay in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B.* 853 (2024) 138633, doi:[10.1016/j.physletb.2024.138633](https://doi.org/10.1016/j.physletb.2024.138633), arXiv:[2312.02371](https://arxiv.org/abs/2312.02371) [hep-ex]
- A. Tumasyan et al.,  **$KS^0$  and  $\Lambda(\Lambda^-)$  two-particle femtoscopic correlations in PbPb collisions at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Lett. B.* 857 (2024) 138936, doi:[10.1016/j.physletb.2024.138936](https://doi.org/10.1016/j.physletb.2024.138936), arXiv:[2301.05290](https://arxiv.org/abs/2301.05290) [nucl-ex]
- A. Hayrapetyan et al., **Search for Long-Lived Heavy Neutral Leptons with Lepton Flavour Conserving or Violating Decays to a Jet and a Charged Lepton**, *JHEP.* 03 (2024) 105, doi:[10.1007/JHEP03\(2024\)105](https://doi.org/10.1007/JHEP03(2024)105), arXiv:[2312.07484](https://arxiv.org/abs/2312.07484) [hep-ex]
- A. Hayrapetyan et al., **Evidence for  $tWZ$  production in proton-proton collisions at  $\sqrt{s}=13$  TeV in multilepton final states**, *Phys. Lett. B.* 855 (2024) 138815, doi:[10.1016/j.physletb.2024.138815](https://doi.org/10.1016/j.physletb.2024.138815), arXiv:[2312.11668](https://arxiv.org/abs/2312.11668) [hep-ex]
- A. Tumasyan et al., **Observation of the  $(3S)$  Meson and Suppression of States in Pb-Pb Collisions at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Rev. Lett.* 133 (2024) 022302, doi:[10.1103/PhysRevLett.133.022302](https://doi.org/10.1103/PhysRevLett.133.022302), arXiv:[2303.17026](https://arxiv.org/abs/2303.17026) [hep-ex]
- A. Hayrapetyan et al., **Measurement of the primary Lund jet plane density in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2024) 116, doi:[10.1007/JHEP05\(2024\)116](https://doi.org/10.1007/JHEP05(2024)116), arXiv:[2312.16343](https://arxiv.org/abs/2312.16343) [hep-ex]
- A. Hayrapetyan et al., **Measurement of the  $\tau$  lepton polarization in Z boson decays in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 01 (2024) 101, doi:[10.1007/JHEP01\(2024\)101](https://doi.org/10.1007/JHEP01(2024)101), arXiv:[2309.12408](https://arxiv.org/abs/2309.12408) [hep-ex]
- A. Hayrapetyan et al., **Search for supersymmetry in final states with disappearing tracks in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 109 (2024) 072007, doi:[10.1103/PhysRevD.109.072007](https://doi.org/10.1103/PhysRevD.109.072007), arXiv:[2309.16823](https://arxiv.org/abs/2309.16823) [hep-ex]
- A. Tumasyan et al., **Search for central exclusive production of top quark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV with tagged protons**, *JHEP.* 06 (2024) 187, doi:[10.1007/JHEP06\(2024\)187](https://doi.org/10.1007/JHEP06(2024)187), arXiv:[2310.11231](https://arxiv.org/abs/2310.11231) [hep-ex]
- A. Hayrapetyan et al., **New Structures in the  $J/\psi J/\psi$  Mass Spectrum in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 132 (2024) 111901, doi:[10.1103/PhysRevLett.132.111901](https://doi.org/10.1103/PhysRevLett.132.111901), arXiv:[2306.07164](https://arxiv.org/abs/2306.07164) [hep-ex]
- A. Hayrapetyan et al., **Luminosity determination using Z boson production at the CMS experiment**, *Eur. Phys. J. C.* 84 (2024) 26, doi:[10.1140/epjc/s10052-023-12268-2](https://doi.org/10.1140/epjc/s10052-023-12268-2), arXiv:[2309.01008](https://arxiv.org/abs/2309.01008) [hep-ex]
- A. Hayrapetyan et al., **Search for a third-generation leptoquark coupled to a  $\tau$  lepton and a b quark through single, pair, and nonresonant production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2024) 311, doi:[10.1007/JHEP05\(2024\)311](https://doi.org/10.1007/JHEP05(2024)311), arXiv:[2308.07826](https://arxiv.org/abs/2308.07826) [hep-ex]
- A. Hayrapetyan et al., **Observation of  $WW \gamma$  production and search for  $H \gamma$  production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 132 (2024) 121901, doi:[10.1103/PhysRevLett.132.121901](https://doi.org/10.1103/PhysRevLett.132.121901), arXiv:[2310.05164](https://arxiv.org/abs/2310.05164) [hep-ex]
- A. Tumasyan et al., **Multiplicity and transverse momentum dependence of charge-balance functions in pPb and PbPb collisions at LHC energies**, *JHEP.* 08 (2024) 148, doi:[10.1007/JHEP08\(2024\)148](https://doi.org/10.1007/JHEP08(2024)148), arXiv:[2307.11185](https://arxiv.org/abs/2307.11185) [nucl-ex]

- A. Hayrapetyan et al., **Search for Narrow Trijet Resonances in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 133 (2024) 011801, doi:[10.1103/PhysRevLett.133.011801](https://doi.org/10.1103/PhysRevLett.133.011801), arXiv:[2310.14023](https://arxiv.org/abs/2310.14023) [hep-ex]
- A. Hayrapetyan et al., **Measurement of the Higgs boson production via vector boson fusion and its decay into bottom quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 01 (2024) 173, doi:[10.1007/JHEP01\(2024\)173](https://doi.org/10.1007/JHEP01(2024)173), arXiv:[2308.01253](https://arxiv.org/abs/2308.01253) [hep-ex]
- A. Tumasyan et al., **Measurement of simplified template cross sections of the Higgs boson produced in association with W or Z bosons in the Hbb decay channel in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 109 (2024) 092011, doi:[10.1103/PhysRevD.109.092011](https://doi.org/10.1103/PhysRevD.109.092011), arXiv:[2312.07562](https://arxiv.org/abs/2312.07562) [hep-ex]
- A. Hayrapetyan et al., **Inclusive and differential cross section measurements of  $t\bar{t}b\bar{b}$  production in the lepton+jets channel at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2024) 042, doi:[10.1007/JHEP05\(2024\)042](https://doi.org/10.1007/JHEP05(2024)042), arXiv:[2309.14442](https://arxiv.org/abs/2309.14442) [hep-ex]
- A. Hayrapetyan et al., **Search for new Higgs bosons via same-sign top quark pair production in association with a jet in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 850 (2024) 138478, doi:[10.1016/j.physletb.2024.138478](https://doi.org/10.1016/j.physletb.2024.138478), arXiv:[2311.03261](https://arxiv.org/abs/2311.03261) [hep-ex]
- A. Tumasyan et al., **Two-particle Bose-Einstein correlations and their Lévy parameters in PbPb collisions at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Rev. C.* 109 (2024) 024914, doi:[10.1103/PhysRevC.109.024914](https://doi.org/10.1103/PhysRevC.109.024914), arXiv:[2306.11574](https://arxiv.org/abs/2306.11574) [nucl-ex]
- A. Hayrapetyan et al., **Search for stealth supersymmetry in final states with two photons, jets, and low missing transverse momentum in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 109 (2024) 112009, doi:[10.1103/PhysRevD.109.112009](https://doi.org/10.1103/PhysRevD.109.112009), arXiv:[2310.03154](https://arxiv.org/abs/2310.03154) [hep-ex]
- A. Hayrapetyan et al., **Search for long-lived heavy neutral leptons decaying in the CMS muon detectors in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 110 (2024) 012004, doi:[10.1103/PhysRevD.110.012004](https://doi.org/10.1103/PhysRevD.110.012004), arXiv:[2402.18658](https://arxiv.org/abs/2402.18658) [hep-ex]
- A. Hayrapetyan et al., **Performance of the CMS high-level trigger during LHC Run 2**, *JINST.* 19 (2024) P11021, doi:[10.1088/1748-0221/19/11/P11021](https://doi.org/10.1088/1748-0221/19/11/P11021), arXiv:[2410.17038](https://arxiv.org/abs/2410.17038) [physics.ins-det]
- A. Hayrapetyan et al., **Search for pair production of scalar and vector leptoquarks decaying to muons and bottom quarks in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 109 (2024) 112003, doi:[10.1103/PhysRevD.109.112003](https://doi.org/10.1103/PhysRevD.109.112003), arXiv:[2402.08668](https://arxiv.org/abs/2402.08668) [hep-ex]
- A. Hayrapetyan et al., **Constraints on anomalous Higgs boson couplings from its production and decay using the WW channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 84 (2024) 779, doi:[10.1140/epjc/s10052-024-12925-0](https://doi.org/10.1140/epjc/s10052-024-12925-0), arXiv:[2403.00657](https://arxiv.org/abs/2403.00657) [hep-ex]
- A. Hayrapetyan et al., **Search for long-lived particles decaying in the CMS muon detectors in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 110 (2024) 032007, doi:[10.1103/PhysRevD.110.032007](https://doi.org/10.1103/PhysRevD.110.032007), arXiv:[2402.01898](https://arxiv.org/abs/2402.01898) [hep-ex]
- A. Hayrapetyan et al., **Measurement of the  $B_s^0 \rightarrow J/\psi K_S^0$  effective lifetime from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2024) 247, doi:[10.1007/JHEP10\(2024\)247](https://doi.org/10.1007/JHEP10(2024)247), arXiv:[2407.13441](https://arxiv.org/abs/2407.13441) [hep-ex]
- A. Hayrapetyan et al., **Search for Higgs boson pair production with one associated vector boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2024) 061, doi:[10.1007/JHEP10\(2024\)061](https://doi.org/10.1007/JHEP10(2024)061), arXiv:[2404.08462](https://arxiv.org/abs/2404.08462) [hep-ex]
- A. Hayrapetyan et al., **Search for dark QCD with emerging jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2024) 142, doi:[10.1007/JHEP07\(2024\)142](https://doi.org/10.1007/JHEP07(2024)142), arXiv:[2403.01556](https://arxiv.org/abs/2403.01556) [hep-ex]
- A. Hayrapetyan et al., **Combined search for electroweak production of winos, binos, higgsinos, and sleptons in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D.* 109 (2024) 112001, doi:[10.1103/PhysRevD.109.112001](https://doi.org/10.1103/PhysRevD.109.112001), arXiv:[2402.01888](https://arxiv.org/abs/2402.01888) [hep-ex]
- A. Hayrapetyan et al., **Measurement of multijet azimuthal correlations and determination of the strong coupling in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 84 (2024) 842, doi:[10.1140/epjc/s10052-024-13116-7](https://doi.org/10.1140/epjc/s10052-024-13116-7), arXiv:[2404.16082](https://arxiv.org/abs/2404.16082) [hep-ex]
- A. Hayrapetyan et al., **Measurement of the polarizations of prompt and non-prompt  $\Lambda$  and  $\psi(2S)$  mesons produced in pp collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B.* 858 (2024) 139044, doi:[10.1016/j.physletb.2024.139044](https://doi.org/10.1016/j.physletb.2024.139044), arXiv:[2406.14409](https://arxiv.org/abs/2406.14409) [hep-ex]
- A. Hayrapetyan et al., **Measurement of differential ZZ + jets production cross sections in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2024) 209, doi:[10.1007/JHEP10\(2024\)209](https://doi.org/10.1007/JHEP10(2024)209), arXiv:[2404.02711](https://arxiv.org/abs/2404.02711) [hep-ex]

- A. Hayrapetyan et al., **Search for long-lived heavy neutrinos in the decays of B mesons produced in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2024) 183, doi:[10.1007/JHEP06\(2024\)183](https://doi.org/10.1007/JHEP06(2024)183), arXiv:[2403.04584](https://arxiv.org/abs/2403.04584) [hep-ex]
- A. Hayrapetyan et al., **Measurement of the production cross section of a Higgs boson with large transverse momentum in its decays to a pair of  $\tau$  leptons in proton-proton collisions at  $s=13$ TeV**, *Phys. Lett. B*. 857 (2024) 138964, doi:[10.1016/j.physletb.2024.138964](https://doi.org/10.1016/j.physletb.2024.138964), arXiv:[2403.20201](https://arxiv.org/abs/2403.20201) [hep-ex]
- J. Balcas et al., **Automated Network Services for Exascale Data Movement**, *EPJ Web Conf.* 295 (2024) 01009, doi:[10.1051/epjconf/202429501009](https://doi.org/10.1051/epjconf/202429501009)
- A. Hayrapetyan et al., **Searches for Pair-Produced Multijet Resonances Using Data Scouting in Proton-Proton Collisions at  $s=13$  TeV**, *Phys. Rev. Lett.* 133 (2024) 201803, doi:[10.1103/PhysRevLett.133.201803](https://doi.org/10.1103/PhysRevLett.133.201803), arXiv:[2404.02992](https://arxiv.org/abs/2404.02992) [hep-ex]
- A. Hayrapetyan et al., **Measurement of Energy Correlators inside Jets and Determination of the Strong Coupling  $\alpha_S(m_Z)$** , *Phys. Rev. Lett.* 133 (2024) 071903, doi:[10.1103/PhysRevLett.133.071903](https://doi.org/10.1103/PhysRevLett.133.071903), arXiv:[2402.13864](https://arxiv.org/abs/2402.13864) [hep-ex]
- A. Hayrapetyan et al., **Search for Soft Unclustered Energy Patterns in Proton-Proton Collisions at 13 TeV**, *Phys. Rev. Lett.* 133 (2024) 191902, doi:[10.1103/PhysRevLett.133.191902](https://doi.org/10.1103/PhysRevLett.133.191902), arXiv:[2403.05311](https://arxiv.org/abs/2403.05311) [hep-ex]
- A. Hayrapetyan et al., **Search for a resonance decaying to a W boson and a photon in proton-proton collisions at  $\sqrt{s} = 13$  TeV using leptonic W boson decays**, *JHEP*. 09 (2024) 186, doi:[10.1007/JHEP09\(2024\)186](https://doi.org/10.1007/JHEP09(2024)186), arXiv:[2406.05737](https://arxiv.org/abs/2406.05737) [hep-ex]
- A. Hayrapetyan et al., **Search for new physics in high-mass diphoton events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 08 (2024) 215, doi:[10.1007/JHEP08\(2024\)215](https://doi.org/10.1007/JHEP08(2024)215), arXiv:[2405.09320](https://arxiv.org/abs/2405.09320) [hep-ex]
- A. Hayrapetyan et al., **The CMS Statistical Analysis and Combination Tool: Combine**, *Comput. Softw. Big Sci.* 8 (2024) 19, doi:[10.1007/s41781-024-00121-4](https://doi.org/10.1007/s41781-024-00121-4), arXiv:[2404.06614](https://arxiv.org/abs/2404.06614) [physics.data-an]
- A. Hayrapetyan et al., **Performance of the CMS electromagnetic calorimeter in pp collisions at  $\sqrt{s} = 13$  TeV**, *JINST*. 19 (2024) P09004, doi:[10.1088/1748-0221/19/09/P09004](https://doi.org/10.1088/1748-0221/19/09/P09004), arXiv:[2403.15518](https://arxiv.org/abs/2403.15518) [physics.ins-det]
- A. Hayrapetyan et al., **Observation of quantum entanglement in top quark pair production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Rept. Prog. Phys.* 87 (2024) 117801, doi:[10.1088/1361-6633/ad7e4d](https://doi.org/10.1088/1361-6633/ad7e4d), arXiv:[2406.03976](https://arxiv.org/abs/2406.03976) [hep-ex]
- A. Hayrapetyan et al., **Search for production of a single vectorlike quark decaying to tH or tZ in the all-hadronic final state in pp collisions at  $s=13$  TeV**, *Phys. Rev. D*. 110 (2024) 072012, doi:[10.1103/PhysRevD.110.072012](https://doi.org/10.1103/PhysRevD.110.072012), arXiv:[2405.05071](https://arxiv.org/abs/2405.05071) [hep-ex]
- A. Hayrapetyan et al., **Performance of CMS muon reconstruction from proton-proton to heavy ion collisions**, *JINST*. 19 (2024) P09012, doi:[10.1088/1748-0221/19/09/P09012](https://doi.org/10.1088/1748-0221/19/09/P09012), arXiv:[2404.17377](https://arxiv.org/abs/2404.17377) [hep-ex]
- A. Hayrapetyan et al., **Observation of  $\gamma\gamma \rightarrow \tau\tau$  in proton-proton collisions and limits on the anomalous electromagnetic moments of the  $\tau$  lepton**, *Rept. Prog. Phys.* 87 (2024) 107801, doi:[10.1088/1361-6633/ad6fcb](https://doi.org/10.1088/1361-6633/ad6fcb), arXiv:[2406.03975](https://arxiv.org/abs/2406.03975) [hep-ex]
- A. Hayrapetyan et al., **Search for long-lived particles decaying to final states with a pair of muons in proton-proton collisions at  $\sqrt{s} = 13.6$  TeV**, *JHEP*. 05 (2024) 047, doi:[10.1007/JHEP05\(2024\)047](https://doi.org/10.1007/JHEP05(2024)047), arXiv:[2402.14491](https://arxiv.org/abs/2402.14491) [hep-ex]
- A. Hayrapetyan et al., **Observation of the  $\Xi_b\psi(2S)\Xi^-$  decay and studies of the  $\Xi_b(5945)0$  baryon in proton-proton collisions at  $s=13$  TeV**, *Phys. Rev. D*. 110 (2024) 012002, doi:[10.1103/PhysRevD.110.012002](https://doi.org/10.1103/PhysRevD.110.012002), arXiv:[2402.17738](https://arxiv.org/abs/2402.17738) [hep-ex]
- A. Hayrapetyan et al., **Searches for violation of Lorentz invariance in top quark pair production using dilepton events in 13 TeV proton-proton collisions**, *Phys. Lett. B*. 857 (2024) 138979, doi:[10.1016/j.physletb.2024.138979](https://doi.org/10.1016/j.physletb.2024.138979), arXiv:[2405.14757](https://arxiv.org/abs/2405.14757) [hep-ex]
- A. Hayrapetyan et al., **Search for Higgs boson pair production in the  $b\bar{b}W^+W^-$  decay mode in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2024) 293, doi:[10.1007/JHEP07\(2024\)293](https://doi.org/10.1007/JHEP07(2024)293), arXiv:[2403.09430](https://arxiv.org/abs/2403.09430) [hep-ex]
- A. Hayrapetyan et al., **Extracting the speed of sound in quarkgluon plasma with ultrarelativistic lead-lead collisions at the LHC**, *Rept. Prog. Phys.* 87 (2024) 077801, doi:[10.1088/1361-6633/ad4b9b](https://doi.org/10.1088/1361-6633/ad4b9b), arXiv:[2401.06896](https://arxiv.org/abs/2401.06896) [nucl-ex]
- A. Hayrapetyan et al., **Test of lepton flavor universality in  $B^{\pm} \rightarrow K^{\pm} \mu^+ \mu^-$  and  $B^{\pm} \rightarrow K^{\pm} e^+ e^-$  decays in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Rept. Prog. Phys.* 87 (2024) 077802, doi:[10.1088/1361-6633/ad4e65](https://doi.org/10.1088/1361-6633/ad4e65), arXiv:[2401.07090](https://arxiv.org/abs/2401.07090) [hep-ex]

- A. Hayrapetyan et al., **Search for  $ZZ$  and  $ZH$  production in the  $b\bar{b}b\bar{b}$  final state using proton-proton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 84 (2024) 712, doi:[10.1140/epjc/s10052-024-13021-z](https://doi.org/10.1140/epjc/s10052-024-13021-z), arXiv:[2403.20241](https://arxiv.org/abs/2403.20241) [hep-ex]
- A. Hayrapetyan et al., **Search for long-lived particles using displaced vertices and missing transverse momentum in proton-proton collisions at  $s=13\text{ TeV}$** , *Phys. Rev. D.* 109 (2024) 112005, doi:[10.1103/PhysRevD.109.112005](https://doi.org/10.1103/PhysRevD.109.112005), arXiv:[2402.15804](https://arxiv.org/abs/2402.15804) [hep-ex]
- A. Hayrapetyan et al., **Portable Acceleration of CMS Computing Workflows with Coprocessors as a Service**, *Comput. Softw. Big Sci.* 8 (2024) 17, doi:[10.1007/s41781-024-00124-1](https://doi.org/10.1007/s41781-024-00124-1), arXiv:[2402.15366](https://arxiv.org/abs/2402.15366) [physics.ins-det]
- A. Tumasyan et al., **Search for a scalar or pseudoscalar dilepton resonance produced in association with a massive vector boson or top quark-antiquark pair in multilepton events at  $s=13\text{ TeV}$** , *Phys. Rev. D.* 110 (2024) 012013, doi:[10.1103/PhysRevD.110.012013](https://doi.org/10.1103/PhysRevD.110.012013), arXiv:[2402.11098](https://arxiv.org/abs/2402.11098) [hep-ex]
- A. Hayrapetyan et al., **Search for the  $Z$  Boson Decay to  $\tau\tau\mu\mu$  in Proton-Proton Collisions at  $s=13\text{ TeV}$** , *Phys. Rev. Lett.* 133 (2024) 161805, doi:[10.1103/PhysRevLett.133.161805](https://doi.org/10.1103/PhysRevLett.133.161805), arXiv:[2404.18298](https://arxiv.org/abs/2404.18298) [hep-ex]
- A. Hayrapetyan et al., **Search for exotic decays of the Higgs boson to a pair of pseudoscalars in the  $\mu\mu b\bar{b}$  and  $\tau\tau b\bar{b}$  final states**, *Eur. Phys. J. C.* 84 (2024) 493, doi:[10.1140/epjc/s10052-024-12727-4](https://doi.org/10.1140/epjc/s10052-024-12727-4), arXiv:[2402.13358](https://arxiv.org/abs/2402.13358) [hep-ex]
- A. Hayrapetyan et al., **Observation of the  $\Lambda_b^0 \rightarrow J/\psi \Xi^- K^+$  decay**, *Eur. Phys. J. C.* 84 (2024) 1062, doi:[10.1140/epjc/s10052-024-13114-9](https://doi.org/10.1140/epjc/s10052-024-13114-9), arXiv:[2401.16303](https://arxiv.org/abs/2401.16303) [hep-ex]
- A. Hayrapetyan et al., **Observation of double  $J/\psi$  meson production in pPb collisions at  $s_{NN}=8.16\text{ TeV}$** , *Phys. Rev. D.* 110 (2024) 092002, doi:[10.1103/PhysRevD.110.092002](https://doi.org/10.1103/PhysRevD.110.092002), arXiv:[2407.03223](https://arxiv.org/abs/2407.03223) [nucl-ex]
- A. Hayrapetyan et al., **Search for bottom-type vectorlike quark pair production in dileptonic and fully hadronic final states in proton-proton collisions at  $s=13\text{ TeV}$** , *Phys. Rev. D.* 110 (2024) 052004, doi:[10.1103/PhysRevD.110.052004](https://doi.org/10.1103/PhysRevD.110.052004), arXiv:[2402.13808](https://arxiv.org/abs/2402.13808) [hep-ex]
- A. Hayrapetyan et al., **Search for heavy neutral leptons in final states with electrons, muons, and hadronically decaying tau leptons in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 06 (2024) 123, doi:[10.1007/JHEP06\(2024\)123](https://doi.org/10.1007/JHEP06(2024)123), arXiv:[2403.00100](https://arxiv.org/abs/2403.00100) [hep-ex]
- A. Hayrapetyan et al., **Observation of the  $J/\psi \mu^+ \mu^- \mu^+ \mu^-$  decay in proton-proton collisions at  $s=13\text{ TeV}$** , *Phys. Rev. D.* 109 (2024) L111101, doi:[10.1103/PhysRevD.109.L111101](https://doi.org/10.1103/PhysRevD.109.L111101), arXiv:[2403.11352](https://arxiv.org/abs/2403.11352) [hep-ex]
- A. Hayrapetyan et al., **Search for the decay of the Higgs boson to a pair of light pseudoscalar bosons in the final state with four bottom quarks in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 06 (2024) 097, doi:[10.1007/JHEP06\(2024\)097](https://doi.org/10.1007/JHEP06(2024)097), arXiv:[2403.10341](https://arxiv.org/abs/2403.10341) [hep-ex]
- O. Gutsche et al., **The U.S. CMS HL-LHC R&D Strategic Plan**, *EPJ Web Conf.* 295 (2024) 04050, doi:[10.1051/epjconf/202429504050](https://doi.org/10.1051/epjconf/202429504050), arXiv:[2312.00772](https://arxiv.org/abs/2312.00772) [hep-ex]
- K.H.M. Kwok et al., **Application of performance portability solutions for GPUs and many-core CPUs to track reconstruction kernels**, *EPJ Web Conf.* 295 (2024) 11003, doi:[10.1051/epjconf/202429511003](https://doi.org/10.1051/epjconf/202429511003), arXiv:[2401.14221](https://arxiv.org/abs/2401.14221) [physics.acc-ph]
- N. Smith et al., **A Ceph S3 Object Data Store for HEP**, *EPJ Web Conf.* 295 (2024) 01003, doi:[10.1051/epjconf/202429501003](https://doi.org/10.1051/epjconf/202429501003), arXiv:[2311.16321](https://arxiv.org/abs/2311.16321) [physics.data-an]
- A. Tumasyan et al., **Search for high-mass exclusive diphoton production with tagged protons in proton-proton collisions at  $s=13\text{ TeV}$** , *Phys. Rev. D.* 110 (2024) 012010, doi:[10.1103/PhysRevD.110.012010](https://doi.org/10.1103/PhysRevD.110.012010), arXiv:[2311.02725](https://arxiv.org/abs/2311.02725) [hep-ex]
- A. Hayrapetyan et al., **Nonresonant central exclusive production of charged-hadron pairs in proton-proton collisions at  $s=13\text{ TeV}$** , *Phys. Rev. D.* 109 (2024) 112013, doi:[10.1103/PhysRevD.109.112013](https://doi.org/10.1103/PhysRevD.109.112013), arXiv:[2401.14494](https://arxiv.org/abs/2401.14494) [hep-ex]
- G. Aad et al., **Combination of inclusive top-quark pair production cross-section measurements using ATLAS and CMS data at  $\sqrt{s} = 7$  and  $8\text{ TeV}$** , *JHEP.* 07 (2023) 213, doi:[10.1007/JHEP07\(2023\)213](https://doi.org/10.1007/JHEP07(2023)213), arXiv:[2205.13830](https://arxiv.org/abs/2205.13830) [hep-ex]
- A. Tumasyan et al., **Observation of triple  $J/\psi$  meson production in proton-proton collisions**, *Nature Phys.* 19 (2023) 338–350, doi:[10.1038/s41567-022-01838-y](https://doi.org/10.1038/s41567-022-01838-y), arXiv:[2111.05370](https://arxiv.org/abs/2111.05370) [hep-ex]
- A. Tumasyan et al., **Search for Higgs boson decays to a  $Z$  boson and a photon in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 05 (2023) 233, doi:[10.1007/JHEP05\(2023\)233](https://doi.org/10.1007/JHEP05(2023)233), arXiv:[2204.12945](https://arxiv.org/abs/2204.12945) [hep-ex]
- A. Tumasyan et al., **Observation of  $\tau$  lepton pair production in ultraperipheral lead-lead collisions at  $\sqrt{s_{NN}} = 5.02\text{ TeV}$** , *Phys. Rev. Lett.* 131 (2023) 151803, doi:[10.1103/PhysRevLett.131.151803](https://doi.org/10.1103/PhysRevLett.131.151803), arXiv:[2206.05192](https://arxiv.org/abs/2206.05192) [nucl-ex]



- A. Tumasyan et al., **CMS pythia 8 colour reconnection tunes based on underlying-event data**, *Eur. Phys. J. C.* 83 (2023) 587, doi:[10.1140/epjc/s10052-023-11630-8](https://doi.org/10.1140/epjc/s10052-023-11630-8), arXiv:[2205.02905](https://arxiv.org/abs/2205.02905) [hep-ex]
- A. Tumasyan et al., **Strange hadron collectivity in pPb and PbPb collisions**, *JHEP.* 05 (2023) 007, doi:[10.1007/JHEP05\(2023\)007](https://doi.org/10.1007/JHEP05(2023)007), arXiv:[2205.00080](https://arxiv.org/abs/2205.00080) [nucl-ex]
- A. Tumasyan et al., **Search for medium effects using jets from bottom quarks in PbPb collisions at sNN=5.02TeV**, *Phys. Lett. B.* 844 (2023) 137849, doi:[10.1016/j.physletb.2023.137849](https://doi.org/10.1016/j.physletb.2023.137849), arXiv:[2210.08547](https://arxiv.org/abs/2210.08547) [hep-ex]
- A. Tumasyan et al., **Search for a heavy composite Majorana neutrino in events with dilepton signatures from proton-proton collisions at s=13 TeV**, *Phys. Lett. B.* 843 (2023) 137803, doi:[10.1016/j.physletb.2023.137803](https://doi.org/10.1016/j.physletb.2023.137803), arXiv:[2210.03082](https://arxiv.org/abs/2210.03082) [hep-ex]
- A. Tumasyan et al., **Search for pair-produced vector-like leptons in final states with third-generation leptons and at least three b quark jets in proton-proton collisions at s=13TeV**, *Phys. Lett. B.* 846 (2023) 137713, doi:[10.1016/j.physletb.2023.137713](https://doi.org/10.1016/j.physletb.2023.137713), arXiv:[2208.09700](https://arxiv.org/abs/2208.09700) [hep-ex]
- A. Tumasyan et al., **Search for CP violation in ttH and tH production in multilepton channels in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 092, doi:[10.1007/JHEP07\(2023\)092](https://doi.org/10.1007/JHEP07(2023)092), arXiv:[2208.02686](https://arxiv.org/abs/2208.02686) [hep-ex]
- A. Tumasyan et al., **Search for high-mass exclusive  $\gamma\gamma \rightarrow WW$  and  $\gamma\gamma \rightarrow ZZ$  production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 229, doi:[10.1007/JHEP07\(2023\)229](https://doi.org/10.1007/JHEP07(2023)229), arXiv:[2211.16320](https://arxiv.org/abs/2211.16320) [hep-ex]
- A. Tumasyan et al., **Two-particle azimuthal correlations in  $\gamma p$  interactions using pPb collisions at sNN=8.16TeV**, *Phys. Lett. B.* 844 (2023) 137905, doi:[10.1016/j.physletb.2023.137905](https://doi.org/10.1016/j.physletb.2023.137905), arXiv:[2204.13486](https://arxiv.org/abs/2204.13486) [nucl-ex]
- A. Tumasyan et al., **Measurements of jet multiplicity and jet transverse momentum in multijet events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 83 (2023) 742, doi:[10.1140/epjc/s10052-023-11753-y](https://doi.org/10.1140/epjc/s10052-023-11753-y), arXiv:[2210.13557](https://arxiv.org/abs/2210.13557) [hep-ex]
- A. Tumasyan et al., **Measurement of the top quark pole mass using  $t\bar{t}$ +jet events in the dilepton final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 077, doi:[10.1007/JHEP07\(2023\)077](https://doi.org/10.1007/JHEP07(2023)077), arXiv:[2207.02270](https://arxiv.org/abs/2207.02270) [hep-ex]
- A. Tumasyan et al., **Precision measurement of the Z boson invisible width in pp collisions at s=13 TeV**, *Phys. Lett. B.* 842 (2023) 137563, doi:[10.1016/j.physletb.2022.137563](https://doi.org/10.1016/j.physletb.2022.137563), arXiv:[2206.07110](https://arxiv.org/abs/2206.07110) [hep-ex]
- A. Tumasyan et al., **Search for narrow resonances in the b-tagged dijet mass spectrum in proton-proton collisions at s=13 TeV**, *Phys. Rev. D.* 108 (2023) 012009, doi:[10.1103/PhysRevD.108.012009](https://doi.org/10.1103/PhysRevD.108.012009), arXiv:[2205.01835](https://arxiv.org/abs/2205.01835) [hep-ex]
- A. Tumasyan et al., **Search for pair production of vector-like quarks in leptonic final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 020, doi:[10.1007/JHEP07\(2023\)020](https://doi.org/10.1007/JHEP07(2023)020), arXiv:[2209.07327](https://arxiv.org/abs/2209.07327) [hep-ex]
- A. Tumasyan et al., **Search for Higgs boson decays into Z and J/ $\psi$  and for Higgs and Z boson decays into J/ $\psi$  or Y pairs in pp collisions at s=13 TeV**, *Phys. Lett. B.* 842 (2023) 137534, doi:[10.1016/j.physletb.2022.137534](https://doi.org/10.1016/j.physletb.2022.137534), arXiv:[2206.03525](https://arxiv.org/abs/2206.03525) [hep-ex]
- A. Tumasyan et al., **Search for heavy resonances and quantum black holes in  $e\mu$ ,  $e\tau$ , and  $\mu\tau$  final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2023) 227, doi:[10.1007/JHEP05\(2023\)227](https://doi.org/10.1007/JHEP05(2023)227), arXiv:[2205.06709](https://arxiv.org/abs/2205.06709) [hep-ex]
- A. Tumasyan et al., **Search for Higgs Boson and Observation of Z Boson through their Decay into a Charm Quark-Antiquark Pair in Boosted Topologies in Proton-Proton Collisions at s=13 TeV**, *Phys. Rev. Lett.* 131 (2023) 041801, doi:[10.1103/PhysRevLett.131.041801](https://doi.org/10.1103/PhysRevLett.131.041801), arXiv:[2211.14181](https://arxiv.org/abs/2211.14181) [hep-ex]
- A. Tumasyan et al., **Search for exotic Higgs boson decays  $H \rightarrow \mathcal{A}\mathcal{A} \rightarrow 4\gamma$  with events containing two merged diphotons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 131 (2023) 101801, doi:[10.1103/PhysRevLett.131.101801](https://doi.org/10.1103/PhysRevLett.131.101801), arXiv:[2209.06197](https://arxiv.org/abs/2209.06197) [hep-ex]
- A. Tumasyan et al., **Measurement of the tt charge asymmetry in events with highly Lorentz-boosted top quarks in pp collisions at s=13 TeV**, *Phys. Lett. B.* 846 (2023) 137703, doi:[10.1016/j.physletb.2023.137703](https://doi.org/10.1016/j.physletb.2023.137703), arXiv:[2208.02751](https://arxiv.org/abs/2208.02751) [hep-ex]
- A. Tumasyan et al., **Search for Nonresonant Pair Production of Highly Energetic Higgs Bosons Decaying to Bottom Quarks**, *Phys. Rev. Lett.* 131 (2023) 041803, doi:[10.1103/PhysRevLett.131.041803](https://doi.org/10.1103/PhysRevLett.131.041803), arXiv:[2205.06667](https://arxiv.org/abs/2205.06667) [hep-ex]
- A. Tumasyan et al., **Searches for additional Higgs bosons and for vector leptoquarks in  $\tau\tau$  final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 073, doi:[10.1007/JHEP07\(2023\)073](https://doi.org/10.1007/JHEP07(2023)073), arXiv:[2208.02717](https://arxiv.org/abs/2208.02717) [hep-ex]

- A. Tumasyan et al., **Search for nonresonant Higgs boson pair production in final state with two bottom quarks and two tau leptons in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B.* 842 (2023) 137531, doi:[10.1016/j.physletb.2022.137531](https://doi.org/10.1016/j.physletb.2022.137531), arXiv:[2206.09401](https://arxiv.org/abs/2206.09401) [hep-ex]
- A. Tumasyan et al., **Search for new physics using effective field theory in 13 TeV pp collision events that contain a top quark pair and a boosted Z or Higgs boson**, *Phys. Rev. D.* 108 (2023) 032008, doi:[10.1103/PhysRevD.108.032008](https://doi.org/10.1103/PhysRevD.108.032008), arXiv:[2208.12837](https://arxiv.org/abs/2208.12837) [hep-ex]
- A. Tumasyan et al., **Proton reconstruction with the CMS-TOTEM Precision Proton Spectrometer**, *JINST.* 18 (2023) P09009, doi:[10.1088/1748-0221/18/09/P09009](https://doi.org/10.1088/1748-0221/18/09/P09009), arXiv:[2210.05854](https://arxiv.org/abs/2210.05854) [hep-ex]
- A. Tumasyan et al., **Probing Heavy Majorana Neutrinos and the Weinberg Operator through Vector Boson Fusion Processes in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 131 (2023) 011803, doi:[10.1103/PhysRevLett.131.011803](https://doi.org/10.1103/PhysRevLett.131.011803), arXiv:[2206.08956](https://arxiv.org/abs/2206.08956) [hep-ex]
- A. Tumasyan et al., **Search for supersymmetry in final states with a single electron or muon using angular correlations and heavy-object identification in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2023) 149, doi:[10.1007/JHEP09\(2023\)149](https://doi.org/10.1007/JHEP09(2023)149), arXiv:[2211.08476](https://arxiv.org/abs/2211.08476) [hep-ex]
- A. Tumasyan et al., **Measurement of differential cross sections for the production of a Z boson in association with jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 108 (2023) 052004, doi:[10.1103/PhysRevD.108.052004](https://doi.org/10.1103/PhysRevD.108.052004), arXiv:[2205.02872](https://arxiv.org/abs/2205.02872) [hep-ex]
- A. Tumasyan et al., **Search for a charged Higgs boson decaying into a heavy neutral Higgs boson and a W boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2023) 032, doi:[10.1007/JHEP09\(2023\)032](https://doi.org/10.1007/JHEP09(2023)032), arXiv:[2207.01046](https://arxiv.org/abs/2207.01046) [hep-ex]
- A. Tumasyan et al., **Measurements of Higgs boson production in the decay channel with a pair of  $\tau$  leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 83 (2023) 562, doi:[10.1140/epjc/s10052-023-11452-8](https://doi.org/10.1140/epjc/s10052-023-11452-8), arXiv:[2204.12957](https://arxiv.org/abs/2204.12957) [hep-ex]
- A. Tumasyan et al., **Search for Higgs boson pairs decaying to  $WW^*WW^*$ ,  $WW^*\tau\tau$ , and  $\tau\tau\tau\tau$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 095, doi:[10.1007/JHEP07\(2023\)095](https://doi.org/10.1007/JHEP07(2023)095), arXiv:[2206.10268](https://arxiv.org/abs/2206.10268) [hep-ex]
- A. Tumasyan et al., **Measurement of the differential  $t\bar{t}$  production cross section as a function of the jet mass and extraction of the top quark mass in hadronic decays of boosted top quarks**, *Eur. Phys. J. C.* 83 (2023) 560, doi:[10.1140/epjc/s10052-023-11587-8](https://doi.org/10.1140/epjc/s10052-023-11587-8), arXiv:[2211.01456](https://arxiv.org/abs/2211.01456) [hep-ex]
- A. Tumasyan et al., **Azimuthal Correlations within Exclusive Dijets with Large Momentum Transfer in Photon-Lead Collisions**, *Phys. Rev. Lett.* 131 (2023) 051901, doi:[10.1103/PhysRevLett.131.051901](https://doi.org/10.1103/PhysRevLett.131.051901), arXiv:[2205.00045](https://arxiv.org/abs/2205.00045) [nucl-ex]
- A. Tumasyan et al., **Measurement of the  $B^0 \rightarrow \mu^+ \mu^-$  decay properties and search for the  $B^0 \rightarrow \mu^+ \mu^-$  decay in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 842 (2023) 137955, doi:[10.1016/j.physletb.2023.137955](https://doi.org/10.1016/j.physletb.2023.137955), arXiv:[2212.10311](https://arxiv.org/abs/2212.10311) [hep-ex]
- A. Tumasyan et al., **Search for new physics in the  $\tau$  lepton plus missing transverse momentum final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2023) 051, doi:[10.1007/JHEP09\(2023\)051](https://doi.org/10.1007/JHEP09(2023)051), arXiv:[2212.12604](https://arxiv.org/abs/2212.12604) [hep-ex]
- A. Tumasyan et al., **Azimuthal anisotropy of dijet events in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 07 (2023) 139, doi:[10.1007/JHEP07\(2023\)139](https://doi.org/10.1007/JHEP07(2023)139), arXiv:[2210.08325](https://arxiv.org/abs/2210.08325) [hep-ex]
- A. Tumasyan et al., **Search for nonresonant Higgs boson pair production in the four leptons plus two b jets final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2023) 130, doi:[10.1007/JHEP06\(2023\)130](https://doi.org/10.1007/JHEP06(2023)130), arXiv:[2206.10657](https://arxiv.org/abs/2206.10657) [hep-ex]
- A. Tumasyan et al., **Observation of same-sign WW production from double parton scattering in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 131 (2023) 091803, doi:[10.1103/PhysRevLett.131.091803](https://doi.org/10.1103/PhysRevLett.131.091803), arXiv:[2206.02681](https://arxiv.org/abs/2206.02681) [hep-ex]
- A. Tumasyan et al., **Search for new heavy resonances decaying to WW, WZ, ZZ, WH, or ZH boson pairs in the all-jets final state in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B.* 844 (2023) 137813, doi:[10.1016/j.physletb.2023.137813](https://doi.org/10.1016/j.physletb.2023.137813), arXiv:[2210.00043](https://arxiv.org/abs/2210.00043) [hep-ex]
- A. Tumasyan et al., **Search for Higgs Boson Decay to a Charm Quark-Antiquark Pair in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 131 (2023) 061801, doi:[10.1103/PhysRevLett.131.061801](https://doi.org/10.1103/PhysRevLett.131.061801), arXiv:[2205.05550](https://arxiv.org/abs/2205.05550) [hep-ex]

- A. Tumasyan et al., **Search for long-lived particles decaying to a pair of muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 05 (2023) 228, doi:[10.1007/JHEP05\(2023\)228](https://doi.org/10.1007/JHEP05(2023)228), arXiv:[2205.08582](https://arxiv.org/abs/2205.08582) [hep-ex]
- A. Tumasyan et al., **Search for CP violating top quark couplings in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 023, doi:[10.1007/JHEP07\(2023\)023](https://doi.org/10.1007/JHEP07(2023)023), arXiv:[2205.07434](https://arxiv.org/abs/2205.07434) [hep-ex]
- A. Tumasyan et al., **Search for electroweak production of charginos and neutralinos at  $s=13\text{TeV}$  in final states containing hadronic decays of WW, WZ, or WH and missing transverse momentum**, *Phys. Lett. B*. 842 (2023) 137460, doi:[10.1016/j.physletb.2022.137460](https://doi.org/10.1016/j.physletb.2022.137460), arXiv:[2205.09597](https://arxiv.org/abs/2205.09597) [hep-ex]
- A. Tumasyan et al., **Search for light Higgs bosons from supersymmetric cascade decays in pp collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 83 (2023) 571, doi:[10.1140/epjc/s10052-023-11581-0](https://doi.org/10.1140/epjc/s10052-023-11581-0), arXiv:[2204.13532](https://arxiv.org/abs/2204.13532) [hep-ex]
- A. Tumasyan et al., **Search for a massive scalar resonance decaying to a light scalar and a Higgs boson in the four b quarks final state with boosted topology**, *Phys. Lett. B*. 842 (2023) 137392, doi:[10.1016/j.physletb.2022.137392](https://doi.org/10.1016/j.physletb.2022.137392), arXiv:[2204.12413](https://arxiv.org/abs/2204.12413) [hep-ex]
- A. Tumasyan et al., **Search for direct pair production of supersymmetric partners of  $\tau$  leptons in the final state with two hadronically decaying  $\tau$  leptons and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 108 (2023) 012011, doi:[10.1103/PhysRevD.108.012011](https://doi.org/10.1103/PhysRevD.108.012011), arXiv:[2207.02254](https://arxiv.org/abs/2207.02254) [hep-ex]
- A. Tumasyan et al., **Measurement of the cross section of top quark-antiquark pair production in association with a W boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 219, doi:[10.1007/JHEP07\(2023\)219](https://doi.org/10.1007/JHEP07(2023)219), arXiv:[2208.06485](https://arxiv.org/abs/2208.06485) [hep-ex]
- A. Tumasyan et al., **Measurement of the mass dependence of the transverse momentum of lepton pairs in Drell-Yan production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 83 (2023) 628, doi:[10.1140/epjc/s10052-023-11631-7](https://doi.org/10.1140/epjc/s10052-023-11631-7), arXiv:[2205.04897](https://arxiv.org/abs/2205.04897) [hep-ex]
- A. Tumasyan et al., **Measurements of the Higgs boson production cross section and couplings in the W boson pair decay channel in proton-proton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C*. 83 (2023) 667, doi:[10.1140/epjc/s10052-023-11632-6](https://doi.org/10.1140/epjc/s10052-023-11632-6), arXiv:[2206.09466](https://arxiv.org/abs/2206.09466) [hep-ex]
- A. Tumasyan et al., **Constraints on anomalous Higgs boson couplings to vector bosons and fermions from the production of Higgs bosons using the  $\tau\tau$  final state**, *Phys. Rev. D*. 108 (2023) 032013, doi:[10.1103/PhysRevD.108.032013](https://doi.org/10.1103/PhysRevD.108.032013), arXiv:[2205.05120](https://arxiv.org/abs/2205.05120) [hep-ex]
- A. Tumasyan et al., **Search for the Higgs boson decay to a pair of electrons in proton-proton collisions at  $s=13\text{TeV}$** , *Phys. Lett. B*. 846 (2023) 137783, doi:[10.1016/j.physletb.2023.137783](https://doi.org/10.1016/j.physletb.2023.137783), arXiv:[2208.00265](https://arxiv.org/abs/2208.00265) [hep-ex]
- A. Tumasyan et al., **Search for resonant and nonresonant production of pairs of dijet resonances in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 161, doi:[10.1007/JHEP07\(2023\)161](https://doi.org/10.1007/JHEP07(2023)161), arXiv:[2206.09997](https://arxiv.org/abs/2206.09997) [hep-ex]
- A. Tumasyan et al., **Azimuthal correlations in Z +jets events in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C*. 83 (2023) 722, doi:[10.1140/epjc/s10052-023-11833-z](https://doi.org/10.1140/epjc/s10052-023-11833-z), arXiv:[2210.16139](https://arxiv.org/abs/2210.16139) [hep-ex]
- A. Tumasyan et al., **Search for CP violation using  $t\bar{t}$  events in the lepton+jets channel in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2023) 081, doi:[10.1007/JHEP06\(2023\)081](https://doi.org/10.1007/JHEP06(2023)081), arXiv:[2205.02314](https://arxiv.org/abs/2205.02314) [hep-ex]
- A. Tumasyan et al., **Search for long-lived particles using out-of-time trackless jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 210, doi:[10.1007/JHEP07\(2023\)210](https://doi.org/10.1007/JHEP07(2023)210), arXiv:[2212.06695](https://arxiv.org/abs/2212.06695) [hep-ex]
- A. Tumasyan et al., **Reconstruction of decays to merged photons using end-to-end deep learning with domain continuation in the CMS detector**, *Phys. Rev. D*. 108 (2023) 052002, doi:[10.1103/PhysRevD.108.052002](https://doi.org/10.1103/PhysRevD.108.052002), arXiv:[2204.12313](https://arxiv.org/abs/2204.12313) [hep-ex]
- A. Tumasyan et al., **Measurement of the dependence of the hadron production fraction ratio  $f_s/f_u$  and  $f_d/f_u$  on B meson kinematic variables in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 131 (2023) 121901, doi:[10.1103/PhysRevLett.131.121901](https://doi.org/10.1103/PhysRevLett.131.121901), arXiv:[2212.02309](https://arxiv.org/abs/2212.02309) [hep-ex]
- A. Tumasyan et al., **Observation of electroweak  $W+W-$  pair production in association with two jets in proton-proton collisions at  $s=13\text{TeV}$** , *Phys. Lett. B*. 841 (2023) 137495, doi:[10.1016/j.physletb.2022.137495](https://doi.org/10.1016/j.physletb.2022.137495), arXiv:[2205.05711](https://arxiv.org/abs/2205.05711) [hep-ex]
- A. Tumasyan et al., **Measurement of the Higgs boson inclusive and differential fiducial production cross sections in the diphoton decay channel with pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 091, doi:[10.1007/JHEP07\(2023\)091](https://doi.org/10.1007/JHEP07(2023)091), arXiv:[2208.12279](https://arxiv.org/abs/2208.12279) [hep-ex]

- A. Tumasyan et al., **Search for the exotic decay of the Higgs boson into two light pseudoscalars with four photons in the final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 148, doi:[10.1007/JHEP07\(2023\)148](https://doi.org/10.1007/JHEP07(2023)148), arXiv:[2208.01469](https://arxiv.org/abs/2208.01469) [hep-ex]
- A. Tumasyan et al., **Measurement of the electroweak production of  $W \gamma$  in association with two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 108 (2023) 032017, doi:[10.1103/PhysRevD.108.032017](https://doi.org/10.1103/PhysRevD.108.032017), arXiv:[2212.12592](https://arxiv.org/abs/2212.12592) [hep-ex]
- A. Tumasyan et al., **Measurement of inclusive and differential cross sections for single top quark production in association with a W boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2023) 046, doi:[10.1007/JHEP07\(2023\)046](https://doi.org/10.1007/JHEP07(2023)046), arXiv:[2208.00924](https://arxiv.org/abs/2208.00924) [hep-ex]
- A. Tumasyan et al., **Search for a vector-like quark  $T' \rightarrow tH$  via the diphoton decay mode of the Higgs boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 09 (2023) 057, doi:[10.1007/JHEP09\(2023\)057](https://doi.org/10.1007/JHEP09(2023)057), arXiv:[2302.12802](https://arxiv.org/abs/2302.12802) [hep-ex]
- A. Hayrapetyan et al., **Search for a high-mass dimuon resonance produced in association with b quark jets at  $\sqrt{s} = 13$  TeV**, *JHEP*. 10 (2023) 043, doi:[10.1007/JHEP10\(2023\)043](https://doi.org/10.1007/JHEP10(2023)043), arXiv:[2307.08708](https://arxiv.org/abs/2307.08708) [hep-ex]
- A. Tumasyan et al., **Measurement of the top quark mass using a profile likelihood approach with the lepton + jets final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 83 (2023) 963, doi:[10.1140/epjc/s10052-023-12050-4](https://doi.org/10.1140/epjc/s10052-023-12050-4), arXiv:[2302.01967](https://arxiv.org/abs/2302.01967) [hep-ex]
- A. Hayrapetyan et al., **Observation of four top quark production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 847 (2023) 138290, doi:[10.1016/j.physletb.2023.138290](https://doi.org/10.1016/j.physletb.2023.138290), arXiv:[2305.13439](https://arxiv.org/abs/2305.13439) [hep-ex]
- A. Hayrapetyan et al., **Measurements of inclusive and differential cross sections for the Higgs boson production and decay to four-leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 08 (2023) 040, doi:[10.1007/JHEP08\(2023\)040](https://doi.org/10.1007/JHEP08(2023)040), arXiv:[2305.07532](https://arxiv.org/abs/2305.07532) [hep-ex]
- A. Hayrapetyan et al., **Search for direct production of GeV-scale resonances decaying to a pair of muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 12 (2023) 070, doi:[10.1007/JHEP12\(2023\)070](https://doi.org/10.1007/JHEP12(2023)070), arXiv:[2309.16003](https://arxiv.org/abs/2309.16003) [hep-ex]
- A. Tumasyan et al., **Search for top squarks in the four-body decay mode with single lepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2023) 060, doi:[10.1007/JHEP06\(2023\)060](https://doi.org/10.1007/JHEP06(2023)060), arXiv:[2301.08096](https://arxiv.org/abs/2301.08096) [hep-ex]
- A. Tumasyan et al., **First Measurement of the Forward Rapidity Gap Distribution in pPb Collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *Phys. Rev. D*. 108 (2023) 092004, doi:[10.1103/PhysRevD.108.092004](https://doi.org/10.1103/PhysRevD.108.092004), arXiv:[2301.07630](https://arxiv.org/abs/2301.07630) [hep-ex]
- A. Tumasyan et al., **Performance of the local reconstruction algorithms for the CMS hadron calorimeter with Run 2 data**, *JINST*. 18 (2023) P11017, doi:[10.1088/1748-0221/18/11/P11017](https://doi.org/10.1088/1748-0221/18/11/P11017), arXiv:[2306.10355](https://arxiv.org/abs/2306.10355) [hep-ex]
- A. Tumasyan et al., **Measurements of the azimuthal anisotropy of prompt and nonprompt charmonia in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP*. 10 (2023) 115, doi:[10.1007/JHEP10\(2023\)115](https://doi.org/10.1007/JHEP10(2023)115), arXiv:[2305.16928](https://arxiv.org/abs/2305.16928) [hep-ex]
- A. Tumasyan et al., **Search for  $Z'$  bosons decaying to pairs of heavy Majorana neutrinos in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 11 (2023) 181, doi:[10.1007/JHEP11\(2023\)181](https://doi.org/10.1007/JHEP11(2023)181), arXiv:[2307.06959](https://arxiv.org/abs/2307.06959) [hep-ex]
- A. Hayrapetyan et al., **Search for the lepton-flavor violating decay of the Higgs boson and additional Higgs bosons in the  $e \mu$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 108 (2023) 072004, doi:[10.1103/PhysRevD.108.072004](https://doi.org/10.1103/PhysRevD.108.072004), arXiv:[2305.18106](https://arxiv.org/abs/2305.18106) [hep-ex]
- A. Tumasyan et al., **First measurement of the top quark pair production cross section in proton-proton collisions at  $\sqrt{s} = 13.6$  TeV**, *JHEP*. 08 (2023) 204, doi:[10.1007/JHEP08\(2023\)204](https://doi.org/10.1007/JHEP08(2023)204), arXiv:[2303.10680](https://arxiv.org/abs/2303.10680) [hep-ex]
- A. Tumasyan et al., **A search for new physics in central exclusive production using the missing mass technique with the CMS detector and the CMS-TOTEM precision proton spectrometer**, *Eur. Phys. J. C*. 83 (2023) 827, doi:[10.1140/epjc/s10052-023-11687-5](https://doi.org/10.1140/epjc/s10052-023-11687-5), arXiv:[2303.04596](https://arxiv.org/abs/2303.04596) [hep-ex]
- A. Tumasyan et al., **A search for decays of the Higgs boson to invisible particles in events with a top-antitop quark pair or a vector boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 83 (2023) 933, doi:[10.1140/epjc/s10052-023-11952-7](https://doi.org/10.1140/epjc/s10052-023-11952-7), arXiv:[2303.01214](https://arxiv.org/abs/2303.01214) [hep-ex]
- A. Tumasyan et al., **Probing Small Bjorken-x Nuclear Gluonic Structure via Coherent  $J/\psi$  Photoproduction in Ultraperipheral Pb-Pb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.*. 131 (2023) 262301, doi:[10.1103/PhysRevLett.131.262301](https://doi.org/10.1103/PhysRevLett.131.262301), arXiv:[2303.16984](https://arxiv.org/abs/2303.16984) [nucl-ex]



- A. Hayrapetyan et al., **Observation of the rare decay of the  $\eta$  meson to four muons**, *Phys. Rev. Lett.* 131 (2023) 091903, doi:[10.1103/PhysRevLett.131.091903](https://doi.org/10.1103/PhysRevLett.131.091903), arXiv:[2305.04904](https://arxiv.org/abs/2305.04904) [hep-ex]
- A. Tumasyan et al., **Search for resonances in events with photon and jet final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2023) 189, doi:[10.1007/JHEP12\(2023\)189](https://doi.org/10.1007/JHEP12(2023)189), arXiv:[2305.07998](https://arxiv.org/abs/2305.07998) [hep-ex]
- A. Hayrapetyan et al., **Search for new physics in multijet events with at least one photon and large missing transverse momentum in proton-proton collisions at 13 TeV**, *JHEP.* 10 (2023) 046, doi:[10.1007/JHEP10\(2023\)046](https://doi.org/10.1007/JHEP10(2023)046), arXiv:[2307.16216](https://arxiv.org/abs/2307.16216) [hep-ex]
- A. Hayrapetyan et al., **Search for physics beyond the standard model in top quark production with additional leptons in the context of effective field theory**, *JHEP.* 12 (2023) 068, doi:[10.1007/JHEP12\(2023\)068](https://doi.org/10.1007/JHEP12(2023)068), arXiv:[2307.15761](https://arxiv.org/abs/2307.15761) [hep-ex]
- A. Tumasyan et al., **Search for top squark pair production in a final state with at least one hadronically decaying tau lepton in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2023) 110, doi:[10.1007/JHEP07\(2023\)110](https://doi.org/10.1007/JHEP07(2023)110), arXiv:[2304.07174](https://arxiv.org/abs/2304.07174) [hep-ex]
- A. Tumasyan et al., **Evidence for Four-Top Quark Production in Proton-Proton Collisions at  $s=13\text{TeV}$** , *Phys. Lett. B.* 844 (2023) 138076, doi:[10.1016/j.physletb.2023.138076](https://doi.org/10.1016/j.physletb.2023.138076), arXiv:[2303.03864](https://arxiv.org/abs/2303.03864) [hep-ex]
- A. Tumasyan et al., **Search for electroweak production of charginos and neutralinos in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2022) 147, doi:[10.1007/JHEP04\(2022\)147](https://doi.org/10.1007/JHEP04(2022)147), arXiv:[2106.14246](https://arxiv.org/abs/2106.14246) [hep-ex]
- A. Tumasyan et al., **Measurement of  $W^{\pm}\gamma$  differential cross sections in proton-proton collisions at  $\sqrt{s} = 13$  TeV and effective field theory constraints**, *Phys. Rev. D.* 105 (2022) 052003, doi:[10.1103/PhysRevD.105.052003](https://doi.org/10.1103/PhysRevD.105.052003), arXiv:[2111.13948](https://arxiv.org/abs/2111.13948) [hep-ex]
- A. Tumasyan et al., **Search for a right-handed W boson and a heavy neutrino in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2022) 047, doi:[10.1007/JHEP04\(2022\)047](https://doi.org/10.1007/JHEP04(2022)047), arXiv:[2112.03949](https://arxiv.org/abs/2112.03949) [hep-ex]
- A. Tumasyan et al., **Search for resonant production of strongly coupled dark matter in proton-proton collisions at 13 TeV**, *JHEP.* 06 (2022) 156, doi:[10.1007/JHEP06\(2022\)156](https://doi.org/10.1007/JHEP06(2022)156), arXiv:[2112.11125](https://arxiv.org/abs/2112.11125) [hep-ex]
- A. Tumasyan et al., **Search for supersymmetry in final states with two or three soft leptons and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2022) 091, doi:[10.1007/JHEP04\(2022\)091](https://doi.org/10.1007/JHEP04(2022)091), arXiv:[2111.06296](https://arxiv.org/abs/2111.06296) [hep-ex]
- A. Tumasyan et al., **Search for flavor-changing neutral current interactions of the top quark and the Higgs boson decaying to a bottom quark-antiquark pair at  $\sqrt{s} = 13$  TeV**, *JHEP.* 02 (2022) 169, doi:[10.1007/JHEP02\(2022\)169](https://doi.org/10.1007/JHEP02(2022)169), arXiv:[2112.09734](https://arxiv.org/abs/2112.09734) [hep-ex]
- A. Tumasyan et al., **Measurement of the inclusive  $t\bar{t}$  production cross section in proton-proton collisions at  $\sqrt{s} = 5.02$  TeV**, *JHEP.* 04 (2022) 144, doi:[10.1007/JHEP04\(2022\)144](https://doi.org/10.1007/JHEP04(2022)144), arXiv:[2112.09114](https://arxiv.org/abs/2112.09114) [hep-ex]
- A. Tumasyan et al., **Measurement of the inclusive and differential Higgs boson production cross sections in the decay mode to a pair of  $\tau$  leptons in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 128 (2022) 081805, doi:[10.1103/PhysRevLett.128.081805](https://doi.org/10.1103/PhysRevLett.128.081805), arXiv:[2107.11486](https://arxiv.org/abs/2107.11486) [hep-ex]
- A. Tumasyan et al., **Search for Flavor-Changing Neutral Current Interactions of the Top Quark and Higgs Boson in Final States with Two Photons in Proton-Proton Collisions at  $\sqrt{s} = 13\text{TeV}$** , *Phys. Rev. Lett.* 129 (2022) 032001, doi:[10.1103/PhysRevLett.129.032001](https://doi.org/10.1103/PhysRevLett.129.032001), arXiv:[2111.02219](https://arxiv.org/abs/2111.02219) [hep-ex]
- A. Tumasyan et al., **Measurement of the inclusive and differential WZ production cross sections, polarization angles, and triple gauge couplings in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2022) 032, doi:[10.1007/JHEP07\(2022\)032](https://doi.org/10.1007/JHEP07(2022)032), arXiv:[2110.11231](https://arxiv.org/abs/2110.11231) [hep-ex]
- A. Tumasyan et al., **Strategies and performance of the CMS silicon tracker alignment during LHC Run 2**, *Nucl. Instrum. Meth. A.* 1037 (2022) 166795, doi:[10.1016/j.nima.2022.166795](https://doi.org/10.1016/j.nima.2022.166795), arXiv:[2111.08757](https://arxiv.org/abs/2111.08757) [physics.ins-det]
- A. Tumasyan et al., **Search for heavy resonances decaying to  $Z(\nu\bar{\nu})V(q\bar{q}')$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 106 (2022) 012004, doi:[10.1103/PhysRevD.106.012004](https://doi.org/10.1103/PhysRevD.106.012004), arXiv:[2109.08268](https://arxiv.org/abs/2109.08268) [hep-ex]
- A. Tumasyan et al., **Study of quark and gluon jet substructure in Z+jet and dijet events from pp collisions**, *JHEP.* 01 (2022) 188, doi:[10.1007/JHEP01\(2022\)188](https://doi.org/10.1007/JHEP01(2022)188), arXiv:[2109.03340](https://arxiv.org/abs/2109.03340) [hep-ex]

- A. Tumasyan et al., **Search for long-lived particles decaying to leptons with large impact parameter in proton-proton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 82 (2022) 153, doi:[10.1140/epjc/s10052-022-10027-3](https://doi.org/10.1140/epjc/s10052-022-10027-3), arXiv:[2110.04809](https://arxiv.org/abs/2110.04809) [hep-ex]
- A. Tumasyan et al., **Search for heavy resonances decaying to WW, WZ, or WH boson pairs in the lepton plus merged jet final state in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *Phys. Rev. D.* 105 (2022) 032008, doi:[10.1103/PhysRevD.105.032008](https://doi.org/10.1103/PhysRevD.105.032008), arXiv:[2109.06055](https://arxiv.org/abs/2109.06055) [hep-ex]
- A. Tumasyan et al., **Measurement of double-parton scattering in inclusive production of four jets with low transverse momentum in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 01 (2022) 177, doi:[10.1007/JHEP01\(2022\)177](https://doi.org/10.1007/JHEP01(2022)177), arXiv:[2109.13822](https://arxiv.org/abs/2109.13822) [hep-ex]
- A. Tumasyan et al., **Study of dijet events with large rapidity separation in proton-proton collisions at  $\sqrt{s} = 2.76\text{ TeV}$** , *JHEP.* 03 (2022) 189, doi:[10.1007/JHEP03\(2022\)189](https://doi.org/10.1007/JHEP03(2022)189), arXiv:[2111.04605](https://arxiv.org/abs/2111.04605) [hep-ex]
- A. Tumasyan et al., **Search for resonances decaying to three W bosons in the hadronic final state in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *Phys. Rev. D.* 106 (2022) 012002, doi:[10.1103/PhysRevD.106.012002](https://doi.org/10.1103/PhysRevD.106.012002), arXiv:[2112.13090](https://arxiv.org/abs/2112.13090) [hep-ex]
- A. Tumasyan et al., **Search for a heavy resonance decaying into a top quark and a W boson in the lepton+jets final state at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 04 (2022) 048, doi:[10.1007/JHEP04\(2022\)048](https://doi.org/10.1007/JHEP04(2022)048), arXiv:[2111.10216](https://arxiv.org/abs/2111.10216) [hep-ex]
- A. Tumasyan et al., **Observation of Bs0 mesons and measurement of the Bs0/B+ yield ratio in PbPb collisions at Image 1 TeV**, *Phys. Lett. B.* 829 (2022) 137062, doi:[10.1016/j.physletb.2022.137062](https://doi.org/10.1016/j.physletb.2022.137062), arXiv:[2109.01908](https://arxiv.org/abs/2109.01908) [hep-ex]
- A.M. Sirunyan et al., **Using Z Boson Events to Study Parton-Medium Interactions in Pb-Pb Collisions**, *Phys. Rev. Lett.* 128 (2022) 122301, doi:[10.1103/PhysRevLett.128.122301](https://doi.org/10.1103/PhysRevLett.128.122301), arXiv:[2103.04377](https://arxiv.org/abs/2103.04377) [hep-ex]
- A. Tumasyan et al., **Measurements of the associated production of a W boson and a charm quark in protonproton collisions at  $\sqrt{s} = 8\text{TeV}$** , *Eur. Phys. J. C.* 82 (2022) 1094, doi:[10.1140/epjc/s10052-022-10897-7](https://doi.org/10.1140/epjc/s10052-022-10897-7), arXiv:[2112.00895](https://arxiv.org/abs/2112.00895) [hep-ex]
- A. Tumasyan et al., **Measurement of the production cross section for Z+b jets in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *Phys. Rev. D.* 105 (2022) 092014, doi:[10.1103/PhysRevD.105.092014](https://doi.org/10.1103/PhysRevD.105.092014), arXiv:[2112.09659](https://arxiv.org/abs/2112.09659) [hep-ex]
- A. Tumasyan et al., **Search for low-mass dilepton resonances in Higgs boson decays to four-lepton final states in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 82 (2022) 290, doi:[10.1140/epjc/s10052-022-10127-0](https://doi.org/10.1140/epjc/s10052-022-10127-0), arXiv:[2111.01299](https://arxiv.org/abs/2111.01299) [hep-ex]
- A. Tumasyan et al., **Fragmentation of jets containing a prompt J / $\psi$  meson in PbPb and pp collisions at  $\sqrt{s_{NN}} = 5.02\text{ TeV}$** , *Phys. Lett. B.* 825 (2022) 136842, doi:[10.1016/j.physletb.2021.136842](https://doi.org/10.1016/j.physletb.2021.136842), arXiv:[2106.13235](https://arxiv.org/abs/2106.13235) [hep-ex]
- A. Tumasyan et al., **Probing Charm Quark Dynamics via Multiparticle Correlations in Pb-Pb Collisions at  $\sqrt{s_{NN}} = 5.02\text{ TeV}$** , *Phys. Rev. Lett.* 129 (2022) 022001, doi:[10.1103/PhysRevLett.129.022001](https://doi.org/10.1103/PhysRevLett.129.022001), arXiv:[2112.12236](https://arxiv.org/abs/2112.12236) [hep-ex]
- A. Tumasyan et al., **Evidence for WW/WZ vector boson scattering in the decay channel  $\ell\nu qq$  produced in association with two jets in proton-proton collisions at  $s=13\text{ TeV}$** , *Phys. Lett. B.* 834 (2022) 137438, doi:[10.1016/j.physletb.2022.137438](https://doi.org/10.1016/j.physletb.2022.137438), arXiv:[2112.05259](https://arxiv.org/abs/2112.05259) [hep-ex]
- A. Tumasyan et al., **Search for heavy resonances decaying to a pair of Lorentz-boosted Higgs bosons in final states with leptons and a bottom quark pair at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 05 (2022) 005, doi:[10.1007/JHEP05\(2022\)005](https://doi.org/10.1007/JHEP05(2022)005), arXiv:[2112.03161](https://arxiv.org/abs/2112.03161) [hep-ex]
- A. Tumasyan et al., **Search for strongly interacting massive particles generating trackless jets in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 82 (2022) 213, doi:[10.1140/epjc/s10052-022-10095-5](https://doi.org/10.1140/epjc/s10052-022-10095-5), arXiv:[2105.09178](https://arxiv.org/abs/2105.09178) [hep-ex]
- A. Tumasyan et al., **A new calibration method for charm jet identification validated with proton-proton collision events at  $\sqrt{s} = 13\text{ TeV}$** , *JINST.* 17 (2022) P03014, doi:[10.1088/1748-0221/17/03/P03014](https://doi.org/10.1088/1748-0221/17/03/P03014), arXiv:[2111.03027](https://arxiv.org/abs/2111.03027) [hep-ex]
- A. Tumasyan et al., **Search for long-lived particles decaying into muon pairs in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$  collected with a dedicated high-rate data stream**, *JHEP.* 04 (2022) 062, doi:[10.1007/JHEP04\(2022\)062](https://doi.org/10.1007/JHEP04(2022)062), arXiv:[2112.13769](https://arxiv.org/abs/2112.13769) [hep-ex]
- A. Tumasyan et al., **Analysis of the CP structure of the Yukawa coupling between the Higgs boson and  $\tau$  leptons in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 06 (2022) 012, doi:[10.1007/JHEP06\(2022\)012](https://doi.org/10.1007/JHEP06(2022)012), arXiv:[2110.04836](https://arxiv.org/abs/2110.04836) [hep-ex]

- A. Tumasyan et al., **Inclusive and differential cross section measurements of single top quark production in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 02 (2022) 107, doi:[10.1007/JHEP02\(2022\)107](https://doi.org/10.1007/JHEP02(2022)107), arXiv:[2111.02860](https://arxiv.org/abs/2111.02860) [hep-ex]
- A. Tumasyan et al., **Search for heavy resonances decaying to ZZ or ZW and axion-like particles mediating non-resonant ZZ or ZH production at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2022) 087, doi:[10.1007/JHEP04\(2022\)087](https://doi.org/10.1007/JHEP04(2022)087), arXiv:[2111.13669](https://arxiv.org/abs/2111.13669) [hep-ex]
- A. Tumasyan et al., **Search for long-lived particles produced in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2022) 160, doi:[10.1007/JHEP03\(2022\)160](https://doi.org/10.1007/JHEP03(2022)160), arXiv:[2110.13218](https://arxiv.org/abs/2110.13218) [hep-ex]
- A. Tumasyan et al., **Measurement and QCD analysis of double-differential inclusive jet cross sections in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 02 (2022) 142, doi:[10.1007/JHEP02\(2022\)142](https://doi.org/10.1007/JHEP02(2022)142), arXiv:[2111.10431](https://arxiv.org/abs/2111.10431) [hep-ex]
- A.M. Sirunyan et al., **Evidence for X(3872) in Pb-Pb Collisions and Studies of its Prompt Production at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Rev. Lett.* 128 (2022) 032001, doi:[10.1103/PhysRevLett.128.032001](https://doi.org/10.1103/PhysRevLett.128.032001), arXiv:[2102.13048](https://arxiv.org/abs/2102.13048) [hep-ex]
- A. Tumasyan et al., **Search for W  $\gamma$  resonances in proton-proton collisions at  $\sqrt{s} = 13$  TeV using hadronic decays of Lorentz-boosted W bosons**, *Phys. Lett. B*. 826 (2022) 136888, doi:[10.1016/j.physletb.2022.136888](https://doi.org/10.1016/j.physletb.2022.136888), arXiv:[2106.10509](https://arxiv.org/abs/2106.10509) [hep-ex]
- A. Tumasyan et al., **Observation of  $B^0 \rightarrow \psi(2S) K_S^0 \pi^+ \pi^-$  and  $B^0_S \rightarrow \psi(2S) K_S^0$  decays**, *Eur. Phys. J. C*. 82 (2022) 499, doi:[10.1140/epjc/s10052-022-10315-y](https://doi.org/10.1140/epjc/s10052-022-10315-y), arXiv:[2201.09131](https://arxiv.org/abs/2201.09131) [hep-ex]
- A. Tumasyan et al., **Search for Higgs Boson Pair Production in the Four b Quark Final State in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 129 (2022) 081802, doi:[10.1103/PhysRevLett.129.081802](https://doi.org/10.1103/PhysRevLett.129.081802), arXiv:[2202.09617](https://arxiv.org/abs/2202.09617) [hep-ex]
- A. Tumasyan et al., **A portrait of the Higgs boson by the CMS experiment ten years after the discovery.**, *Nature*. 607 (2022) 60–68, doi:[10.1038/s41586-022-04892-x](https://doi.org/10.1038/s41586-022-04892-x), arXiv:[2207.00043](https://arxiv.org/abs/2207.00043) [hep-ex]
- A. Tumasyan et al., **Search for long-lived heavy neutral leptons with displaced vertices in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *JHEP*. 07 (2022) 081, doi:[10.1007/JHEP07\(2022\)081](https://doi.org/10.1007/JHEP07(2022)081), arXiv:[2201.05578](https://arxiv.org/abs/2201.05578) [hep-ex]
- A. Tumasyan et al., **Search for new physics in the lepton plus missing transverse momentum final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2022) 067, doi:[10.1007/JHEP07\(2022\)067](https://doi.org/10.1007/JHEP07(2022)067), arXiv:[2202.06075](https://arxiv.org/abs/2202.06075) [hep-ex]
- A. Tumasyan et al., **Measurement of the Higgs boson width and evidence of its off-shell contributions to ZZ production**, *Nature Phys.* 18 (2022) 1329–1334, doi:[10.1038/s41567-022-01682-0](https://doi.org/10.1038/s41567-022-01682-0), arXiv:[2202.06923](https://arxiv.org/abs/2202.06923) [hep-ex]
- A. Tumasyan et al., **Measurement of the inclusive and differential  $t\bar{t}\gamma$  cross sections in the dilepton channel and effective field theory interpretation in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *JHEP*. 05 (2022) 091, doi:[10.1007/JHEP05\(2022\)091](https://doi.org/10.1007/JHEP05(2022)091), arXiv:[2201.07301](https://arxiv.org/abs/2201.07301) [hep-ex]
- A. Tumasyan et al., **Search for resonances decaying to three W bosons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 129 (2022) 021802, doi:[10.1103/PhysRevLett.129.021802](https://doi.org/10.1103/PhysRevLett.129.021802), arXiv:[2201.08476](https://arxiv.org/abs/2201.08476) [hep-ex]
- A. Tumasyan et al., **Precision measurement of the W boson decay branching fractions in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 105 (2022) 072008, doi:[10.1103/PhysRevD.105.072008](https://doi.org/10.1103/PhysRevD.105.072008), arXiv:[2201.07861](https://arxiv.org/abs/2201.07861) [hep-ex]
- A. Tumasyan et al., **Inclusive nonresonant multilepton probes of new phenomena at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D*. 105 (2022) 112007, doi:[10.1103/PhysRevD.105.112007](https://doi.org/10.1103/PhysRevD.105.112007), arXiv:[2202.08676](https://arxiv.org/abs/2202.08676) [hep-ex]
- A. Tumasyan et al., **Identification of hadronic tau lepton decays using a deep neural network**, *JINST*. 17 (2022) P07023, doi:[10.1088/1748-0221/17/07/P07023](https://doi.org/10.1088/1748-0221/17/07/P07023), arXiv:[2201.08458](https://arxiv.org/abs/2201.08458) [hep-ex]
- A. Tumasyan et al., **Search for invisible decays of the Higgs boson produced via vector boson fusion in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Rev. D*. 105 (2022) 092007, doi:[10.1103/PhysRevD.105.092007](https://doi.org/10.1103/PhysRevD.105.092007), arXiv:[2201.11585](https://arxiv.org/abs/2201.11585) [hep-ex]
- A. Tumasyan et al., **Search for new particles in an extended Higgs sector with four b quarks in the final state at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B*. 835 (2022) 137566, doi:[10.1016/j.physletb.2022.137566](https://doi.org/10.1016/j.physletb.2022.137566), arXiv:[2203.00480](https://arxiv.org/abs/2203.00480) [hep-ex]
- A. Tumasyan et al., **Observation of the  $B_c^+$  Meson in Pb-Pb and pp Collisions at  $\sqrt{s_{NN}}=5.02$  TeV and Measurement of its Nuclear Modification Factor**, *Phys. Rev. Lett.* 128 (2022) 252301, doi:[10.1103/PhysRevLett.128.252301](https://doi.org/10.1103/PhysRevLett.128.252301), arXiv:[2201.02659](https://arxiv.org/abs/2201.02659) [hep-ex]

- A. Tumasyan et al., **Search for a  $W'$  boson decaying to a vector-like quark and a top or bottom quark in the all-jets final state at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2022) 088, doi:[10.1007/JHEP09\(2022\)088](https://doi.org/10.1007/JHEP09(2022)088), arXiv:[2202.12988](https://arxiv.org/abs/2202.12988) [hep-ex]
- A. Tumasyan et al., **Search for high-mass resonances decaying to a jet and a Lorentz-boosted resonance in proton-proton collisions at  $\sqrt{s}=13$ TeV**, *Phys. Lett. B.* 832 (2022) 137263, doi:[10.1016/j.physletb.2022.137263](https://doi.org/10.1016/j.physletb.2022.137263), arXiv:[2201.02140](https://arxiv.org/abs/2201.02140) [hep-ex]
- A. Tumasyan et al., **Measurement of the Drell-Yan forward-backward asymmetry at high dilepton masses in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 2022 (2022) 063, doi:[10.1007/JHEP08\(2022\)063](https://doi.org/10.1007/JHEP08(2022)063), arXiv:[2202.12327](https://arxiv.org/abs/2202.12327) [hep-ex]
- A. Tumasyan et al., **Search for higgsinos decaying to two Higgs bosons and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2022) 014, doi:[10.1007/JHEP05\(2022\)014](https://doi.org/10.1007/JHEP05(2022)014), arXiv:[2201.04206](https://arxiv.org/abs/2201.04206) [hep-ex]
- A. Tumasyan et al., **Nuclear modification of  $\Upsilon$  states in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 835 (2022) 137397, doi:[10.1016/j.physletb.2022.137397](https://doi.org/10.1016/j.physletb.2022.137397), arXiv:[2202.11807](https://arxiv.org/abs/2202.11807) [hep-ex]
- A. Tumasyan et al., **Search for single production of a vector-like T quark decaying to a top quark and a Z boson in the final state with jets and missing transverse momentum at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2022) 093, doi:[10.1007/JHEP05\(2022\)093](https://doi.org/10.1007/JHEP05(2022)093), arXiv:[2201.02227](https://arxiv.org/abs/2201.02227) [hep-ex]
- A. Tumasyan et al., **Search for charged-lepton flavor violation in top quark production and decay in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2022) 082, doi:[10.1007/JHEP06\(2022\)082](https://doi.org/10.1007/JHEP06(2022)082), arXiv:[2201.07859](https://arxiv.org/abs/2201.07859) [hep-ex]
- A. Tumasyan et al., **First Search for Exclusive Diphoton Production at High Mass with Tagged Protons in Proton-Proton Collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 129 (2022) 011801, doi:[10.1103/PhysRevLett.129.011801](https://doi.org/10.1103/PhysRevLett.129.011801), arXiv:[2110.05916](https://arxiv.org/abs/2110.05916) [hep-ex]
- A.M. Sirunyan et al., **Correlations of azimuthal anisotropy Fourier harmonics with subevent cumulants in  $pPb$  collisions at  $\sqrt{s_{NN}} = 8.16$ TeV**, *Phys. Rev. C.* 103 (2021) 014902, doi:[10.1103/PhysRevC.103.014902](https://doi.org/10.1103/PhysRevC.103.014902), arXiv:[1905.09935](https://arxiv.org/abs/1905.09935) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in final states with two oppositely charged same-flavor leptons and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2021) 123, doi:[10.1007/JHEP04\(2021\)123](https://doi.org/10.1007/JHEP04(2021)123), arXiv:[2012.08600](https://arxiv.org/abs/2012.08600) [hep-ex]
- A.M. Sirunyan et al., **Measurement of prompt  $D^0$  and  $\bar{D}^0$  meson azimuthal anisotropy and search for strong electric fields in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 816 (2021) 136253, doi:[10.1016/j.physletb.2021.136253](https://doi.org/10.1016/j.physletb.2021.136253), arXiv:[2009.12628](https://arxiv.org/abs/2009.12628) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections for Z bosons produced in association with charm jets in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2021) 109, doi:[10.1007/JHEP04\(2021\)109](https://doi.org/10.1007/JHEP04(2021)109), arXiv:[2012.04119](https://arxiv.org/abs/2012.04119) [hep-ex]
- A.M. Sirunyan et al., **Development and validation of HERWIG 7 tunes from CMS underlying-event measurements**, *Eur. Phys. J. C.* 81 (2021) 312, doi:[10.1140/epjc/s10052-021-08949-5](https://doi.org/10.1140/epjc/s10052-021-08949-5), arXiv:[2011.03422](https://arxiv.org/abs/2011.03422) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the inclusive and differential Higgs boson production cross sections in the leptonic WW decay mode at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2021) 003, doi:[10.1007/JHEP03\(2021\)003](https://doi.org/10.1007/JHEP03(2021)003), arXiv:[2007.01984](https://arxiv.org/abs/2007.01984) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $CP$ -violating phase  $\phi_s$  in the  $B_s^0 \rightarrow J/\psi \phi(1020) \rightarrow \mu^+ \mu^- K^+ K^-$  channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 816 (2021) 136188, doi:[10.1016/j.physletb.2021.136188](https://doi.org/10.1016/j.physletb.2021.136188), arXiv:[2007.02434](https://arxiv.org/abs/2007.02434) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the azimuthal anisotropy of Image 1 and Image 2 mesons in PbPb collisions at  $\sqrt{s_{NN}}=5.02$ TeV**, *Phys. Lett. B.* 819 (2021) 136385, doi:[10.1016/j.physletb.2021.136385](https://doi.org/10.1016/j.physletb.2021.136385), arXiv:[2006.07707](https://arxiv.org/abs/2006.07707) [hep-ex]
- A.M. Sirunyan et al., **Measurements of production cross sections of polarized same-sign W boson pairs in association with two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 812 (2021) 136018, doi:[10.1016/j.physletb.2020.136018](https://doi.org/10.1016/j.physletb.2020.136018), arXiv:[2009.09429](https://arxiv.org/abs/2009.09429) [hep-ex]
- A.M. Sirunyan et al., **Evidence for electroweak production of four charged leptons and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 812 (2021) 135992, doi:[10.1016/j.physletb.2020.135992](https://doi.org/10.1016/j.physletb.2020.135992), arXiv:[2008.07013](https://arxiv.org/abs/2008.07013) [hep-ex]



- A.M. Sirunyan et al., **Measurement of b jet shapes in proton-proton collisions at  $\sqrt{s} = 5.02$  TeV**, *JHEP*. 05 (2021) 054, doi:[10.1007/JHEP05\(2021\)054](https://doi.org/10.1007/JHEP05(2021)054), arXiv:[2005.14219](https://arxiv.org/abs/2005.14219) [hep-ex]
- A.M. Sirunyan et al., **Measurements of  $pp \rightarrow ZZ$  production cross sections and constraints on anomalous triple gauge couplings at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 81 (2021) 200, doi:[10.1140/epjc/s10052-020-08817-8](https://doi.org/10.1140/epjc/s10052-020-08817-8), arXiv:[2009.01186](https://arxiv.org/abs/2009.01186) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the Z boson differential production cross section using its invisible decay mode (Z  $\nu\bar{\nu}$ ) in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 05 (2021) 205, doi:[10.1007/JHEP05\(2021\)205](https://doi.org/10.1007/JHEP05(2021)205), arXiv:[2012.09254](https://arxiv.org/abs/2012.09254) [hep-ex]
- A.M. Sirunyan et al., **Search for long-lived particles using displaced jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 104 (2021) 012015, doi:[10.1103/PhysRevD.104.012015](https://doi.org/10.1103/PhysRevD.104.012015), arXiv:[2012.01581](https://arxiv.org/abs/2012.01581) [hep-ex]
- A.M. Sirunyan et al., **Search for dark photons in Higgs boson production via vector boson fusion in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2021) 011, doi:[10.1007/JHEP03\(2021\)011](https://doi.org/10.1007/JHEP03(2021)011), arXiv:[2009.14009](https://arxiv.org/abs/2009.14009) [hep-ex]
- A.M. Sirunyan et al., **Search for the lepton flavor violating decay  $\tau \rightarrow 3 \mu$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 01 (2021) 163, doi:[10.1007/JHEP01\(2021\)163](https://doi.org/10.1007/JHEP01(2021)163), arXiv:[2007.05658](https://arxiv.org/abs/2007.05658) [hep-ex]
- V. Khachatryan et al., **The very forward CASTOR calorimeter of the CMS experiment**, *JINST*. 16 (2021) P02010, doi:[10.1088/1748-0221/16/02/P02010](https://doi.org/10.1088/1748-0221/16/02/P02010), arXiv:[2011.01185](https://arxiv.org/abs/2011.01185) [physics.ins-det]
- T.C. Collaboration et al., **Search for new physics in top quark production with additional leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV using effective field theory**, *JHEP*. 03 (2021) 095, doi:[10.1007/JHEP03\(2021\)095](https://doi.org/10.1007/JHEP03(2021)095), arXiv:[2012.04120](https://arxiv.org/abs/2012.04120) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the Higgs boson production rate in association with top quarks in final states with electrons, muons, and hadronically decaying tau leptons at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 81 (2021) 378, doi:[10.1140/epjc/s10052-021-09014-x](https://doi.org/10.1140/epjc/s10052-021-09014-x), arXiv:[2011.03652](https://arxiv.org/abs/2011.03652) [hep-ex]
- A.M. Sirunyan et al., **Angular analysis of the decay  $B^+ \rightarrow K^*(892)^+ \mu^+ \mu^-$  in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 04 (2021) 124, doi:[10.1007/JHEP04\(2021\)124](https://doi.org/10.1007/JHEP04(2021)124), arXiv:[2010.13968](https://arxiv.org/abs/2010.13968) [hep-ex]
- A.M. Sirunyan et al., **Search for the rare decay of the W boson into a pion and a photon in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 819 (2021) 136409, doi:[10.1016/j.physletb.2021.136409](https://doi.org/10.1016/j.physletb.2021.136409), arXiv:[2011.06028](https://arxiv.org/abs/2011.06028) [hep-ex]
- A.M. Sirunyan et al., **Search for top squark pair production using dilepton final states in  $pp$  collision data collected at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 81 (2021) 3, doi:[10.1140/epjc/s10052-020-08701-5](https://doi.org/10.1140/epjc/s10052-020-08701-5), arXiv:[2008.05936](https://arxiv.org/abs/2008.05936) [hep-ex]
- A.M. Sirunyan et al., **Studies of charm and beauty hadron long-range correlations in  $pp$  and  $pPb$  collisions at LHC energies**, *Phys. Lett. B*. 813 (2021) 136036, doi:[10.1016/j.physletb.2020.136036](https://doi.org/10.1016/j.physletb.2020.136036), arXiv:[2009.07065](https://arxiv.org/abs/2009.07065) [hep-ex]
- A.M. Sirunyan et al., **Observation of Forward Neutron Multiplicity Dependence of Dimuon Acoplanarity in Ultraperipheral Pb-Pb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.*. 127 (2021) 122001, doi:[10.1103/PhysRevLett.127.122001](https://doi.org/10.1103/PhysRevLett.127.122001), arXiv:[2011.05239](https://arxiv.org/abs/2011.05239) [hep-ex]
- A.M. Sirunyan et al., **Search for nonresonant Higgs boson pair production in final states with two bottom quarks and two photons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2021) 257, doi:[10.1007/JHEP03\(2021\)257](https://doi.org/10.1007/JHEP03(2021)257), arXiv:[2011.12373](https://arxiv.org/abs/2011.12373) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential  $t\bar{t}$  production cross sections using top quarks at large transverse momenta in  $pp$  collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 103 (2021) 052008, doi:[10.1103/PhysRevD.103.052008](https://doi.org/10.1103/PhysRevD.103.052008), arXiv:[2008.07860](https://arxiv.org/abs/2008.07860) [hep-ex]
- A.M. Sirunyan et al., **Electron and photon reconstruction and identification with the CMS experiment at the CERN LHC**, *JINST*. 16 (2021) P05014, doi:[10.1088/1748-0221/16/05/P05014](https://doi.org/10.1088/1748-0221/16/05/P05014), arXiv:[2012.06888](https://arxiv.org/abs/2012.06888) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter produced in association with a leptonically decaying Z boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 81 (2021) 13, doi:[10.1140/epjc/s10052-020-08739-5](https://doi.org/10.1140/epjc/s10052-020-08739-5), arXiv:[2008.04735](https://arxiv.org/abs/2008.04735) [hep-ex]
- A.M. Sirunyan et al., **First measurement of the cross section for top quark pair production with additional charm jets using dileptonic final states in  $pp$  collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 820 (2021) 136565, doi:[10.1016/j.physletb.2021.136565](https://doi.org/10.1016/j.physletb.2021.136565), arXiv:[2012.09225](https://arxiv.org/abs/2012.09225) [hep-ex]

- A.M. Sirunyan et al., **Search for singly and pair-produced leptoquarks coupling to third-generation fermions in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B.* 819 (2021) 136446, doi:[10.1016/j.physletb.2021.136446](https://doi.org/10.1016/j.physletb.2021.136446), arXiv:[2012.04178](https://arxiv.org/abs/2012.04178) [hep-ex]
- A.M. Sirunyan et al., **Evidence for Higgs boson decay to a pair of muons**, *JHEP.* 01 (2021) 148, doi:[10.1007/JHEP01\(2021\)148](https://doi.org/10.1007/JHEP01(2021)148), arXiv:[2009.04363](https://arxiv.org/abs/2009.04363) [hep-ex]
- A.M. Sirunyan et al., **MUSiC: a model-unspecific search for new physics in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 81 (2021) 629, doi:[10.1140/epjc/s10052-021-09236-z](https://doi.org/10.1140/epjc/s10052-021-09236-z), arXiv:[2010.02984](https://arxiv.org/abs/2010.02984) [hep-ex]
- K. Lee et al., **Probing effective field theory operators in the associated production of top quarks with a Z boson in multilepton final states at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2021) 083, doi:[10.1007/JHEP12\(2021\)083](https://doi.org/10.1007/JHEP12(2021)083), arXiv:[2107.13896](https://arxiv.org/abs/2107.13896) [hep-ex]
- A.M. Sirunyan et al., **Search for top squark production in fully-hadronic final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 104 (2021) 052001, doi:[10.1103/PhysRevD.104.052001](https://doi.org/10.1103/PhysRevD.104.052001), arXiv:[2103.01290](https://arxiv.org/abs/2103.01290) [hep-ex]
- A.M. Sirunyan et al., **Search for resonant and nonresonant new phenomena in high-mass dilepton final states at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2021) 208, doi:[10.1007/JHEP07\(2021\)208](https://doi.org/10.1007/JHEP07(2021)208), arXiv:[2103.02708](https://arxiv.org/abs/2103.02708) [hep-ex]
- A. Tumasyan et al., **Combined searches for the production of supersymmetric top quark partners in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 81 (2021) 970, doi:[10.1140/epjc/s10052-021-09721-5](https://doi.org/10.1140/epjc/s10052-021-09721-5), arXiv:[2107.10892](https://arxiv.org/abs/2107.10892) [hep-ex]
- A. Tumasyan et al., **Search for new particles in events with energetic jets and large missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2021) 153, doi:[10.1007/JHEP11\(2021\)153](https://doi.org/10.1007/JHEP11(2021)153), arXiv:[2107.13021](https://arxiv.org/abs/2107.13021) [hep-ex]
- A. Tumasyan et al., **Search for chargino-neutralino production in events with Higgs and W bosons using 137 fb<sup>-1</sup> of proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2021) 045, doi:[10.1007/JHEP10\(2021\)045](https://doi.org/10.1007/JHEP10(2021)045), arXiv:[2107.12553](https://arxiv.org/abs/2107.12553) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the W  $\gamma$  Production Cross Section in Proton-Proton Collisions at  $\sqrt{s}=13$  TeV and Constraints on Effective Field Theory Coefficients**, *Phys. Rev. Lett.* 126 (2021) 252002, doi:[10.1103/PhysRevLett.126.252002](https://doi.org/10.1103/PhysRevLett.126.252002), arXiv:[2102.02283](https://arxiv.org/abs/2102.02283) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the differential cross sections of the production of Z + jets and  $\gamma$  + jets and of Z boson emission collinear with a jet in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2021) 285, doi:[10.1007/JHEP05\(2021\)285](https://doi.org/10.1007/JHEP05(2021)285), arXiv:[2102.02238](https://arxiv.org/abs/2102.02238) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy vector resonance decaying to a Z boson and a Higgs boson in proton-proton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 81 (2021) 688, doi:[10.1140/epjc/s10052-021-09348-6](https://doi.org/10.1140/epjc/s10052-021-09348-6), arXiv:[2102.08198](https://arxiv.org/abs/2102.08198) [hep-ex]
- A. Tumasyan et al., **Measurement of the electroweak production of Z  $\gamma$  and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV and constraints on anomalous quartic gauge couplings**, *Phys. Rev. D.* 104 (2021) 072001, doi:[10.1103/PhysRevD.104.072001](https://doi.org/10.1103/PhysRevD.104.072001), arXiv:[2106.11082](https://arxiv.org/abs/2106.11082) [hep-ex]
- A.M. Sirunyan et al., **Measurements of angular distance and momentum ratio distributions in three-jet and Z + two-jet final states in pp collisions**, *Eur. Phys. J. C.* 81 (2021) 852, doi:[10.1140/epjc/s10052-021-09570-2](https://doi.org/10.1140/epjc/s10052-021-09570-2), arXiv:[2102.08816](https://arxiv.org/abs/2102.08816) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy resonance decaying to a top quark and a W boson at  $\sqrt{s} = 13$  TeV in the fully hadronic final state**, *JHEP.* 12 (2021) 106, doi:[10.1007/JHEP12\(2021\)106](https://doi.org/10.1007/JHEP12(2021)106), arXiv:[2104.12853](https://arxiv.org/abs/2104.12853) [hep-ex]
- A. Tumasyan et al., **Measurements of the  $pp \rightarrow W^{\pm}\gamma\gamma$  and  $pp \rightarrow Z\gamma\gamma$  cross sections at  $\sqrt{s} = 13$  TeV and limits on anomalous quartic gauge couplings**, *JHEP.* 10 (2021) 174, doi:[10.1007/JHEP10\(2021\)174](https://doi.org/10.1007/JHEP10(2021)174), arXiv:[2105.12780](https://arxiv.org/abs/2105.12780) [hep-ex]
- A. Tumasyan et al., **Measurement of the top quark mass using events with a single reconstructed top quark in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2021) 161, doi:[10.1007/JHEP12\(2021\)161](https://doi.org/10.1007/JHEP12(2021)161), arXiv:[2108.10407](https://arxiv.org/abs/2108.10407) [hep-ex]
- A. Tumasyan et al., **Search for Long-Lived Particles Decaying in the CMS End Cap Muon Detectors in Proton-Proton Collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 127 (2021) 261804, doi:[10.1103/PhysRevLett.127.261804](https://doi.org/10.1103/PhysRevLett.127.261804), arXiv:[2107.04838](https://arxiv.org/abs/2107.04838) [hep-ex]

- A. Tumasyan et al., **Measurement of the inclusive and differential  $t\bar{t}\gamma$  cross sections in the single-lepton channel and EFT interpretation at  $\sqrt{s} = 13$  TeV**, *JHEP*. 12 (2021) 180, doi:[10.1007/JHEP12\(2021\)180](https://doi.org/10.1007/JHEP12(2021)180), arXiv:[2107.01508](https://arxiv.org/abs/2107.01508) [hep-ex]
- A.M. Sirunyan et al., **Search for top squarks in final states with two top quarks and several light-flavor jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 104 (2021) 032006, doi:[10.1103/PhysRevD.104.032006](https://doi.org/10.1103/PhysRevD.104.032006), arXiv:[2102.06976](https://arxiv.org/abs/2102.06976) [hep-ex]
- A.M. Sirunyan et al., **Measurements of Higgs boson production cross sections and couplings in the diphoton decay channel at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2021) 027, doi:[10.1007/JHEP07\(2021\)027](https://doi.org/10.1007/JHEP07(2021)027), arXiv:[2103.06956](https://arxiv.org/abs/2103.06956) [hep-ex]
- A.M. Sirunyan et al., **Constraints on the Initial State of Pb-Pb Collisions via Measurements of Z-Boson Yields and Azimuthal Anisotropy at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Rev. Lett.* 127 (2021) 102002, doi:[10.1103/PhysRevLett.127.102002](https://doi.org/10.1103/PhysRevLett.127.102002), arXiv:[2103.14089](https://arxiv.org/abs/2103.14089) [hep-ex]
- A. Tumasyan et al., **Measurement of prompt open-charm production cross sections in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 11 (2021) 225, doi:[10.1007/JHEP11\(2021\)225](https://doi.org/10.1007/JHEP11(2021)225), arXiv:[2107.01476](https://arxiv.org/abs/2107.01476) [hep-ex]
- A.M. Sirunyan et al., **Search for  $W'$  bosons decaying to a top and a bottom quark at  $\sqrt{s}=13$  TeV in the hadronic final state**, *Phys. Lett. B*. 820 (2021) 136535, doi:[10.1016/j.physletb.2021.136535](https://doi.org/10.1016/j.physletb.2021.136535), arXiv:[2104.04831](https://arxiv.org/abs/2104.04831) [hep-ex]
- A.M. Sirunyan et al., **In-medium modification of dijets in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP*. 05 (2021) 116, doi:[10.1007/JHEP05\(2021\)116](https://doi.org/10.1007/JHEP05(2021)116), arXiv:[2101.04720](https://arxiv.org/abs/2101.04720) [hep-ex]
- A.M. Sirunyan et al., **Constraints on anomalous Higgs boson couplings to vector bosons and fermions in its production and decay using the four-lepton final state**, *Phys. Rev. D*. 104 (2021) 052004, doi:[10.1103/PhysRevD.104.052004](https://doi.org/10.1103/PhysRevD.104.052004), arXiv:[2104.12152](https://arxiv.org/abs/2104.12152) [hep-ex]
- A. Tumasyan et al., **Measurements of the electroweak diboson production cross sections in proton-proton collisions at  $\sqrt{s} = 5.02$  TeV using leptonic decays**, *Phys. Rev. Lett.* 127 (2021) 191801, doi:[10.1103/PhysRevLett.127.191801](https://doi.org/10.1103/PhysRevLett.127.191801), arXiv:[2107.01137](https://arxiv.org/abs/2107.01137) [hep-ex]
- A.M. Sirunyan et al., **Search for lepton-flavor violating decays of the Higgs boson in the  $\mu\tau$  and  $e\tau$  final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 104 (2021) 032013, doi:[10.1103/PhysRevD.104.032013](https://doi.org/10.1103/PhysRevD.104.032013), arXiv:[2105.03007](https://arxiv.org/abs/2105.03007) [hep-ex]
- A.M. Sirunyan et al., **Observation of a New Excited Beauty Strange Baryon Decaying to  $\Xi_b^-\pi^+\pi^-$** , *Phys. Rev. Lett.* 126 (2021) 252003, doi:[10.1103/PhysRevLett.126.252003](https://doi.org/10.1103/PhysRevLett.126.252003), arXiv:[2102.04524](https://arxiv.org/abs/2102.04524) [hep-ex]
- A.M. Sirunyan et al., **Search for long-lived particles decaying to jets with displaced vertices in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 104 (2021) 052011, doi:[10.1103/PhysRevD.104.052011](https://doi.org/10.1103/PhysRevD.104.052011), arXiv:[2104.13474](https://arxiv.org/abs/2104.13474) [hep-ex]
- A.M. Sirunyan et al., **Measurements of production cross sections of the Higgs boson in the four-lepton final state in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 81 (2021) 488, doi:[10.1140/epjc/s10052-021-09200-x](https://doi.org/10.1140/epjc/s10052-021-09200-x), arXiv:[2103.04956](https://arxiv.org/abs/2103.04956) [hep-ex]
- A. Tumasyan et al., **Measurement of differential  $t\bar{t}$  production cross sections in the full kinematic range using lepton+jets events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 104 (2021) 092013, doi:[10.1103/PhysRevD.104.092013](https://doi.org/10.1103/PhysRevD.104.092013), arXiv:[2108.02803](https://arxiv.org/abs/2108.02803) [hep-ex]
- A. Tumasyan et al., **Observation of  $tW$  production in the single-lepton channel in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 11 (2021) 111, doi:[10.1007/JHEP11\(2021\)111](https://doi.org/10.1007/JHEP11(2021)111), arXiv:[2109.01706](https://arxiv.org/abs/2109.01706) [hep-ex]
- A.M. Sirunyan et al., **First measurement of large area jet transverse momentum spectra in heavy-ion collisions**, *JHEP*. 05 (2021) 284, doi:[10.1007/JHEP05\(2021\)284](https://doi.org/10.1007/JHEP05(2021)284), arXiv:[2102.13080](https://arxiv.org/abs/2102.13080) [hep-ex]
- A. Tumasyan et al., **Study of Z boson plus jets events using variables sensitive to double-parton scattering in pp collisions at 13 TeV**, *JHEP*. 10 (2021) 176, doi:[10.1007/JHEP10\(2021\)176](https://doi.org/10.1007/JHEP10(2021)176), arXiv:[2105.14511](https://arxiv.org/abs/2105.14511) [hep-ex]
- A.M. Sirunyan et al., **Search for charged Higgs bosons produced in vector boson fusion processes and decaying into vector boson pairs in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 81 (2021) 723, doi:[10.1140/epjc/s10052-021-09472-3](https://doi.org/10.1140/epjc/s10052-021-09472-3), arXiv:[2104.04762](https://arxiv.org/abs/2104.04762) [hep-ex]
- A.M. Sirunyan et al., **Precision luminosity measurement in proton-proton collisions at  $\sqrt{s} = 13$  TeV in 2015 and 2016 at CMS**, *Eur. Phys. J. C*. 81 (2021) 800, doi:[10.1140/epjc/s10052-021-09538-2](https://doi.org/10.1140/epjc/s10052-021-09538-2), arXiv:[2104.01927](https://arxiv.org/abs/2104.01927) [hep-ex]
- A. Tumasyan et al., **Search for a heavy Higgs boson decaying into two lighter Higgs bosons in the  $\tau\tau b\bar{b}$  final state at 13 TeV**, *JHEP*. 11 (2021) 057, doi:[10.1007/JHEP11\(2021\)057](https://doi.org/10.1007/JHEP11(2021)057), arXiv:[2106.10361](https://arxiv.org/abs/2106.10361) [hep-ex]

- A.M. Sirunyan et al., **Study of Drell-Yan dimuon production in proton-lead collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *JHEP.* 05 (2021) 182, doi:[10.1007/JHEP05\(2021\)182](https://doi.org/10.1007/JHEP05(2021)182), arXiv:[2102.13648](https://arxiv.org/abs/2102.13648) [hep-ex]
- A.M. Sirunyan et al., **Performance of the CMS muon trigger system in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JINST.* 16 (2021) P07001, doi:[10.1088/1748-0221/16/07/P07001](https://doi.org/10.1088/1748-0221/16/07/P07001), arXiv:[2102.04790](https://arxiv.org/abs/2102.04790) [hep-ex]
- A.M. Sirunyan et al., **Hard color-singlet exchange in dijet events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 104 (2021) 032009, doi:[10.1103/PhysRevD.104.032009](https://doi.org/10.1103/PhysRevD.104.032009), arXiv:[2102.06945](https://arxiv.org/abs/2102.06945) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the single top quark and antiquark production cross sections in the  $t$  channel and their ratio in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 800 (2020) 135042, doi:[10.1016/j.physletb.2019.135042](https://doi.org/10.1016/j.physletb.2019.135042), arXiv:[1812.10514](https://arxiv.org/abs/1812.10514) [hep-ex]
- A.M. Sirunyan et al., **Search for electroweak production of a vector-like T quark using fully hadronic final states**, *JHEP.* 01 (2020) 036, doi:[10.1007/JHEP01\(2020\)036](https://doi.org/10.1007/JHEP01(2020)036), arXiv:[1909.04721](https://arxiv.org/abs/1909.04721) [hep-ex]
- A.M. Sirunyan et al., **Measurement of properties of  $B_s^0 \rightarrow \mu^+ \mu^-$  decays and search for  $B^0 \rightarrow \mu^+ \mu^-$  with the CMS experiment**, *JHEP.* 04 (2020) 188, doi:[10.1007/JHEP04\(2020\)188](https://doi.org/10.1007/JHEP04(2020)188), arXiv:[1910.12127](https://arxiv.org/abs/1910.12127) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy Higgs boson decaying to a pair of W bosons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2020) 034, doi:[10.1007/JHEP03\(2020\)034](https://doi.org/10.1007/JHEP03(2020)034), arXiv:[1912.01594](https://arxiv.org/abs/1912.01594) [hep-ex]
- A.M. Sirunyan et al., **Search for a Narrow Resonance Lighter than 200 GeV Decaying to a Pair of Muons in Proton-Proton Collisions at  $\sqrt{s} = \text{TeV}$** , *Phys. Rev. Lett.* 124 (2020) 131802, doi:[10.1103/PhysRevLett.124.131802](https://doi.org/10.1103/PhysRevLett.124.131802), arXiv:[1912.04776](https://arxiv.org/abs/1912.04776) [hep-ex]
- A.M. Sirunyan et al., **Extraction and validation of a new set of CMS PYTHIA8 tunes from underlying-event measurements**, *Eur. Phys. J. C.* 80 (2020) 4, doi:[10.1140/epjc/s10052-019-7499-4](https://doi.org/10.1140/epjc/s10052-019-7499-4), arXiv:[1903.12179](https://arxiv.org/abs/1903.12179) [hep-ex]
- A.M. Sirunyan et al., **A deep neural network to search for new long-lived particles decaying to jets**, *Mach. Learn. Sci. Tech.* 1 (2020) 035012, doi:[10.1088/2632-2153/ab9023](https://doi.org/10.1088/2632-2153/ab9023), arXiv:[1912.12238](https://arxiv.org/abs/1912.12238) [hep-ex]
- A.M. Sirunyan et al., **Study of  $J/\psi$  meson production inside jets in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 804 (2020) 135409, doi:[10.1016/j.physletb.2020.135409](https://doi.org/10.1016/j.physletb.2020.135409), arXiv:[1910.01686](https://arxiv.org/abs/1910.01686) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $t\bar{t}b\bar{b}$  production cross section in the all-jet final state in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 803 (2020) 135285, doi:[10.1016/j.physletb.2020.135285](https://doi.org/10.1016/j.physletb.2020.135285), arXiv:[1909.05306](https://arxiv.org/abs/1909.05306) [hep-ex]
- A.M. Sirunyan et al., **Search for direct pair production of supersymmetric partners to the  $\tau$  lepton in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 80 (2020) 189, doi:[10.1140/epjc/s10052-020-7739-7](https://doi.org/10.1140/epjc/s10052-020-7739-7), arXiv:[1907.13179](https://arxiv.org/abs/1907.13179) [hep-ex]
- A.M. Sirunyan et al., **Measurement of  $t\bar{t}$  normalised multi-differential cross sections in pp collisions at  $\sqrt{s} = 13$  TeV, and simultaneous determination of the strong coupling strength, top quark pole mass, and parton distribution functions**, *Eur. Phys. J. C.* 80 (2020) 658, doi:[10.1140/epjc/s10052-020-7917-7](https://doi.org/10.1140/epjc/s10052-020-7917-7), arXiv:[1904.05237](https://arxiv.org/abs/1904.05237) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the Jet Mass Distribution and Top Quark Mass in Hadronic Decays of Boosted Top Quarks in pp Collisions at  $\sqrt{s} = \text{TeV}$** , *Phys. Rev. Lett.* 124 (2020) 202001, doi:[10.1103/PhysRevLett.124.202001](https://doi.org/10.1103/PhysRevLett.124.202001), arXiv:[1911.03800](https://arxiv.org/abs/1911.03800) [hep-ex]
- A.M. Sirunyan et al., **Bose-Einstein correlations of charged hadrons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2020) 014, doi:[10.1007/JHEP03\(2020\)014](https://doi.org/10.1007/JHEP03(2020)014), arXiv:[1910.08815](https://arxiv.org/abs/1910.08815) [hep-ex]
- A.M. Sirunyan et al., **Search for high mass dijet resonances with a new background prediction method in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2020) 033, doi:[10.1007/JHEP05\(2020\)033](https://doi.org/10.1007/JHEP05(2020)033), arXiv:[1911.03947](https://arxiv.org/abs/1911.03947) [hep-ex]
- A.M. Sirunyan et al., **Calibration of the CMS hadron calorimeters using proton-proton collision data at  $\sqrt{s} = 13$  TeV**, *JINST.* 15 (2020) P05002, doi:[10.1088/1748-0221/15/05/P05002](https://doi.org/10.1088/1748-0221/15/05/P05002), arXiv:[1910.00079](https://arxiv.org/abs/1910.00079) [physics.ins-det]
- A.M. Sirunyan et al., **A search for the standard model Higgs boson decaying to charm quarks**, *JHEP.* 03 (2020) 131, doi:[10.1007/JHEP03\(2020\)131](https://doi.org/10.1007/JHEP03(2020)131), arXiv:[1912.01662](https://arxiv.org/abs/1912.01662) [hep-ex]
- A.M. Sirunyan et al., **Performance of the reconstruction and identification of high-momentum muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JINST.* 15 (2020) P02027, doi:[10.1088/1748-0221/15/02/P02027](https://doi.org/10.1088/1748-0221/15/02/P02027), arXiv:[1912.03516](https://arxiv.org/abs/1912.03516) [physics.ins-det]
- A.M. Sirunyan et al., **Strange hadron production in pp and pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. C.* 101 (2020) 064906, doi:[10.1103/PhysRevC.101.064906](https://doi.org/10.1103/PhysRevC.101.064906), arXiv:[1910.04812](https://arxiv.org/abs/1910.04812) [hep-ex]



- A.M. Sirunyan et al., **Constraints on the  $\chi_{c1}$  versus  $\chi_{c2}$  Polarizations in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 124 (2020) 162002, doi:[10.1103/PhysRevLett.124.162002](https://doi.org/10.1103/PhysRevLett.124.162002), arXiv:[1912.07706](https://arxiv.org/abs/1912.07706) [hep-ex]
- A.M. Sirunyan et al., **Evidence for  $WW$  production from double-parton interactions in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C* 80 (2020) 41, doi:[10.1140/epjc/s10052-019-7541-6](https://doi.org/10.1140/epjc/s10052-019-7541-6), arXiv:[1909.06265](https://arxiv.org/abs/1909.06265) [hep-ex]
- A.M. Sirunyan et al., **Studies of charm quark diffusion inside jets using PbPb and pp collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 125 (2020) 102001, doi:[10.1103/PhysRevLett.125.102001](https://doi.org/10.1103/PhysRevLett.125.102001), arXiv:[1911.01461](https://arxiv.org/abs/1911.01461) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections and charge ratios for t-channel single top quark production in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C* 80 (2020) 370, doi:[10.1140/epjc/s10052-020-7858-1](https://doi.org/10.1140/epjc/s10052-020-7858-1), arXiv:[1907.08330](https://arxiv.org/abs/1907.08330) [hep-ex]
- A.M. Sirunyan et al., **Running of the top quark mass from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B* 803 (2020) 135263, doi:[10.1016/j.physletb.2020.135263](https://doi.org/10.1016/j.physletb.2020.135263), arXiv:[1909.09193](https://arxiv.org/abs/1909.09193) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy pseudoscalar Higgs boson decaying into a 125 GeV Higgs boson and a Z boson in final states with two tau and two light leptons at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2020) 065, doi:[10.1007/JHEP03\(2020\)065](https://doi.org/10.1007/JHEP03(2020)065), arXiv:[1910.11634](https://arxiv.org/abs/1910.11634) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark forward-backward production asymmetry and the anomalous chromoelectric and chromomagnetic moments in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2020) 146, doi:[10.1007/JHEP06\(2020\)146](https://doi.org/10.1007/JHEP06(2020)146), arXiv:[1912.09540](https://arxiv.org/abs/1912.09540) [hep-ex]
- A.M. Sirunyan et al., **Observation of nuclear modifications in  $W^\pm$  boson production in pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *Phys. Lett. B* 800 (2020) 135048, doi:[10.1016/j.physletb.2019.135048](https://doi.org/10.1016/j.physletb.2019.135048), arXiv:[1905.01486](https://arxiv.org/abs/1905.01486) [hep-ex]
- A.M. Sirunyan et al., **Search for top squark pair production in a final state with two tau leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 02 (2020) 015, doi:[10.1007/JHEP02\(2020\)015](https://doi.org/10.1007/JHEP02(2020)015), arXiv:[1910.12932](https://arxiv.org/abs/1910.12932) [hep-ex]
- A.M. Sirunyan et al., **Search for physics beyond the standard model in multilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2020) 051, doi:[10.1007/JHEP03\(2020\)051](https://doi.org/10.1007/JHEP03(2020)051), arXiv:[1911.04968](https://arxiv.org/abs/1911.04968) [hep-ex]
- A.M. Sirunyan et al., **Search for dijet resonances using events with three jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B* 805 (2020) 135448, doi:[10.1016/j.physletb.2020.135448](https://doi.org/10.1016/j.physletb.2020.135448), arXiv:[1911.03761](https://arxiv.org/abs/1911.03761) [hep-ex]
- A.M. Sirunyan et al., **Observation of the  $\Lambda_b^0 \rightarrow J/\psi \Lambda \phi$  decay in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B* 802 (2020) 135203, doi:[10.1016/j.physletb.2020.135203](https://doi.org/10.1016/j.physletb.2020.135203), arXiv:[1911.03789](https://arxiv.org/abs/1911.03789) [hep-ex]
- A.M. Sirunyan et al., **Mixed higher-order anisotropic flow and nonlinear response coefficients of charged particles in PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  and 5.02 TeV**, *Eur. Phys. J. C* 80 (2020) 534, doi:[10.1140/epjc/s10052-020-7834-9](https://doi.org/10.1140/epjc/s10052-020-7834-9), arXiv:[1910.08789](https://arxiv.org/abs/1910.08789) [hep-ex]
- A.M. Sirunyan et al., **Measurement of electroweak production of a W boson in association with two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C* 80 (2020) 43, doi:[10.1140/epjc/s10052-019-7585-7](https://doi.org/10.1140/epjc/s10052-019-7585-7), arXiv:[1903.04040](https://arxiv.org/abs/1903.04040) [hep-ex]
- A.M. Sirunyan et al., **Determination of the strong coupling constant  $\alpha_S(m_Z)$  from measurements of inclusive  $W^\pm$  and Z boson production cross sections in proton-proton collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 06 (2020) 018, doi:[10.1007/JHEP06\(2020\)018](https://doi.org/10.1007/JHEP06(2020)018), arXiv:[1912.04387](https://arxiv.org/abs/1912.04387) [hep-ex]
- A.M. Sirunyan et al., **Search for new neutral Higgs bosons through the  $H \rightarrow ZA \rightarrow \ell^+ \ell^- b \bar{b}$  process in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2020) 055, doi:[10.1007/JHEP03\(2020\)055](https://doi.org/10.1007/JHEP03(2020)055), arXiv:[1911.03781](https://arxiv.org/abs/1911.03781) [hep-ex]
- A.M. Sirunyan et al., **Combined search for supersymmetry with photons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B* 801 (2020) 135183, doi:[10.1016/j.physletb.2019.135183](https://doi.org/10.1016/j.physletb.2019.135183), arXiv:[1907.00857](https://arxiv.org/abs/1907.00857) [hep-ex]
- A.M. Sirunyan et al., **Search for lepton flavour violating decays of a neutral heavy Higgs boson to  $\mu\tau$  and  $e\tau$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2020) 103, doi:[10.1007/JHEP03\(2020\)103](https://doi.org/10.1007/JHEP03(2020)103), arXiv:[1911.10267](https://arxiv.org/abs/1911.10267) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy Higgs bosons decaying to a top quark pair in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2020) 171, doi:[10.1007/JHEP04\(2020\)171](https://doi.org/10.1007/JHEP04(2020)171), arXiv:[1908.01115](https://arxiv.org/abs/1908.01115) [hep-ex]
- A.M. Sirunyan et al., **A multi-dimensional search for new heavy resonances decaying to boosted  $WW$ ,  $WZ$ , or  $ZZ$  boson pairs in the dijet final state at 13 TeV**, *Eur. Phys. J. C* 80 (2020) 237, doi:[10.1140/epjc/s10052-020-7773-5](https://doi.org/10.1140/epjc/s10052-020-7773-5), arXiv:[1906.05977](https://arxiv.org/abs/1906.05977) [hep-ex]

- A.M. Sirunyan et al., **Search for a charged Higgs boson decaying into top and bottom quarks in events with electrons or muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 01 (2020) 096, doi:[10.1007/JHEP01\(2020\)096](https://doi.org/10.1007/JHEP01(2020)096), arXiv:[1908.09206](https://arxiv.org/abs/1908.09206) [hep-ex]
- A.M. Sirunyan et al., **Search for production of four top quarks in final states with same-sign or multiple leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 80 (2020) 75, doi:[10.1140/epjc/s10052-019-7593-7](https://doi.org/10.1140/epjc/s10052-019-7593-7), arXiv:[1908.06463](https://arxiv.org/abs/1908.06463) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark pair production cross section in dilepton final states containing one  $\tau$  lepton in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 02 (2020) 191, doi:[10.1007/JHEP02\(2020\)191](https://doi.org/10.1007/JHEP02(2020)191), arXiv:[1911.13204](https://arxiv.org/abs/1911.13204) [hep-ex]
- A.M. Sirunyan et al., **Search for light pseudoscalar boson pairs produced from decays of the 125 GeV Higgs boson in final states with two muons and two nearby tracks in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 800 (2020) 135087, doi:[10.1016/j.physletb.2019.135087](https://doi.org/10.1016/j.physletb.2019.135087), arXiv:[1907.07235](https://arxiv.org/abs/1907.07235) [hep-ex]
- A.M. Sirunyan et al., **Measurement of top quark pair production in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2020) 056, doi:[10.1007/JHEP03\(2020\)056](https://doi.org/10.1007/JHEP03(2020)056), arXiv:[1907.11270](https://arxiv.org/abs/1907.11270) [hep-ex]
- A.M. Sirunyan et al., **Production of  $\Lambda_c^+$  baryons in proton-proton and lead-lead collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B*. 803 (2020) 135328, doi:[10.1016/j.physletb.2020.135328](https://doi.org/10.1016/j.physletb.2020.135328), arXiv:[1906.03322](https://arxiv.org/abs/1906.03322) [hep-ex]
- A.M. Sirunyan et al., **A Deep Neural Network for Simultaneous Estimation of b Jet Energy and Resolution**, *Comput. Softw. Big Sci.* 4 (2020) 10, doi:[10.1007/s41781-020-00041-z](https://doi.org/10.1007/s41781-020-00041-z), arXiv:[1912.06046](https://arxiv.org/abs/1912.06046) [physics.data-an]
- A.M. Sirunyan et al., **Multiparticle correlation studies in pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *Phys. Rev. C*. 101 (2020) 014912, doi:[10.1103/PhysRevC.101.014912](https://doi.org/10.1103/PhysRevC.101.014912), arXiv:[1904.11519](https://arxiv.org/abs/1904.11519) [hep-ex]
- A.M. Sirunyan et al., **Searches for physics beyond the standard model with the  $M_{T2}$  variable in hadronic final states with and without disappearing tracks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 80 (2020) 3, doi:[10.1140/epjc/s10052-019-7493-x](https://doi.org/10.1140/epjc/s10052-019-7493-x), arXiv:[1909.03460](https://arxiv.org/abs/1909.03460) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter particles produced in association with a Higgs boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2020) 025, doi:[10.1007/JHEP03\(2020\)025](https://doi.org/10.1007/JHEP03(2020)025), arXiv:[1908.01713](https://arxiv.org/abs/1908.01713) [hep-ex]
- A.M. Sirunyan et al., **Search for direct top squark pair production in events with one lepton, jets, and missing transverse momentum at 13 TeV with the CMS experiment**, *JHEP*. 05 (2020) 032, doi:[10.1007/JHEP05\(2020\)032](https://doi.org/10.1007/JHEP05(2020)032), arXiv:[1912.08887](https://arxiv.org/abs/1912.08887) [hep-ex]
- A.M. Sirunyan et al., **Search for Supersymmetry with a Compressed Mass Spectrum in Events with a Soft  $\tau$  Lepton, a Highly Energetic Jet, and Large Missing Transverse Momentum in Proton-Proton Collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 124 (2020) 041803, doi:[10.1103/PhysRevLett.124.041803](https://doi.org/10.1103/PhysRevLett.124.041803), arXiv:[1910.01185](https://arxiv.org/abs/1910.01185) [hep-ex]
- A.M. Sirunyan et al., **Evidence for Top Quark Production in Nucleus-Nucleus Collisions**, *Phys. Rev. Lett.* 125 (2020) 222001, doi:[10.1103/PhysRevLett.125.222001](https://doi.org/10.1103/PhysRevLett.125.222001), arXiv:[2006.11110](https://arxiv.org/abs/2006.11110) [hep-ex]
- A.M. Sirunyan et al., **Search for disappearing tracks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 806 (2020) 135502, doi:[10.1016/j.physletb.2020.135502](https://doi.org/10.1016/j.physletb.2020.135502), arXiv:[2004.05153](https://arxiv.org/abs/2004.05153) [hep-ex]
- A.M. Sirunyan et al., **Dependence of inclusive jet production on the anti- $k_T$  distance parameter in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 12 (2020) 082, doi:[10.1007/JHEP12\(2020\)082](https://doi.org/10.1007/JHEP12(2020)082), arXiv:[2005.05159](https://arxiv.org/abs/2005.05159) [hep-ex]
- A.M. Sirunyan et al., **Search for an excited lepton that decays via a contact interaction to a lepton and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 05 (2020) 052, doi:[10.1007/JHEP05\(2020\)052](https://doi.org/10.1007/JHEP05(2020)052), arXiv:[2001.04521](https://arxiv.org/abs/2001.04521) [hep-ex]
- A.M. Sirunyan et al., **Measurements of  $t\bar{t}H$  Production and the CP Structure of the Yukawa Interaction between the Higgs Boson and Top Quark in the Diphoton Decay Channel**, *Phys. Rev. Lett.* 125 (2020) 061801, doi:[10.1103/PhysRevLett.125.061801](https://doi.org/10.1103/PhysRevLett.125.061801), arXiv:[2003.10866](https://arxiv.org/abs/2003.10866) [hep-ex]
- A.M. Sirunyan et al., **Performance of the CMS Level-1 trigger in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JINST*. 15 (2020) P10017, doi:[10.1088/1748-0221/15/10/P10017](https://doi.org/10.1088/1748-0221/15/10/P10017), arXiv:[2006.10165](https://arxiv.org/abs/2006.10165) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the W boson rapidity, helicity, double-differential cross sections, and charge asymmetry in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 102 (2020) 092012, doi:[10.1103/PhysRevD.102.092012](https://doi.org/10.1103/PhysRevD.102.092012), arXiv:[2008.04174](https://arxiv.org/abs/2008.04174) [hep-ex]

- A.M. Sirunyan et al., **Search for physics beyond the standard model in events with jets and two same-sign or at least three charged leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 80 (2020) 752, doi:[10.1140/epjc/s10052-020-8168-3](https://doi.org/10.1140/epjc/s10052-020-8168-3), arXiv:[2001.10086](https://arxiv.org/abs/2001.10086) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in pp collisions at  $\sqrt{s} = 13$  TeV with 137 fb<sup>-1</sup> in final states with a single lepton using the sum of masses of large-radius jets**, *Phys. Rev. D.* 101 (2020) 052010, doi:[10.1103/PhysRevD.101.052010](https://doi.org/10.1103/PhysRevD.101.052010), arXiv:[1911.07558](https://arxiv.org/abs/1911.07558) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark Yukawa coupling from  $t\bar{t}$  kinematic distributions in the dilepton final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 092013, doi:[10.1103/PhysRevD.102.092013](https://doi.org/10.1103/PhysRevD.102.092013), arXiv:[2009.07123](https://arxiv.org/abs/2009.07123) [hep-ex]
- A.M. Sirunyan et al., **Measurement of single-diffractive dijet production in proton-proton collisions at  $\sqrt{s} = 8$  TeV with the CMS and TOTEM experiments**, *Eur. Phys. J. C.* 80 (2020) 1164, doi:[10.1140/epjc/s10052-020-08562-y](https://doi.org/10.1140/epjc/s10052-020-08562-y), arXiv:[2002.12146](https://arxiv.org/abs/2002.12146) [hep-ex]
- A.M. Sirunyan et al., **Pileup mitigation at CMS in 13 TeV data**, *JINST.* 15 (2020) P09018, doi:[10.1088/1748-0221/15/09/P09018](https://doi.org/10.1088/1748-0221/15/09/P09018), arXiv:[2003.00503](https://arxiv.org/abs/2003.00503) [hep-ex]
- A.M. Sirunyan et al., **Observation of the  $B_s^0 \rightarrow X(3872) \phi$  decay**, *Phys. Rev. Lett.* 125 (2020) 152001, doi:[10.1103/PhysRevLett.125.152001](https://doi.org/10.1103/PhysRevLett.125.152001), arXiv:[2005.04764](https://arxiv.org/abs/2005.04764) [hep-ex]
- G. Aad et al., **Combination of the W boson polarization measurements in top quark decays using ATLAS and CMS data at  $\sqrt{s} = 8$  TeV**, *JHEP.* 08 (2020) 051, doi:[10.1007/JHEP08\(2020\)051](https://doi.org/10.1007/JHEP08(2020)051), arXiv:[2005.03799](https://arxiv.org/abs/2005.03799) [hep-ex]
- A.M. Sirunyan et al., **Investigation into the event-activity dependence of  $\Upsilon(nS)$  relative production in proton-proton collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 11 (2020) 001, doi:[10.1007/JHEP11\(2020\)001](https://doi.org/10.1007/JHEP11(2020)001), arXiv:[2007.04277](https://arxiv.org/abs/2007.04277) [hep-ex]
- A.M. Sirunyan et al., **Search for a light pseudoscalar Higgs boson in the boosted  $\mu\mu\tau\tau$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 08 (2020) 139, doi:[10.1007/JHEP08\(2020\)139](https://doi.org/10.1007/JHEP08(2020)139), arXiv:[2005.08694](https://arxiv.org/abs/2005.08694) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in proton-proton collisions at  $\sqrt{s} = 13$  TeV in events with high-momentum Z bosons and missing transverse momentum**, *JHEP.* 09 (2020) 149, doi:[10.1007/JHEP09\(2020\)149](https://doi.org/10.1007/JHEP09(2020)149), arXiv:[2008.04422](https://arxiv.org/abs/2008.04422) [hep-ex]
- A.M. Sirunyan et al., **Measurements of production cross sections of WZ and same-sign WW boson pairs in association with two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 809 (2020) 135710, doi:[10.1016/j.physletb.2020.135710](https://doi.org/10.1016/j.physletb.2020.135710), arXiv:[2005.01173](https://arxiv.org/abs/2005.01173) [hep-ex]
- A.M. Sirunyan et al., **Search for decays of the 125 GeV Higgs boson into a Z boson and a  $\rho$  or  $\phi$  meson**, *JHEP.* 11 (2020) 039, doi:[10.1007/JHEP11\(2020\)039](https://doi.org/10.1007/JHEP11(2020)039), arXiv:[2007.05122](https://arxiv.org/abs/2007.05122) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the cross section for  $t\bar{t}$  production with additional jets and b jets in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2020) 125, doi:[10.1007/JHEP07\(2020\)125](https://doi.org/10.1007/JHEP07(2020)125), arXiv:[2003.06467](https://arxiv.org/abs/2003.06467) [hep-ex]
- A.M. Sirunyan et al., **Observation of the Production of Three Massive Gauge Bosons at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 125 (2020) 151802, doi:[10.1103/PhysRevLett.125.151802](https://doi.org/10.1103/PhysRevLett.125.151802), arXiv:[2006.11191](https://arxiv.org/abs/2006.11191) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the associated production of a Z boson with charm or bottom quark jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 032007, doi:[10.1103/PhysRevD.102.032007](https://doi.org/10.1103/PhysRevD.102.032007), arXiv:[2001.06899](https://arxiv.org/abs/2001.06899) [hep-ex]
- A.M. Sirunyan et al., **Search for charged Higgs bosons decaying into a top and a bottom quark in the all-jet final state of pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2020) 126, doi:[10.1007/JHEP07\(2020\)126](https://doi.org/10.1007/JHEP07(2020)126), arXiv:[2001.07763](https://arxiv.org/abs/2001.07763) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the cross section for electroweak production of a Z boson, a photon and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV and constraints on anomalous quartic couplings**, *JHEP.* 06 (2020) 076, doi:[10.1007/JHEP06\(2020\)076](https://doi.org/10.1007/JHEP06(2020)076), arXiv:[2002.09902](https://arxiv.org/abs/2002.09902) [hep-ex]
- A.M. Sirunyan et al., **Study of central exclusive  $\pi^+\pi^-$  production in proton-proton collisions at  $\sqrt{s} = 5.02$  and 13 TeV**, *Eur. Phys. J. C.* 80 (2020) 718, doi:[10.1140/epjc/s10052-020-8166-5](https://doi.org/10.1140/epjc/s10052-020-8166-5), arXiv:[2003.02811](https://arxiv.org/abs/2003.02811) [hep-ex]
- A.M. Sirunyan et al., **Search for resonant pair production of Higgs bosons in the  $bbZZ$  channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 032003, doi:[10.1103/PhysRevD.102.032003](https://doi.org/10.1103/PhysRevD.102.032003), arXiv:[2006.06391](https://arxiv.org/abs/2006.06391) [hep-ex]
- N. Smith et al., **Coffea: Columnar Object Framework For Effective Analysis**, *EPJ Web Conf.* 245 (2020) 06012, doi:[10.1051/epjconf/202024506012](https://doi.org/10.1051/epjconf/202024506012), arXiv:[2008.12712](https://arxiv.org/abs/2008.12712) [cs.DC]

- A.M. Sirunyan et al., **Measurements with silicon photomultipliers of dose-rate effects in the radiation damage of plastic scintillator tiles in the CMS hadron endcap calorimeter**, *JINST.* 15 (2020) P06009, doi:[10.1088/1748-0221/15/06/P06009](https://doi.org/10.1088/1748-0221/15/06/P06009), arXiv:[2001.06553](https://arxiv.org/abs/2001.06553) [physics.ins-det]
- A.M. Sirunyan et al.,  **$W^+W^-$  boson pair production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 092001, doi:[10.1103/PhysRevD.102.092001](https://doi.org/10.1103/PhysRevD.102.092001), arXiv:[2009.00119](https://arxiv.org/abs/2009.00119) [hep-ex]
- A.M. Sirunyan et al., **The production of isolated photons in PbPb and pp collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 07 (2020) 116, doi:[10.1007/JHEP07\(2020\)116](https://doi.org/10.1007/JHEP07(2020)116), arXiv:[2003.12797](https://arxiv.org/abs/2003.12797) [hep-ex]
- A.M. Sirunyan et al., **Search for a light charged Higgs boson in the  $H^\pm \rightarrow cs$  channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 072001, doi:[10.1103/PhysRevD.102.072001](https://doi.org/10.1103/PhysRevD.102.072001), arXiv:[2005.08900](https://arxiv.org/abs/2005.08900) [hep-ex]
- A.M. Sirunyan et al., **Measurement of quark- and gluon-like jet fractions using jet charge in PbPb and pp collisions at 5.02 TeV**, *JHEP.* 07 (2020) 115, doi:[10.1007/JHEP07\(2020\)115](https://doi.org/10.1007/JHEP07(2020)115), arXiv:[2004.00602](https://arxiv.org/abs/2004.00602) [hep-ex]
- A.M. Sirunyan et al., **Identification of heavy, energetic, hadronically decaying particles using machine-learning techniques**, *JINST.* 15 (2020) P06005, doi:[10.1088/1748-0221/15/06/P06005](https://doi.org/10.1088/1748-0221/15/06/P06005), arXiv:[2004.08262](https://arxiv.org/abs/2004.08262) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $\Upsilon(1S)$  pair production cross section and search for resonances decaying to  $\Upsilon(1S) \mu^+\mu^-$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 808 (2020) 135578, doi:[10.1016/j.physletb.2020.135578](https://doi.org/10.1016/j.physletb.2020.135578), arXiv:[2002.06393](https://arxiv.org/abs/2002.06393) [hep-ex]
- A.M. Sirunyan et al., **Measurement of  $B_c(2S)^+$  and  $B_c^*(2S)^+$  cross section ratios in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 092007, doi:[10.1103/PhysRevD.102.092007](https://doi.org/10.1103/PhysRevD.102.092007), arXiv:[2008.08629](https://arxiv.org/abs/2008.08629) [hep-ex]
- A.M. Sirunyan et al., **A search for bottom-type, vector-like quark pair production in a fully hadronic final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 102 (2020) 112004, doi:[10.1103/PhysRevD.102.112004](https://doi.org/10.1103/PhysRevD.102.112004), arXiv:[2008.09835](https://arxiv.org/abs/2008.09835) [hep-ex]
- A.M. Sirunyan et al., **Measurement of CKM matrix elements in single top quark  $t$ -channel production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 808 (2020) 135609, doi:[10.1016/j.physletb.2020.135609](https://doi.org/10.1016/j.physletb.2020.135609), arXiv:[2004.12181](https://arxiv.org/abs/2004.12181) [hep-ex]
- A.M. Sirunyan et al., **Reconstruction of signal amplitudes in the CMS electromagnetic calorimeter in the presence of overlapping proton-proton interactions**, *JINST.* 15 (2020) P10002, doi:[10.1088/1748-0221/15/10/P10002](https://doi.org/10.1088/1748-0221/15/10/P10002), arXiv:[2006.14359](https://arxiv.org/abs/2006.14359) [physics.ins-det]
- A.M. Sirunyan et al., **A measurement of the Higgs boson mass in the diphoton decay channel**, *Phys. Lett. B.* 805 (2020) 135425, doi:[10.1016/j.physletb.2020.135425](https://doi.org/10.1016/j.physletb.2020.135425), arXiv:[2002.06398](https://arxiv.org/abs/2002.06398) [hep-ex]
- A.M. Sirunyan et al., **Observation of electroweak production of  $W \gamma$  with two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 811 (2020) 135988, doi:[10.1016/j.physletb.2020.135988](https://doi.org/10.1016/j.physletb.2020.135988), arXiv:[2008.10521](https://arxiv.org/abs/2008.10521) [hep-ex]
- A.M. Sirunyan et al., **Inclusive search for highly boosted Higgs bosons decaying to bottom quark-antiquark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2020) 085, doi:[10.1007/JHEP12\(2020\)085](https://doi.org/10.1007/JHEP12(2020)085), arXiv:[2006.13251](https://arxiv.org/abs/2006.13251) [hep-ex]
- A.M. Sirunyan et al., **Study of excited  $\Lambda_b^0$  states decaying to  $\Lambda_b^0 \pi^+ \pi^-$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 803 (2020) 135345, doi:[10.1016/j.physletb.2020.135345](https://doi.org/10.1016/j.physletb.2020.135345), arXiv:[2001.06533](https://arxiv.org/abs/2001.06533) [hep-ex]
- O. Gutsche et al., **Striped Data Analysis Framework**, *EPJ Web Conf.* 245 (2020) 06042, doi:[10.1051/epjconf/202024506042](https://doi.org/10.1051/epjconf/202024506042)
- M. Aaboud et al., **Combinations of single-top-quark production cross-section measurements and  $f_{LV}^{tb}$  determinations at  $\sqrt{s} = 7$  and 8 TeV with the ATLAS and CMS experiments**, *JHEP.* 05 (2019) 088, doi:[10.1007/JHEP05\(2019\)088](https://doi.org/10.1007/JHEP05(2019)088), arXiv:[1902.07158](https://arxiv.org/abs/1902.07158) [hep-ex]
- A.M. Sirunyan et al., **Non-Gaussian elliptic-flow fluctuations in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 789 (2019) 643–665, doi:[10.1016/j.physletb.2018.11.063](https://doi.org/10.1016/j.physletb.2018.11.063), arXiv:[1711.05594](https://arxiv.org/abs/1711.05594) [nucl-ex]
- A.M. Sirunyan et al., **Probing the chiral magnetic wave in  $pPb$  and PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV using charge-dependent azimuthal anisotropies**, *Phys. Rev. C.* 100 (2019) 064908, doi:[10.1103/PhysRevC.100.064908](https://doi.org/10.1103/PhysRevC.100.064908), arXiv:[1708.08901](https://arxiv.org/abs/1708.08901) [nucl-ex]
- A.M. Sirunyan et al., **Measurements of  $t\bar{t}$  differential cross sections in proton-proton collisions at  $\sqrt{s} = 13$  TeV using events containing two leptons**, *JHEP.* 02 (2019) 149, doi:[10.1007/JHEP02\(2019\)149](https://doi.org/10.1007/JHEP02(2019)149), arXiv:[1811.06625](https://arxiv.org/abs/1811.06625) [hep-ex]



- A.M. Sirunyan et al., **Measurement of exclusive  $\Upsilon$  photoproduction from protons in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C.* 79 (2019) 277, doi:[10.1140/epjc/s10052-019-6774-8](https://doi.org/10.1140/epjc/s10052-019-6774-8), arXiv:[1809.11080](https://arxiv.org/abs/1809.11080) [hep-ex]
- A.M. Sirunyan et al., **Search for new particles decaying to a jet and an emerging jet**, *JHEP.* 02 (2019) 179, doi:[10.1007/JHEP02\(2019\)179](https://doi.org/10.1007/JHEP02(2019)179), arXiv:[1810.10069](https://arxiv.org/abs/1810.10069) [hep-ex]
- A.M. Sirunyan et al., **Studies of Beauty Suppression via Nonprompt  $D^0$  Mesons in Pb-Pb Collisions at  $Q^2 = 4\text{GeV}^2$** , *Phys. Rev. Lett.* 123 (2019) 022001, doi:[10.1103/PhysRevLett.123.022001](https://doi.org/10.1103/PhysRevLett.123.022001), arXiv:[1810.11102](https://arxiv.org/abs/1810.11102) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections for Z boson pair production in association with jets at  $\sqrt{s} = 8$  and 13 TeV**, *Phys. Lett. B.* 789 (2019) 19–44, doi:[10.1016/j.physletb.2018.11.007](https://doi.org/10.1016/j.physletb.2018.11.007), arXiv:[1806.11073](https://arxiv.org/abs/1806.11073) [hep-ex]
- A.M. Sirunyan et al., **Search for narrow H  $\gamma$  resonances in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 122 (2019) 081804, doi:[10.1103/PhysRevLett.122.081804](https://doi.org/10.1103/PhysRevLett.122.081804), arXiv:[1808.01257](https://arxiv.org/abs/1808.01257) [hep-ex]
- A.M. Sirunyan et al., **Measurement of inclusive and differential Higgs boson production cross sections in the diphoton decay channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 01 (2019) 183, doi:[10.1007/JHEP01\(2019\)183](https://doi.org/10.1007/JHEP01(2019)183), arXiv:[1807.03825](https://arxiv.org/abs/1807.03825) [hep-ex]
- A.M. Sirunyan et al., **Search for a standard model-like Higgs boson in the mass range between 70 and 110 GeV in the diphoton final state in proton-proton collisions at  $\sqrt{s} = 8$  and 13 TeV**, *Phys. Lett. B.* 793 (2019) 320–347, doi:[10.1016/j.physletb.2019.03.064](https://doi.org/10.1016/j.physletb.2019.03.064), arXiv:[1811.08459](https://arxiv.org/abs/1811.08459) [hep-ex]
- A.M. Sirunyan et al., **Search for single production of vector-like quarks decaying to a top quark and a W boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 90, doi:[10.1140/epjc/s10052-019-6556-3](https://doi.org/10.1140/epjc/s10052-019-6556-3), arXiv:[1809.08597](https://arxiv.org/abs/1809.08597) [hep-ex]
- A.M. Sirunyan et al., **Observation of prompt J/  $\psi$  meson elliptic flow in high-multiplicity pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *Phys. Lett. B.* 791 (2019) 172–194, doi:[10.1016/j.physletb.2019.02.018](https://doi.org/10.1016/j.physletb.2019.02.018), arXiv:[1810.01473](https://arxiv.org/abs/1810.01473) [hep-ex]
- A.M. Sirunyan et al., **Measurement of associated production of a W boson and a charm quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 269, doi:[10.1140/epjc/s10052-019-6752-1](https://doi.org/10.1140/epjc/s10052-019-6752-1), arXiv:[1811.10021](https://arxiv.org/abs/1811.10021) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetric partners of electrons and muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 790 (2019) 140–166, doi:[10.1016/j.physletb.2019.01.005](https://doi.org/10.1016/j.physletb.2019.01.005), arXiv:[1806.05264](https://arxiv.org/abs/1806.05264) [hep-ex]
- A.M. Sirunyan et al., **Evidence for light-by-light scattering and searches for axion-like particles in ultraperipheral PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 797 (2019) 134826, doi:[10.1016/j.physletb.2019.134826](https://doi.org/10.1016/j.physletb.2019.134826), arXiv:[1810.04602](https://arxiv.org/abs/1810.04602) [hep-ex]
- A.M. Sirunyan et al., **Measurement of  $B_s^0$  meson production in pp and PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 796 (2019) 168–190, doi:[10.1016/j.physletb.2019.07.014](https://doi.org/10.1016/j.physletb.2019.07.014), arXiv:[1810.03022](https://arxiv.org/abs/1810.03022) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in final states with a single photon and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 02 (2019) 074, doi:[10.1007/JHEP02\(2019\)074](https://doi.org/10.1007/JHEP02(2019)074), arXiv:[1810.00196](https://arxiv.org/abs/1810.00196) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $t\bar{t}$  production cross section, the top quark mass, and the strong coupling constant using dilepton events in pp collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 368, doi:[10.1140/epjc/s10052-019-6863-8](https://doi.org/10.1140/epjc/s10052-019-6863-8), arXiv:[1812.10505](https://arxiv.org/abs/1812.10505) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in events with a photon, a lepton, and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 01 (2019) 154, doi:[10.1007/JHEP01\(2019\)154](https://doi.org/10.1007/JHEP01(2019)154), arXiv:[1812.04066](https://arxiv.org/abs/1812.04066) [hep-ex]
- A.M. Sirunyan et al., **Search for a W' boson decaying to a  $\tau$  lepton and a neutrino in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 792 (2019) 107–131, doi:[10.1016/j.physletb.2019.01.069](https://doi.org/10.1016/j.physletb.2019.01.069), arXiv:[1807.11421](https://arxiv.org/abs/1807.11421) [hep-ex]
- A.M. Sirunyan et al., **Measurement of prompt  $\psi(2S)$  production cross sections in proton-lead and proton-proton collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 790 (2019) 509–532, doi:[10.1016/j.physletb.2019.01.058](https://doi.org/10.1016/j.physletb.2019.01.058), arXiv:[1805.02248](https://arxiv.org/abs/1805.02248) [hep-ex]
- A.M. Sirunyan et al., **Search for rare decays of Z and Higgs bosons to J/  $\psi$  and a photon in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 94, doi:[10.1140/epjc/s10052-019-6562-5](https://doi.org/10.1140/epjc/s10052-019-6562-5), arXiv:[1810.10056](https://arxiv.org/abs/1810.10056) [hep-ex]
- A.M. Sirunyan et al., **Measurement and interpretation of differential cross sections for Higgs boson production at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 792 (2019) 369–396, doi:[10.1016/j.physletb.2019.03.059](https://doi.org/10.1016/j.physletb.2019.03.059), arXiv:[1812.06504](https://arxiv.org/abs/1812.06504) [hep-ex]

- A.M. Sirunyan et al., **Search for  $t\bar{t}H$  production in the  $H \rightarrow b\bar{b}$  decay channel with leptonic  $t\bar{t}$  decays in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2019) 026, doi:[10.1007/JHEP03\(2019\)026](https://doi.org/10.1007/JHEP03(2019)026), arXiv:[1804.03682](https://arxiv.org/abs/1804.03682) [hep-ex]
- A.M. Sirunyan et al., **Search for pair-produced three-jet resonances in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 99 (2019) 012010, doi:[10.1103/PhysRevD.99.012010](https://doi.org/10.1103/PhysRevD.99.012010), arXiv:[1810.10092](https://arxiv.org/abs/1810.10092) [hep-ex]
- A.M. Sirunyan et al., **Combination of searches for Higgs boson pair production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 122 (2019) 121803, doi:[10.1103/PhysRevLett.122.121803](https://doi.org/10.1103/PhysRevLett.122.121803), arXiv:[1811.09689](https://arxiv.org/abs/1811.09689) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy neutrinos and third-generation leptoquarks in hadronic states of two  $\tau$  leptons and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2019) 170, doi:[10.1007/JHEP03\(2019\)170](https://doi.org/10.1007/JHEP03(2019)170), arXiv:[1811.00806](https://arxiv.org/abs/1811.00806) [hep-ex]
- A.M. Sirunyan et al., **Jet Shapes of Isolated Photon-Tagged Jets in Pb-Pb and pp Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 122 (2019) 152001, doi:[10.1103/PhysRevLett.122.152001](https://doi.org/10.1103/PhysRevLett.122.152001), arXiv:[1809.08602](https://arxiv.org/abs/1809.08602) [hep-ex]
- A.M. Sirunyan et al., **Search for associated production of a Higgs boson and a single top quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 99 (2019) 092005, doi:[10.1103/PhysRevD.99.092005](https://doi.org/10.1103/PhysRevD.99.092005), arXiv:[1811.09696](https://arxiv.org/abs/1811.09696) [hep-ex]
- A.M. Sirunyan et al., **A search for pair production of new light bosons decaying into muons in proton-proton collisions at 13 TeV**, *Phys. Lett. B*. 796 (2019) 131–154, doi:[10.1016/j.physletb.2019.07.013](https://doi.org/10.1016/j.physletb.2019.07.013), arXiv:[1812.00380](https://arxiv.org/abs/1812.00380) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy Majorana neutrinos in same-sign dilepton channels in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 01 (2019) 122, doi:[10.1007/JHEP01\(2019\)122](https://doi.org/10.1007/JHEP01(2019)122), arXiv:[1806.10905](https://arxiv.org/abs/1806.10905) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy resonances decaying into two Higgs bosons or into a Higgs boson and a W or Z boson in proton-proton collisions at 13 TeV**, *JHEP*. 01 (2019) 051, doi:[10.1007/JHEP01\(2019\)051](https://doi.org/10.1007/JHEP01(2019)051), arXiv:[1808.01365](https://arxiv.org/abs/1808.01365) [hep-ex]
- A.M. Sirunyan et al., **Search for pair production of second-generation leptoquarks at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 99 (2019) 032014, doi:[10.1103/PhysRevD.99.032014](https://doi.org/10.1103/PhysRevD.99.032014), arXiv:[1808.05082](https://arxiv.org/abs/1808.05082) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the energy density as a function of pseudorapidity in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 391, doi:[10.1140/epjc/s10052-019-6861-x](https://doi.org/10.1140/epjc/s10052-019-6861-x), arXiv:[1812.04095](https://arxiv.org/abs/1812.04095) [hep-ex]
- A.M. Sirunyan et al., **Study of the underlying event in top quark pair production in pp collisions at 13 TeV**, *Eur. Phys. J. C*. 79 (2019) 123, doi:[10.1140/epjc/s10052-019-6620-z](https://doi.org/10.1140/epjc/s10052-019-6620-z), arXiv:[1807.02810](https://arxiv.org/abs/1807.02810) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the differential Drell-Yan cross section in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 12 (2019) 059, doi:[10.1007/JHEP12\(2019\)059](https://doi.org/10.1007/JHEP12(2019)059), arXiv:[1812.10529](https://arxiv.org/abs/1812.10529) [hep-ex]
- A.M. Sirunyan et al., **Search for the Higgs boson decaying to two muons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 122 (2019) 021801, doi:[10.1103/PhysRevLett.122.021801](https://doi.org/10.1103/PhysRevLett.122.021801), arXiv:[1807.06325](https://arxiv.org/abs/1807.06325) [hep-ex]
- A.M. Sirunyan et al., **Search for pair production of first-generation scalar leptoquarks at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 99 (2019) 052002, doi:[10.1103/PhysRevD.99.052002](https://doi.org/10.1103/PhysRevD.99.052002), arXiv:[1811.01197](https://arxiv.org/abs/1811.01197) [hep-ex]
- A.M. Sirunyan et al., **Search for contact interactions and large extra dimensions in the dilepton mass spectra from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2019) 114, doi:[10.1007/JHEP04\(2019\)114](https://doi.org/10.1007/JHEP04(2019)114), arXiv:[1812.10443](https://arxiv.org/abs/1812.10443) [hep-ex]
- A.M. Sirunyan et al., **Search for an exotic decay of the Higgs boson to a pair of light pseudoscalars in the final state with two muons and two b quarks in pp collisions at 13 TeV**, *Phys. Lett. B*. 795 (2019) 398–423, doi:[10.1016/j.physletb.2019.06.021](https://doi.org/10.1016/j.physletb.2019.06.021), arXiv:[1812.06359](https://arxiv.org/abs/1812.06359) [hep-ex]
- A.M. Sirunyan et al., **Search for low-mass resonances decaying into bottom quark-antiquark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 99 (2019) 012005, doi:[10.1103/PhysRevD.99.012005](https://doi.org/10.1103/PhysRevD.99.012005), arXiv:[1810.11822](https://arxiv.org/abs/1810.11822) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections for inclusive isolated-photon and photon+jets production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 20, doi:[10.1140/epjc/s10052-018-6482-9](https://doi.org/10.1140/epjc/s10052-018-6482-9), arXiv:[1807.00782](https://arxiv.org/abs/1807.00782) [hep-ex]
- A.M. Sirunyan et al., **Search for long-lived particles decaying into displaced jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 99 (2019) 032011, doi:[10.1103/PhysRevD.99.032011](https://doi.org/10.1103/PhysRevD.99.032011), arXiv:[1811.07991](https://arxiv.org/abs/1811.07991) [hep-ex]

- A.M. Sirunyan et al., **Search for resonant  $t\bar{t}$  production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2019) 031, doi:[10.1007/JHEP04\(2019\)031](https://doi.org/10.1007/JHEP04(2019)031), arXiv:[1810.05905](https://arxiv.org/abs/1810.05905) [hep-ex]
- A.M. Sirunyan et al., **Inclusive search for supersymmetry in pp collisions at  $\sqrt{s} = 13$  TeV using razor variables and boosted object identification in zero and one lepton final states**, *JHEP*. 03 (2019) 031, doi:[10.1007/JHEP03\(2019\)031](https://doi.org/10.1007/JHEP03(2019)031), arXiv:[1812.06302](https://arxiv.org/abs/1812.06302) [hep-ex]
- A.M. Sirunyan et al., **Search for a  $W'$  boson decaying to a vector-like quark and a top or bottom quark in the all-jets final state**, *JHEP*. 03 (2019) 127, doi:[10.1007/JHEP03\(2019\)127](https://doi.org/10.1007/JHEP03(2019)127), arXiv:[1811.07010](https://arxiv.org/abs/1811.07010) [hep-ex]
- A.M. Sirunyan et al., **Search for excited leptons in  $\ell\ell\gamma$  final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2019) 015, doi:[10.1007/JHEP04\(2019\)015](https://doi.org/10.1007/JHEP04(2019)015), arXiv:[1811.03052](https://arxiv.org/abs/1811.03052) [hep-ex]
- A.M. Sirunyan et al., **Observation of Single Top Quark Production in Association with a  $Z$  Boson in Proton-Proton Collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 122 (2019) 132003, doi:[10.1103/PhysRevLett.122.132003](https://doi.org/10.1103/PhysRevLett.122.132003), arXiv:[1812.05900](https://arxiv.org/abs/1812.05900) [hep-ex]
- A.M. Sirunyan et al., **Search for resonant production of second-generation sleptons with same-sign dimuon events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 305, doi:[10.1140/epjc/s10052-019-6800-x](https://doi.org/10.1140/epjc/s10052-019-6800-x), arXiv:[1811.09760](https://arxiv.org/abs/1811.09760) [hep-ex]
- A.M. Sirunyan et al., **Search for nonresonant Higgs boson pair production in the  $b\bar{b}b\bar{b}$  final state at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2019) 112, doi:[10.1007/JHEP04\(2019\)112](https://doi.org/10.1007/JHEP04(2019)112), arXiv:[1810.11854](https://arxiv.org/abs/1810.11854) [hep-ex]
- A.M. Sirunyan et al., **Search for Higgs boson pair production in the  $\gamma\gamma b\bar{b}$  final state in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 788 (2019) 7–36, doi:[10.1016/j.physletb.2018.10.056](https://doi.org/10.1016/j.physletb.2018.10.056), arXiv:[1806.00408](https://arxiv.org/abs/1806.00408) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark mass in the all-jets final state at  $\sqrt{s} = 13$  TeV and combination with the lepton+jets channel**, *Eur. Phys. J. C*. 79 (2019) 313, doi:[10.1140/epjc/s10052-019-6788-2](https://doi.org/10.1140/epjc/s10052-019-6788-2), arXiv:[1812.10534](https://arxiv.org/abs/1812.10534) [hep-ex]
- A.M. Sirunyan et al., **Combined measurements of Higgs boson couplings in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 421, doi:[10.1140/epjc/s10052-019-6909-y](https://doi.org/10.1140/epjc/s10052-019-6909-y), arXiv:[1809.10733](https://arxiv.org/abs/1809.10733) [hep-ex]
- A.M. Sirunyan et al., **Search for top quark partners with charge 5/3 in the same-sign dilepton and single-lepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2019) 082, doi:[10.1007/JHEP03\(2019\)082](https://doi.org/10.1007/JHEP03(2019)082), arXiv:[1810.03188](https://arxiv.org/abs/1810.03188) [hep-ex]
- A.M. Sirunyan et al., **Search for production of Higgs boson pairs in the four b quark final state using large-area jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 01 (2019) 040, doi:[10.1007/JHEP01\(2019\)040](https://doi.org/10.1007/JHEP01(2019)040), arXiv:[1808.01473](https://arxiv.org/abs/1808.01473) [hep-ex]
- A.M. Sirunyan et al., **Search for the associated production of the Higgs boson and a vector boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV via Higgs boson decays to  $\tau$  leptons**, *JHEP*. 06 (2019) 093, doi:[10.1007/JHEP06\(2019\)093](https://doi.org/10.1007/JHEP06(2019)093), arXiv:[1809.03590](https://arxiv.org/abs/1809.03590) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy resonance decaying to a top quark and a vector-like top quark in the lepton+jets final state in pp collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 208, doi:[10.1140/epjc/s10052-019-6688-5](https://doi.org/10.1140/epjc/s10052-019-6688-5), arXiv:[1812.06489](https://arxiv.org/abs/1812.06489) [hep-ex]
- A.M. Sirunyan et al., **Search for vector-like quarks in events with two oppositely charged leptons and jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 364, doi:[10.1140/epjc/s10052-019-6855-8](https://doi.org/10.1140/epjc/s10052-019-6855-8), arXiv:[1812.09768](https://arxiv.org/abs/1812.09768) [hep-ex]
- A.M. Sirunyan et al., **Centrality and pseudorapidity dependence of the transverse energy density in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. C*. 100 (2019) 024902, doi:[10.1103/PhysRevC.100.024902](https://doi.org/10.1103/PhysRevC.100.024902), arXiv:[1810.05745](https://arxiv.org/abs/1810.05745) [hep-ex]
- A.M. Sirunyan et al., **Search for invisible decays of a Higgs boson produced through vector boson fusion in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 793 (2019) 520–551, doi:[10.1016/j.physletb.2019.04.025](https://doi.org/10.1016/j.physletb.2019.04.025), arXiv:[1809.05937](https://arxiv.org/abs/1809.05937) [hep-ex]
- A.M. Sirunyan et al., **Measurement of inclusive very forward jet cross sections in proton-lead collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP*. 05 (2019) 043, doi:[10.1007/JHEP05\(2019\)043](https://doi.org/10.1007/JHEP05(2019)043), arXiv:[1812.01691](https://arxiv.org/abs/1812.01691) [hep-ex]

- A.M. Sirunyan et al., **Search for dark matter in events with a leptoquark and missing transverse momentum in proton-proton collisions at 13 TeV**, *Phys. Lett. B.* 795 (2019) 76–99, doi:[10.1016/j.physletb.2019.05.046](https://doi.org/10.1016/j.physletb.2019.05.046), arXiv:[1811.10151](https://arxiv.org/abs/1811.10151) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter particles produced in association with a top quark pair at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 122 (2019) 011803, doi:[10.1103/PhysRevLett.122.011803](https://doi.org/10.1103/PhysRevLett.122.011803), arXiv:[1807.06522](https://arxiv.org/abs/1807.06522) [hep-ex]
- A.M. Sirunyan et al., **Search for an  $L_\mu - L_\tau$  gauge boson using  $Z \rightarrow 4\mu$  events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 792 (2019) 345–368, doi:[10.1016/j.physletb.2019.01.072](https://doi.org/10.1016/j.physletb.2019.01.072), arXiv:[1808.03684](https://arxiv.org/abs/1808.03684) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter produced in association with a Higgs boson decaying to a pair of bottom quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 280, doi:[10.1140/epjc/s10052-019-6730-7](https://doi.org/10.1140/epjc/s10052-019-6730-7), arXiv:[1811.06562](https://arxiv.org/abs/1811.06562) [hep-ex]
- A.M. Sirunyan et al., **Measurement of nuclear modification factors of  $\Upsilon(1S)$ ,  $\Upsilon(2S)$ , and  $\Upsilon(3S)$  mesons in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 790 (2019) 270–293, doi:[10.1016/j.physletb.2019.01.006](https://doi.org/10.1016/j.physletb.2019.01.006), arXiv:[1805.09215](https://arxiv.org/abs/1805.09215) [hep-ex]
- A.M. Sirunyan et al., **Measurements of properties of the Higgs boson decaying to a W boson pair in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 791 (2019) 96, doi:[10.1016/j.physletb.2018.12.073](https://doi.org/10.1016/j.physletb.2018.12.073), arXiv:[1806.05246](https://arxiv.org/abs/1806.05246) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in events with a photon, jets,  $b$ -jets, and missing transverse momentum in proton-proton collisions at 13 TeV**, *Eur. Phys. J. C.* 79 (2019) 444, doi:[10.1140/epjc/s10052-019-6926-x](https://doi.org/10.1140/epjc/s10052-019-6926-x), arXiv:[1901.06726](https://arxiv.org/abs/1901.06726) [hep-ex]
- A.M. Sirunyan et al., **Search for dark photons in decays of Higgs bosons produced in association with Z bosons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2019) 139, doi:[10.1007/JHEP10\(2019\)139](https://doi.org/10.1007/JHEP10(2019)139), arXiv:[1908.02699](https://arxiv.org/abs/1908.02699) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark Yukawa coupling from  $t\bar{t}$  kinematic distributions in the lepton+jets final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 100 (2019) 072007, doi:[10.1103/PhysRevD.100.072007](https://doi.org/10.1103/PhysRevD.100.072007), arXiv:[1907.01590](https://arxiv.org/abs/1907.01590) [hep-ex]
- A.M. Sirunyan et al., **Measurement of exclusive  $\rho(770)^0$  photoproduction in ultraperipheral pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C.* 79 (2019) 702, doi:[10.1140/epjc/s10052-019-7202-9](https://doi.org/10.1140/epjc/s10052-019-7202-9), arXiv:[1902.01339](https://arxiv.org/abs/1902.01339) [hep-ex]
- A.M. Sirunyan et al., **Search for charged Higgs bosons in the  $H^\pm \rightarrow \tau^\pm \nu_\tau$  decay channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2019) 142, doi:[10.1007/JHEP07\(2019\)142](https://doi.org/10.1007/JHEP07(2019)142), arXiv:[1903.04560](https://arxiv.org/abs/1903.04560) [hep-ex]
- A.M. Sirunyan et al., **Performance of missing transverse momentum reconstruction in proton-proton collisions at  $\sqrt{s} = 13$  TeV using the CMS detector**, *JINST.* 14 (2019) P07004, doi:[10.1088/1748-0221/14/07/P07004](https://doi.org/10.1088/1748-0221/14/07/P07004), arXiv:[1903.06078](https://arxiv.org/abs/1903.06078) [hep-ex]
- A.M. Sirunyan et al., **Charged-particle angular correlations in XeXe collisions at  $\sqrt{s_{NN}} = 5.44$  TeV**, *Phys. Rev. C.* 100 (2019) 044902, doi:[10.1103/PhysRevC.100.044902](https://doi.org/10.1103/PhysRevC.100.044902), arXiv:[1901.07997](https://arxiv.org/abs/1901.07997) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the  $pp \rightarrow WZ$  inclusive and differential production cross section and constraints on charged anomalous triple gauge couplings at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2019) 122, doi:[10.1007/JHEP04\(2019\)122](https://doi.org/10.1007/JHEP04(2019)122), arXiv:[1901.03428](https://arxiv.org/abs/1901.03428) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the Higgs boson width and anomalous  $HVV$  couplings from on-shell and off-shell production in the four-lepton final state**, *Phys. Rev. D.* 99 (2019) 112003, doi:[10.1103/PhysRevD.99.112003](https://doi.org/10.1103/PhysRevD.99.112003), arXiv:[1901.00174](https://arxiv.org/abs/1901.00174) [hep-ex]
- A.M. Sirunyan et al., **Search for low mass vector resonances decaying into quark-antiquark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 100 (2019) 112007, doi:[10.1103/PhysRevD.100.112007](https://doi.org/10.1103/PhysRevD.100.112007), arXiv:[1909.04114](https://arxiv.org/abs/1909.04114) [hep-ex]
- A.M. Sirunyan et al., **Search for pair production of vectorlike quarks in the fully hadronic final state**, *Phys. Rev. D.* 100 (2019) 072001, doi:[10.1103/PhysRevD.100.072001](https://doi.org/10.1103/PhysRevD.100.072001), arXiv:[1906.11903](https://arxiv.org/abs/1906.11903) [hep-ex]
- A.M. Sirunyan et al., **Pseudorapidity distributions of charged hadrons in xenon-xenon collisions at  $\sqrt{s_{NN}} = 5.44$  TeV**, *Phys. Lett. B.* 799 (2019) 135049, doi:[10.1016/j.physletb.2019.135049](https://doi.org/10.1016/j.physletb.2019.135049), arXiv:[1902.03603](https://arxiv.org/abs/1902.03603) [hep-ex]
- A.M. Sirunyan et al., **Search for vector-like leptons in multilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 100 (2019) 052003, doi:[10.1103/PhysRevD.100.052003](https://doi.org/10.1103/PhysRevD.100.052003), arXiv:[1905.10853](https://arxiv.org/abs/1905.10853) [hep-ex]
- A.M. Sirunyan et al., **Search for a low-mass  $\tau^+\tau^-$  resonance in association with a bottom quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2019) 210, doi:[10.1007/JHEP05\(2019\)210](https://doi.org/10.1007/JHEP05(2019)210), arXiv:[1903.10228](https://arxiv.org/abs/1903.10228) [hep-ex]



- A.M. Sirunyan et al., **Search for a light charged Higgs boson decaying to a W boson and a CP-odd Higgs boson in final states with  $e\mu\mu$  or  $\mu\mu\mu$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 123 (2019) 131802, doi:[10.1103/PhysRevLett.123.131802](https://doi.org/10.1103/PhysRevLett.123.131802), arXiv:[1905.07453](https://arxiv.org/abs/1905.07453) [hep-ex]
- A.M. Sirunyan et al., **Constraints on anomalous  $HVV$  couplings from the production of Higgs bosons decaying to  $\tau$  lepton pairs**, *Phys. Rev. D.* 100 (2019) 112002, doi:[10.1103/PhysRevD.100.112002](https://doi.org/10.1103/PhysRevD.100.112002), arXiv:[1903.06973](https://arxiv.org/abs/1903.06973) [hep-ex]
- A.M. Sirunyan et al., **Measurements of triple-differential cross sections for inclusive isolated-photon+jet events in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 79 (2019) 969, doi:[10.1140/epjc/s10052-019-7451-7](https://doi.org/10.1140/epjc/s10052-019-7451-7), arXiv:[1907.08155](https://arxiv.org/abs/1907.08155) [hep-ex]
- A.M. Sirunyan et al., **Azimuthal separation in nearly back-to-back jet topologies in inclusive 2- and 3-jet events in pp collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 773, doi:[10.1140/epjc/s10052-019-7276-4](https://doi.org/10.1140/epjc/s10052-019-7276-4), arXiv:[1902.04374](https://arxiv.org/abs/1902.04374) [hep-ex]
- A.M. Sirunyan et al., **Search for the production of four top quarks in the single-lepton and opposite-sign dilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2019) 082, doi:[10.1007/JHEP11\(2019\)082](https://doi.org/10.1007/JHEP11(2019)082), arXiv:[1906.02805](https://arxiv.org/abs/1906.02805) [hep-ex]
- A.M. Sirunyan et al., **Combination of CMS searches for heavy resonances decaying to pairs of bosons or leptons**, *Phys. Lett. B.* 798 (2019) 134952, doi:[10.1016/j.physletb.2019.134952](https://doi.org/10.1016/j.physletb.2019.134952), arXiv:[1906.00057](https://arxiv.org/abs/1906.00057) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the average very forward energy as a function of the track multiplicity at central pseudorapidities in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 893, doi:[10.1140/epjc/s10052-019-7402-3](https://doi.org/10.1140/epjc/s10052-019-7402-3), arXiv:[1908.01750](https://arxiv.org/abs/1908.01750) [hep-ex]
- A.M. Sirunyan et al., **Study of the  $B^+ \rightarrow J/\psi \bar{\Lambda} p$  decay in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 12 (2019) 100, doi:[10.1007/JHEP12\(2019\)100](https://doi.org/10.1007/JHEP12(2019)100), arXiv:[1907.05461](https://arxiv.org/abs/1907.05461) [hep-ex]
- A.M. Sirunyan et al., **Search for MSSM Higgs bosons decaying to  $\mu + \mu -$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 798 (2019) 134992, doi:[10.1016/j.physletb.2019.134992](https://doi.org/10.1016/j.physletb.2019.134992), arXiv:[1907.03152](https://arxiv.org/abs/1907.03152) [hep-ex]
- A.M. Sirunyan et al., **Search for the production of  $W^\pm W^\pm W^\mp$  events at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 100 (2019) 012004, doi:[10.1103/PhysRevD.100.012004](https://doi.org/10.1103/PhysRevD.100.012004), arXiv:[1905.04246](https://arxiv.org/abs/1905.04246) [hep-ex]
- A.M. Sirunyan et al., **Search for resonances decaying to a pair of Higgs bosons in the  $b\bar{b}q\bar{q}'\ell\nu$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2019) 125, doi:[10.1007/JHEP10\(2019\)125](https://doi.org/10.1007/JHEP10(2019)125), arXiv:[1904.04193](https://arxiv.org/abs/1904.04193) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark polarization and  $t\bar{t}$  spin correlations using dilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 100 (2019) 072002, doi:[10.1103/PhysRevD.100.072002](https://doi.org/10.1103/PhysRevD.100.072002), arXiv:[1907.03729](https://arxiv.org/abs/1907.03729) [hep-ex]
- A.M. Sirunyan et al., **An embedding technique to determine  $\tau\tau$  backgrounds in proton-proton collision data**, *JINST.* 14 (2019) P06032, doi:[10.1088/1748-0221/14/06/P06032](https://doi.org/10.1088/1748-0221/14/06/P06032), arXiv:[1903.01216](https://arxiv.org/abs/1903.01216) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry using Higgs boson to diphoton decays at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2019) 109, doi:[10.1007/JHEP11\(2019\)109](https://doi.org/10.1007/JHEP11(2019)109), arXiv:[1908.08500](https://arxiv.org/abs/1908.08500) [hep-ex]
- A.M. Sirunyan et al., **Search for anomalous triple gauge couplings in WW and WZ production in lepton + jet events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2019) 062, doi:[10.1007/JHEP12\(2019\)062](https://doi.org/10.1007/JHEP12(2019)062), arXiv:[1907.08354](https://arxiv.org/abs/1907.08354) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy pseudoscalar boson decaying to a Z and a Higgs boson at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 79 (2019) 564, doi:[10.1140/epjc/s10052-019-7058-z](https://doi.org/10.1140/epjc/s10052-019-7058-z), arXiv:[1903.00941](https://arxiv.org/abs/1903.00941) [hep-ex]
- A.M. Sirunyan et al., **Search for anomalous electroweak production of vector boson pairs in association with two jets in proton-proton collisions at 13 TeV**, *Phys. Lett. B.* 798 (2019) 134985, doi:[10.1016/j.physletb.2019.134985](https://doi.org/10.1016/j.physletb.2019.134985), arXiv:[1905.07445](https://arxiv.org/abs/1905.07445) [hep-ex]
- A.M. Sirunyan et al., **Search for long-lived particles using nonprompt jets and missing transverse momentum with proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 797 (2019) 134876, doi:[10.1016/j.physletb.2019.134876](https://doi.org/10.1016/j.physletb.2019.134876), arXiv:[1906.06441](https://arxiv.org/abs/1906.06441) [hep-ex]
- A.M. Sirunyan et al., **Measurements of differential Z boson production cross sections in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2019) 061, doi:[10.1007/JHEP12\(2019\)061](https://doi.org/10.1007/JHEP12(2019)061), arXiv:[1909.04133](https://arxiv.org/abs/1909.04133) [hep-ex]

- A.M. Sirunyan et al., **Search for supersymmetry with a compressed mass spectrum in the vector boson fusion topology with 1-lepton and 0-lepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 08 (2019) 150, doi:[10.1007/JHEP08\(2019\)150](https://doi.org/10.1007/JHEP08(2019)150), arXiv:[1905.13059](https://arxiv.org/abs/1905.13059) [hep-ex]
- A.M. Sirunyan et al., **Observation of Two Excited  $B_c^+$  States and Measurement of the  $B_c^+(2S)$  Mass in pp Collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 122 (2019) 132001, doi:[10.1103/PhysRevLett.122.132001](https://doi.org/10.1103/PhysRevLett.122.132001), arXiv:[1902.00571](https://arxiv.org/abs/1902.00571) [hep-ex]
- A.M. Sirunyan et al., **Measurement of electroweak WZ boson production and search for new physics in WZ + two jets events in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 795 (2019) 281–307, doi:[10.1016/j.physletb.2019.05.042](https://doi.org/10.1016/j.physletb.2019.05.042), arXiv:[1901.04060](https://arxiv.org/abs/1901.04060) [hep-ex]
- A.M. Sirunyan et al., **Search for Physics beyond the Standard Model in Events with Overlapping Photons and Jets**, *Phys. Rev. Lett.* 123 (2019) 241801, doi:[10.1103/PhysRevLett.123.241801](https://doi.org/10.1103/PhysRevLett.123.241801), arXiv:[1907.06275](https://arxiv.org/abs/1907.06275) [hep-ex]
- A.M. Sirunyan et al., **Search for W boson decays to three charged pions**, *Phys. Rev. Lett.* 122 (2019) 151802, doi:[10.1103/PhysRevLett.122.151802](https://doi.org/10.1103/PhysRevLett.122.151802), arXiv:[1901.11201](https://arxiv.org/abs/1901.11201) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in final states with photons and missing transverse momentum in proton-proton collisions at 13 TeV**, *JHEP*. 06 (2019) 143, doi:[10.1007/JHEP06\(2019\)143](https://doi.org/10.1007/JHEP06(2019)143), arXiv:[1903.07070](https://arxiv.org/abs/1903.07070) [hep-ex]
- A.M. Sirunyan et al., **Search for the pair production of light top squarks in the  $e^\pm\mu^\mp$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2019) 101, doi:[10.1007/JHEP03\(2019\)101](https://doi.org/10.1007/JHEP03(2019)101), arXiv:[1901.01288](https://arxiv.org/abs/1901.01288) [hep-ex]
- A.M. Sirunyan et al., **Search for Higgs and Z boson decays to J/ $\psi$  or Y pairs in the four-muon final state in proton-proton collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B*. 797 (2019) 134811, doi:[10.1016/j.physletb.2019.134811](https://doi.org/10.1016/j.physletb.2019.134811), arXiv:[1905.10408](https://arxiv.org/abs/1905.10408) [hep-ex]
- A.M. Sirunyan et al., **Search for Low-Mass Quark-Antiquark Resonances Produced in Association with a Photon at  $\sqrt{s}=13$  TeV**, *Phys. Rev. Lett.* 123 (2019) 231803, doi:[10.1103/PhysRevLett.123.231803](https://doi.org/10.1103/PhysRevLett.123.231803), arXiv:[1905.10331](https://arxiv.org/abs/1905.10331) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in top quark production in dilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 79 (2019) 886, doi:[10.1140/epjc/s10052-019-7387-y](https://doi.org/10.1140/epjc/s10052-019-7387-y), arXiv:[1903.11144](https://arxiv.org/abs/1903.11144) [hep-ex]
- T.C. Collaboration et al., **Search for supersymmetry in proton-proton collisions at 13 TeV in final states with jets and missing transverse momentum**, *JHEP*. 10 (2019) 244, doi:[10.1007/JHEP10\(2019\)244](https://doi.org/10.1007/JHEP10(2019)244), arXiv:[1908.04722](https://arxiv.org/abs/1908.04722) [hep-ex]
- A.M. Sirunyan et al., **Search for long-lived particles using delayed photons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 100 (2019) 112003, doi:[10.1103/PhysRevD.100.112003](https://doi.org/10.1103/PhysRevD.100.112003), arXiv:[1909.06166](https://arxiv.org/abs/1909.06166) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter produced in association with a single top quark or a top quark pair in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2019) 141, doi:[10.1007/JHEP03\(2019\)141](https://doi.org/10.1007/JHEP03(2019)141), arXiv:[1901.01553](https://arxiv.org/abs/1901.01553) [hep-ex]
- M. Cremonesi et al., **Using Big Data Technologies for HEP Analysis**, *EPJ Web Conf.* 214 (2019) 06030, doi:[10.1051/epjconf/201921406030](https://doi.org/10.1051/epjconf/201921406030), arXiv:[1901.07143](https://arxiv.org/abs/1901.07143) [cs.DC]
- J. Albrecht et al., **A Roadmap for HEP Software and Computing R&D for the 2020s**, *Comput. Softw. Big Sci.* 3 (2019) 7, doi:[10.1007/s41781-018-0018-8](https://doi.org/10.1007/s41781-018-0018-8), arXiv:[1712.06982](https://arxiv.org/abs/1712.06982) [physics.comp-ph]
- D. Hufnagel et al., **HPC resource integration into CMS Computing via HEPCloud**, *EPJ Web Conf.* 214 (2019) 03031, doi:[10.1051/epjconf/201921403031](https://doi.org/10.1051/epjconf/201921403031)
- D. Lange et al., **CMS Computing Resources: Meeting the Demands of the High-Luminosity LHC Physics Program**, *EPJ Web Conf.* 214 (2019) 03055, doi:[10.1051/epjconf/201921403055](https://doi.org/10.1051/epjconf/201921403055)
- M. Aaboud et al., **Combination of inclusive and differential  $t\bar{t}$  charge asymmetry measurements using ATLAS and CMS data at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 04 (2018) 033, doi:[10.1007/JHEP04\(2018\)033](https://doi.org/10.1007/JHEP04(2018)033), arXiv:[1709.05327](https://arxiv.org/abs/1709.05327) [hep-ex]
- J. Chang et al., **Striped Data Server for Scalable Parallel Data Analysis**, *J. Phys. Conf. Ser.* 1085 (2018) 042035, doi:[10.1088/1742-6596/1085/4/042035](https://doi.org/10.1088/1742-6596/1085/4/042035)
- A.M. Sirunyan et al., **Search for vectorlike light-flavor quark partners in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 97 (2018) 072008, doi:[10.1103/PhysRevD.97.072008](https://doi.org/10.1103/PhysRevD.97.072008), arXiv:[1708.02510](https://arxiv.org/abs/1708.02510) [hep-ex]
- A.M. Sirunyan et al., **Search for a massive resonance decaying to a pair of Higgs bosons in the four b quark final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 781 (2018) 244–269, doi:[10.1016/j.physletb.2018.03.084](https://doi.org/10.1016/j.physletb.2018.03.084), arXiv:[1710.04960](https://arxiv.org/abs/1710.04960) [hep-ex]

- A.M. Sirunyan et al., **Inclusive search for a highly boosted Higgs boson decaying to a bottom quark-antiquark pair**, *Phys. Rev. Lett.* 120 (2018) 071802, doi:[10.1103/PhysRevLett.120.071802](https://doi.org/10.1103/PhysRevLett.120.071802), arXiv:[1709.05543](https://arxiv.org/abs/1709.05543) [hep-ex]
- A.M. Sirunyan et al., **Search for the flavor-changing neutral current interactions of the top quark and the Higgs boson which decays into a pair of b quarks at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2018) 102, doi:[10.1007/JHEP06\(2018\)102](https://doi.org/10.1007/JHEP06(2018)102), arXiv:[1712.02399](https://arxiv.org/abs/1712.02399) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry with Higgs boson to diphoton decays using the razor variables at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 779 (2018) 166–190, doi:[10.1016/j.physletb.2017.12.069](https://doi.org/10.1016/j.physletb.2017.12.069), arXiv:[1709.00384](https://arxiv.org/abs/1709.00384) [hep-ex]
- A.M. Sirunyan et al., **Search for gauge-mediated supersymmetry in events with at least one photon and missing transverse momentum in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 780 (2018) 118–143, doi:[10.1016/j.physletb.2018.02.045](https://doi.org/10.1016/j.physletb.2018.02.045), arXiv:[1711.08008](https://arxiv.org/abs/1711.08008) [hep-ex]
- A.M. Sirunyan et al., **Search for natural supersymmetry in events with top quark pairs and photons in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 03 (2018) 167, doi:[10.1007/JHEP03\(2018\)167](https://doi.org/10.1007/JHEP03(2018)167), arXiv:[1707.03325](https://arxiv.org/abs/1707.03325) [hep-ex]
- A.M. Sirunyan et al., **Azimuthal correlations for inclusive 2-jet, 3-jet, and 4-jet events in pp collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 566, doi:[10.1140/epjc/s10052-018-6033-4](https://doi.org/10.1140/epjc/s10052-018-6033-4), arXiv:[1712.05471](https://arxiv.org/abs/1712.05471) [hep-ex]
- A.M. Sirunyan et al., **Search for lepton flavour violating decays of the Higgs boson to  $\mu\tau$  and  $e\tau$  in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2018) 001, doi:[10.1007/JHEP06\(2018\)001](https://doi.org/10.1007/JHEP06(2018)001), arXiv:[1712.07173](https://arxiv.org/abs/1712.07173) [hep-ex]
- A.M. Sirunyan et al., **Search for low mass vector resonances decaying into quark-antiquark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 01 (2018) 097, doi:[10.1007/JHEP01\(2018\)097](https://doi.org/10.1007/JHEP01(2018)097), arXiv:[1710.00159](https://arxiv.org/abs/1710.00159) [hep-ex]
- A.M. Sirunyan et al., **Measurement of quarkonium production cross sections in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 780 (2018) 251–272, doi:[10.1016/j.physletb.2018.02.033](https://doi.org/10.1016/j.physletb.2018.02.033), arXiv:[1710.11002](https://arxiv.org/abs/1710.11002) [hep-ex]
- A.M. Sirunyan et al., **Electroweak production of two jets in association with a Z boson in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 589, doi:[10.1140/epjc/s10052-018-6049-9](https://doi.org/10.1140/epjc/s10052-018-6049-9), arXiv:[1712.09814](https://arxiv.org/abs/1712.09814) [hep-ex]
- A.M. Sirunyan et al., **Search for ZZ resonances in the  $2\ \#\ 2\ \nu$  final state in proton-proton collisions at 13 TeV**, *JHEP*. 03 (2018) 003, doi:[10.1007/JHEP03\(2018\)003](https://doi.org/10.1007/JHEP03(2018)003), arXiv:[1711.04370](https://arxiv.org/abs/1711.04370) [hep-ex]
- A.M. Sirunyan et al., **Search for Z  $\gamma$  resonances using leptonic and hadronic final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 09 (2018) 148, doi:[10.1007/JHEP09\(2018\)148](https://doi.org/10.1007/JHEP09(2018)148), arXiv:[1712.03143](https://arxiv.org/abs/1712.03143) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the  $pp \rightarrow ZZ$  production cross section and the  $Z \rightarrow 4\ell$  branching fraction, and constraints on anomalous triple gauge couplings at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 165, doi:[10.1140/epjc/s10052-018-5567-9](https://doi.org/10.1140/epjc/s10052-018-5567-9), arXiv:[1709.08601](https://arxiv.org/abs/1709.08601) [hep-ex]
- A.M. Sirunyan et al., **Study of jet quenching with isolated-photon+jet correlations in PbPb and pp collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 785 (2018) 14–39, doi:[10.1016/j.physletb.2018.07.061](https://doi.org/10.1016/j.physletb.2018.07.061), arXiv:[1711.09738](https://arxiv.org/abs/1711.09738) [nucl-ex]
- A.M. Sirunyan et al., **Search for massive resonances decaying into WW, WZ, ZZ, qW, and qZ with dijet final states at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 97 (2018) 072006, doi:[10.1103/PhysRevD.97.072006](https://doi.org/10.1103/PhysRevD.97.072006), arXiv:[1708.05379](https://arxiv.org/abs/1708.05379) [hep-ex]
- A.M. Sirunyan et al., **Observation of electroweak production of same-sign W boson pairs in the two jet and two same-sign lepton final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 120 (2018) 081801, doi:[10.1103/PhysRevLett.120.081801](https://doi.org/10.1103/PhysRevLett.120.081801), arXiv:[1709.05822](https://arxiv.org/abs/1709.05822) [hep-ex]
- A.M. Sirunyan et al., **Constraints on the double-parton scattering cross section from same-sign W boson pair production in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 02 (2018) 032, doi:[10.1007/JHEP02\(2018\)032](https://doi.org/10.1007/JHEP02(2018)032), arXiv:[1712.02280](https://arxiv.org/abs/1712.02280) [hep-ex]
- A.M. Sirunyan et al., **Search for Higgs boson pair production in events with two bottom quarks and two tau leptons in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 778 (2018) 101–127, doi:[10.1016/j.physletb.2018.01.001](https://doi.org/10.1016/j.physletb.2018.01.001), arXiv:[1707.02909](https://arxiv.org/abs/1707.02909) [hep-ex]
- A.M. Sirunyan et al., **Search for the X(5568) state decaying into  $B_s^0\pi^\pm$  in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 120 (2018) 202005, doi:[10.1103/PhysRevLett.120.202005](https://doi.org/10.1103/PhysRevLett.120.202005), arXiv:[1712.06144](https://arxiv.org/abs/1712.06144) [hep-ex]
- A.M. Sirunyan et al., **Search for pair production of excited top quarks in the lepton + jets final state**, *Phys. Lett. B.* 778 (2018) 349–370, doi:[10.1016/j.physletb.2018.01.049](https://doi.org/10.1016/j.physletb.2018.01.049), arXiv:[1711.10949](https://arxiv.org/abs/1711.10949) [hep-ex]

- A.M. Sirunyan et al., **Search for supersymmetry in events with at least three electrons or muons, jets, and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 02 (2018) 067, doi:[10.1007/JHEP02\(2018\)067](https://doi.org/10.1007/JHEP02(2018)067), arXiv:[1710.09154](https://arxiv.org/abs/1710.09154) [hep-ex]
- A.M. Sirunyan et al., **Search for top squarks and dark matter particles in opposite-charge dilepton final states at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 97 (2018) 032009, doi:[10.1103/PhysRevD.97.032009](https://doi.org/10.1103/PhysRevD.97.032009), arXiv:[1711.00752](https://arxiv.org/abs/1711.00752) [hep-ex]
- A.M. Sirunyan et al., **Observation of Correlated Azimuthal Anisotropy Fourier Harmonics in  $pp$  and  $p + Pb$  Collisions at the LHC**, *Phys. Rev. Lett.* 120 (2018) 092301, doi:[10.1103/PhysRevLett.120.092301](https://doi.org/10.1103/PhysRevLett.120.092301), arXiv:[1709.09189](https://arxiv.org/abs/1709.09189) [nucl-ex]
- A.M. Sirunyan et al., **Search for the pair production of third-generation squarks with two-body decays to a bottom or charm quark and a neutralino in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 778 (2018) 263–291, doi:[10.1016/j.physletb.2018.01.012](https://doi.org/10.1016/j.physletb.2018.01.012), arXiv:[1707.07274](https://arxiv.org/abs/1707.07274) [hep-ex]
- A.M. Sirunyan et al., **Search for decays of stopped exotic long-lived particles produced in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2018) 127, doi:[10.1007/JHEP05\(2018\)127](https://doi.org/10.1007/JHEP05(2018)127), arXiv:[1801.00359](https://arxiv.org/abs/1801.00359) [hep-ex]
- A.M. Sirunyan et al., **Search for excited quarks of light and heavy flavor in  $\gamma +$  jet final states in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 781 (2018) 390–411, doi:[10.1016/j.physletb.2018.04.007](https://doi.org/10.1016/j.physletb.2018.04.007), arXiv:[1711.04652](https://arxiv.org/abs/1711.04652) [hep-ex]
- A.M. Sirunyan et al., **Search for new phenomena in final states with two opposite-charge, same-flavor leptons, jets, and missing transverse momentum in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2018) 076, doi:[10.1007/s13130-018-7845-2](https://doi.org/10.1007/s13130-018-7845-2), arXiv:[1709.08908](https://arxiv.org/abs/1709.08908) [hep-ex]
- A.M. Sirunyan et al., **Constraints on the chiral magnetic effect using charge-dependent azimuthal correlations in  $pPb$  and  $PbPb$  collisions at the CERN Large Hadron Collider**, *Phys. Rev. C.* 97 (2018) 044912, doi:[10.1103/PhysRevC.97.044912](https://doi.org/10.1103/PhysRevC.97.044912), arXiv:[1708.01602](https://arxiv.org/abs/1708.01602) [nucl-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections in the kinematic angular variable  $\phi^*$  for inclusive Z boson production in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 03 (2018) 172, doi:[10.1007/JHEP03\(2018\)172](https://doi.org/10.1007/JHEP03(2018)172), arXiv:[1710.07955](https://arxiv.org/abs/1710.07955) [hep-ex]
- A.M. Sirunyan et al., **Search for Physics Beyond the Standard Model in Events with High-Momentum Higgs Bosons and Missing Transverse Momentum in Proton-Proton Collisions at 13 TeV**, *Phys. Rev. Lett.* 120 (2018) 241801, doi:[10.1103/PhysRevLett.120.241801](https://doi.org/10.1103/PhysRevLett.120.241801), arXiv:[1712.08501](https://arxiv.org/abs/1712.08501) [hep-ex]
- A.M. Sirunyan et al., **Bose-Einstein correlations in  $pp$ ,  $pPb$ , and  $PbPb$  collisions at  $\sqrt{s_{NN}} = 0.9 - 7$  TeV**, *Phys. Rev. C.* 97 (2018) 064912, doi:[10.1103/PhysRevC.97.064912](https://doi.org/10.1103/PhysRevC.97.064912), arXiv:[1712.07198](https://arxiv.org/abs/1712.07198) [hep-ex]
- A.M. Sirunyan et al., **Search for electroweak production of charginos and neutralinos in multilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2018) 166, doi:[10.1007/JHEP03\(2018\)166](https://doi.org/10.1007/JHEP03(2018)166), arXiv:[1709.05406](https://arxiv.org/abs/1709.05406) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the underlying event activity in inclusive Z boson production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2018) 032, doi:[10.1007/JHEP07\(2018\)032](https://doi.org/10.1007/JHEP07(2018)032), arXiv:[1711.04299](https://arxiv.org/abs/1711.04299) [hep-ex]
- A.M. Sirunyan et al., **Search for Higgsino pair production in  $pp$  collisions at  $\sqrt{s} = 13$  TeV in final states with large missing transverse momentum and two Higgs bosons decaying via  $H \rightarrow b\bar{b}$** , *Phys. Rev. D.* 97 (2018) 032007, doi:[10.1103/PhysRevD.97.032007](https://doi.org/10.1103/PhysRevD.97.032007), arXiv:[1709.04896](https://arxiv.org/abs/1709.04896) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in events with a leptonically decaying Z boson and a large transverse momentum imbalance in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 291, doi:[10.1140/epjc/s10052-018-5740-1](https://doi.org/10.1140/epjc/s10052-018-5740-1), arXiv:[1711.00431](https://arxiv.org/abs/1711.00431) [hep-ex]
- A.M. Sirunyan et al., **Search for standard model production of four top quarks with same-sign and multilepton final states in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 140, doi:[10.1140/epjc/s10052-018-5607-5](https://doi.org/10.1140/epjc/s10052-018-5607-5), arXiv:[1710.10614](https://arxiv.org/abs/1710.10614) [hep-ex]
- A.M. Sirunyan et al., **Evidence for the Higgs boson decay to a bottom quarkantiquark pair**, *Phys. Lett. B.* 780 (2018) 501–532, doi:[10.1016/j.physletb.2018.02.050](https://doi.org/10.1016/j.physletb.2018.02.050), arXiv:[1709.07497](https://arxiv.org/abs/1709.07497) [hep-ex]
- A.M. Sirunyan et al., **Study of dijet events with a large rapidity gap between the two leading jets in pp collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 78 (2018) 242, doi:[10.1140/epjc/s10052-018-5691-6](https://doi.org/10.1140/epjc/s10052-018-5691-6), arXiv:[1710.02586](https://arxiv.org/abs/1710.02586) [hep-ex]



- A.M. Sirunyan et al., **Search for new long-lived particles at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 780 (2018) 432–454, doi:[10.1016/j.physletb.2018.03.019](https://doi.org/10.1016/j.physletb.2018.03.019), arXiv:[1711.09120](https://arxiv.org/abs/1711.09120) [hep-ex]
- A.M. Sirunyan et al., **Nuclear modification factor of  $D^0$  mesons in PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 782 (2018) 474–496, doi:[10.1016/j.physletb.2018.05.074](https://doi.org/10.1016/j.physletb.2018.05.074), arXiv:[1708.04962](https://arxiv.org/abs/1708.04962) [nucl-ex]
- A.M. Sirunyan et al., **Measurement of the Splitting Function in  $pp$  and Pb-Pb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 120 (2018) 142302, doi:[10.1103/PhysRevLett.120.142302](https://doi.org/10.1103/PhysRevLett.120.142302), arXiv:[1708.09429](https://arxiv.org/abs/1708.09429) [nucl-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in events with one lepton and multiple jets exploiting the angular correlation between the lepton and the missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 780 (2018) 384–409, doi:[10.1016/j.physletb.2018.03.028](https://doi.org/10.1016/j.physletb.2018.03.028), arXiv:[1709.09814](https://arxiv.org/abs/1709.09814) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in proton-proton collisions at 13 TeV using identified top quarks**, *Phys. Rev. D.* 97 (2018) 012007, doi:[10.1103/PhysRevD.97.012007](https://doi.org/10.1103/PhysRevD.97.012007), arXiv:[1710.11188](https://arxiv.org/abs/1710.11188) [hep-ex]
- A.M. Sirunyan et al., **Search for resonant and nonresonant Higgs boson pair production in the  $b\bar{b}l\nu l\nu$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 01 (2018) 054, doi:[10.1007/JHEP01\(2018\)054](https://doi.org/10.1007/JHEP01(2018)054), arXiv:[1708.04188](https://arxiv.org/abs/1708.04188) [hep-ex]
- A.M. Sirunyan et al., **Measurement of angular parameters from the decay  $B^0 \rightarrow K^{*0}\mu^+\mu^-$  in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 781 (2018) 517–541, doi:[10.1016/j.physletb.2018.04.030](https://doi.org/10.1016/j.physletb.2018.04.030), arXiv:[1710.02846](https://arxiv.org/abs/1710.02846) [hep-ex]
- A.M. Sirunyan et al., **Pseudorapidity distributions of charged hadrons in proton-lead collisions at  $\sqrt{s_{NN}} = 5.02$  and 8.16 TeV**, *JHEP.* 01 (2018) 045, doi:[10.1007/JHEP01\(2018\)045](https://doi.org/10.1007/JHEP01(2018)045), arXiv:[1710.09355](https://arxiv.org/abs/1710.09355) [hep-ex]
- A.M. Sirunyan et al., **Measurement of associated  $Z +$  charm production in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 78 (2018) 287, doi:[10.1140/epjc/s10052-018-5752-x](https://doi.org/10.1140/epjc/s10052-018-5752-x), arXiv:[1711.02143](https://arxiv.org/abs/1711.02143) [hep-ex]
- A.M. Sirunyan et al., **Search for  $R$ -parity violating supersymmetry in  $pp$  collisions at  $\sqrt{s} = 13$  TeV using  $b$  jets in a final state with a single lepton, many jets, and high sum of large-radius jet masses**, *Phys. Lett. B.* 783 (2018) 114–139, doi:[10.1016/j.physletb.2018.06.028](https://doi.org/10.1016/j.physletb.2018.06.028), arXiv:[1712.08920](https://arxiv.org/abs/1712.08920) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the cross section for top quark pair production in association with a  $W$  or  $Z$  boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 08 (2018) 011, doi:[10.1007/JHEP08\(2018\)011](https://doi.org/10.1007/JHEP08(2018)011), arXiv:[1711.02547](https://arxiv.org/abs/1711.02547) [hep-ex]
- A.M. Sirunyan et al., **Measurement of prompt and nonprompt charmonium suppression in  $PbPb$  collisions at 5.02 TeV**, *Eur. Phys. J. C.* 78 (2018) 509, doi:[10.1140/epjc/s10052-018-5950-6](https://doi.org/10.1140/epjc/s10052-018-5950-6), arXiv:[1712.08959](https://arxiv.org/abs/1712.08959) [nucl-ex]
- A.M. Sirunyan et al., **Measurement of prompt  $D^0$  meson azimuthal anisotropy in Pb-Pb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 120 (2018) 202301, doi:[10.1103/PhysRevLett.120.202301](https://doi.org/10.1103/PhysRevLett.120.202301), arXiv:[1708.03497](https://arxiv.org/abs/1708.03497) [nucl-ex]
- A.M. Sirunyan et al., **Search for single production of a vector-like  $T$  quark decaying to a  $Z$  boson and a top quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 781 (2018) 574–600, doi:[10.1016/j.physletb.2018.04.036](https://doi.org/10.1016/j.physletb.2018.04.036), arXiv:[1708.01062](https://arxiv.org/abs/1708.01062) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the associated production of a single top quark and a  $Z$  boson in  $pp$  collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 779 (2018) 358–384, doi:[10.1016/j.physletb.2018.02.025](https://doi.org/10.1016/j.physletb.2018.02.025), arXiv:[1712.02825](https://arxiv.org/abs/1712.02825) [hep-ex]
- A.M. Sirunyan et al., **Identification of heavy-flavour jets with the CMS detector in  $pp$  collisions at 13 TeV**, *JINST.* 13 (2018) P05011, doi:[10.1088/1748-0221/13/05/P05011](https://doi.org/10.1088/1748-0221/13/05/P05011), arXiv:[1712.07158](https://arxiv.org/abs/1712.07158) [physics.ins-det]
- A.M. Sirunyan et al., **Azimuthal anisotropy of charged particles with transverse momentum up to 100 GeV/ $c$  in PbPb collisions at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Lett. B.* 776 (2018) 195–216, doi:[10.1016/j.physletb.2017.11.041](https://doi.org/10.1016/j.physletb.2017.11.041), arXiv:[1702.00630](https://arxiv.org/abs/1702.00630) [hep-ex]
- A.M. Sirunyan et al., **Measurement of normalized differential  $t\bar{t}$  cross sections in the dilepton channel from  $pp$  collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 04 (2018) 060, doi:[10.1007/JHEP04\(2018\)060](https://doi.org/10.1007/JHEP04(2018)060), arXiv:[1708.07638](https://arxiv.org/abs/1708.07638) [hep-ex]
- A.M. Sirunyan et al., **Pseudorapidity and transverse momentum dependence of flow harmonics in pPb and PbPb collisions**, *Phys. Rev. C.* 98 (2018) 044902, doi:[10.1103/PhysRevC.98.044902](https://doi.org/10.1103/PhysRevC.98.044902), arXiv:[1710.07864](https://arxiv.org/abs/1710.07864) [nucl-ex]
- A.M. Sirunyan et al., **Measurements of  $t\bar{t}$  cross sections in association with  $b$  jets and inclusive jets and their ratio using dilepton final states in  $pp$  collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 776 (2018) 355–378, doi:[10.1016/j.physletb.2017.11.043](https://doi.org/10.1016/j.physletb.2017.11.043), arXiv:[1705.10141](https://arxiv.org/abs/1705.10141) [hep-ex]

- A.M. Sirunyan et al., **Suppression of Excited  $\Upsilon$  States Relative to the Ground State in Pb-Pb Collisions at  $\sqrt{s_{NN}}=5.02$  TeV**, *Phys. Rev. Lett.* 120 (2018) 142301, doi:[10.1103/PhysRevLett.120.142301](https://doi.org/10.1103/PhysRevLett.120.142301), arXiv:[1706.05984](https://arxiv.org/abs/1706.05984) [hep-ex]
- A.M. Sirunyan et al., **Measurement of b hadron lifetimes in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 78 (2018) 457, doi:[10.1140/epjc/s10052-018-5929-3](https://doi.org/10.1140/epjc/s10052-018-5929-3), arXiv:[1710.08949](https://arxiv.org/abs/1710.08949) [hep-ex]
- A.M. Sirunyan et al., **Search for pair production of vector-like quarks in the  $bW \bar{b}W$  channel from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 779 (2018) 82–106, doi:[10.1016/j.physletb.2018.01.077](https://doi.org/10.1016/j.physletb.2018.01.077), arXiv:[1710.01539](https://arxiv.org/abs/1710.01539) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy resonances decaying to a top quark and a bottom quark in the lepton+jets final state in proton-proton collisions at 13 TeV**, *Phys. Lett. B.* 777 (2018) 39–63, doi:[10.1016/j.physletb.2017.12.006](https://doi.org/10.1016/j.physletb.2017.12.006), arXiv:[1708.08539](https://arxiv.org/abs/1708.08539) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the inclusive  $t\bar{t}$  cross section in pp collisions at  $\sqrt{s} = 5.02$  TeV using final states with at least one charged lepton**, *JHEP.* 03 (2018) 115, doi:[10.1007/JHEP03\(2018\)115](https://doi.org/10.1007/JHEP03(2018)115), arXiv:[1711.03143](https://arxiv.org/abs/1711.03143) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in final states with an energetic jet or a hadronically decaying  $W$  or  $Z$  boson and transverse momentum imbalance at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 97 (2018) 092005, doi:[10.1103/PhysRevD.97.092005](https://doi.org/10.1103/PhysRevD.97.092005), arXiv:[1712.02345](https://arxiv.org/abs/1712.02345) [hep-ex]
- A.M. Sirunyan et al., **Observation of the Higgs boson decay to a pair of  $\tau$  leptons with the CMS detector**, *Phys. Lett. B.* 779 (2018) 283–316, doi:[10.1016/j.physletb.2018.02.004](https://doi.org/10.1016/j.physletb.2018.02.004), arXiv:[1708.00373](https://arxiv.org/abs/1708.00373) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy right-handed  $W$  boson and a heavy neutrino in events with two same-flavor leptons and two jets at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2018) 148, doi:[10.1007/JHEP05\(2018\)148](https://doi.org/10.1007/JHEP05(2018)148), arXiv:[1803.11116](https://arxiv.org/abs/1803.11116) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the production cross section for single top quarks in association with  $W$  bosons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2018) 117, doi:[10.1007/JHEP10\(2018\)117](https://doi.org/10.1007/JHEP10(2018)117), arXiv:[1805.07399](https://arxiv.org/abs/1805.07399) [hep-ex]
- A.M. Sirunyan et al., **Search for a new scalar resonance decaying to a pair of  $Z$  bosons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2018) 127, doi:[10.1007/JHEP06\(2018\)127](https://doi.org/10.1007/JHEP06(2018)127), arXiv:[1804.01939](https://arxiv.org/abs/1804.01939) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy resonance decaying to a pair of vector bosons in the lepton plus merged jet final state at  $\sqrt{s} = 13$  TeV**, *JHEP.* 05 (2018) 088, doi:[10.1007/JHEP05\(2018\)088](https://doi.org/10.1007/JHEP05(2018)088), arXiv:[1802.09407](https://arxiv.org/abs/1802.09407) [hep-ex]
- A.M. Sirunyan et al., **Comparing transverse momentum balance of b jet pairs in pp and PbPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 03 (2018) 181, doi:[10.1007/JHEP03\(2018\)181](https://doi.org/10.1007/JHEP03(2018)181), arXiv:[1802.00707](https://arxiv.org/abs/1802.00707) [hep-ex]
- A.M. Sirunyan et al., **Search for physics beyond the standard model in high-mass diphoton events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 98 (2018) 092001, doi:[10.1103/PhysRevD.98.092001](https://doi.org/10.1103/PhysRevD.98.092001), arXiv:[1809.00327](https://arxiv.org/abs/1809.00327) [hep-ex]
- A.M. Sirunyan et al., **Search for a charged Higgs boson decaying to charm and bottom quarks in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 11 (2018) 115, doi:[10.1007/JHEP11\(2018\)115](https://doi.org/10.1007/JHEP11(2018)115), arXiv:[1808.06575](https://arxiv.org/abs/1808.06575) [hep-ex]
- A.M. Sirunyan et al., **Evidence for associated production of a Higgs boson with a top quark pair in final states with electrons, muons, and hadronically decaying  $\tau$  leptons at  $\sqrt{s} = 13$  TeV**, *JHEP.* 08 (2018) 066, doi:[10.1007/JHEP08\(2018\)066](https://doi.org/10.1007/JHEP08(2018)066), arXiv:[1803.05485](https://arxiv.org/abs/1803.05485) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the groomed jet mass in PbPb and pp collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 10 (2018) 161, doi:[10.1007/JHEP10\(2018\)161](https://doi.org/10.1007/JHEP10(2018)161), arXiv:[1805.05145](https://arxiv.org/abs/1805.05145) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter in events with energetic, hadronically decaying top quarks and missing transverse momentum at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2018) 027, doi:[10.1007/JHEP06\(2018\)027](https://doi.org/10.1007/JHEP06(2018)027), arXiv:[1801.08427](https://arxiv.org/abs/1801.08427) [hep-ex]
- A.M. Sirunyan et al., **Search for high-mass resonances in final states with a lepton and missing transverse momentum at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2018) 128, doi:[10.1007/JHEP06\(2018\)128](https://doi.org/10.1007/JHEP06(2018)128), arXiv:[1803.11133](https://arxiv.org/abs/1803.11133) [hep-ex]
- A.M. Sirunyan et al., **Evidence for the associated production of a single top quark and a photon in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 121 (2018) 221802, doi:[10.1103/PhysRevLett.121.221802](https://doi.org/10.1103/PhysRevLett.121.221802), arXiv:[1808.02913](https://arxiv.org/abs/1808.02913) [hep-ex]
- A.M. Sirunyan et al., **Search for beyond the standard model Higgs bosons decaying into a  $b\bar{b}$  pair in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 08 (2018) 113, doi:[10.1007/JHEP08\(2018\)113](https://doi.org/10.1007/JHEP08(2018)113), arXiv:[1805.12191](https://arxiv.org/abs/1805.12191) [hep-ex]

- A.M. Sirunyan et al., **Search for lepton-flavor violating decays of heavy resonances and quantum black holes to  $e\mu$  final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 04 (2018) 073, doi:[10.1007/JHEP04\(2018\)073](https://doi.org/10.1007/JHEP04(2018)073), arXiv:[1802.01122](https://arxiv.org/abs/1802.01122) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections for the production of top quark pairs and of additional jets in lepton+jets events from pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 97 (2018) 112003, doi:[10.1103/PhysRevD.97.112003](https://doi.org/10.1103/PhysRevD.97.112003), arXiv:[1803.08856](https://arxiv.org/abs/1803.08856) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy neutral leptons in events with three charged leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 120 (2018) 221801, doi:[10.1103/PhysRevLett.120.221801](https://doi.org/10.1103/PhysRevLett.120.221801), arXiv:[1802.02965](https://arxiv.org/abs/1802.02965) [hep-ex]
- A.M. Sirunyan et al., **Search for high-mass resonances in dilepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 06 (2018) 120, doi:[10.1007/JHEP06\(2018\)120](https://doi.org/10.1007/JHEP06(2018)120), arXiv:[1803.06292](https://arxiv.org/abs/1803.06292) [hep-ex]
- A.M. Sirunyan et al., **Constraining gluon distributions in nuclei using dijets in proton-proton and proton-lead collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 121 (2018) 062002, doi:[10.1103/PhysRevLett.121.062002](https://doi.org/10.1103/PhysRevLett.121.062002), arXiv:[1805.04736](https://arxiv.org/abs/1805.04736) [hep-ex]
- A.M. Sirunyan et al., **Performance of reconstruction and identification of  $\tau$  leptons decaying to hadrons and  $\nu_\tau$  in pp collisions at  $\sqrt{s} = 13$  TeV**, *JINST*. 13 (2018) P10005, doi:[10.1088/1748-0221/13/10/P10005](https://doi.org/10.1088/1748-0221/13/10/P10005), arXiv:[1809.02816](https://arxiv.org/abs/1809.02816) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in events with two soft oppositely charged leptons and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 782 (2018) 440–467, doi:[10.1016/j.physletb.2018.05.062](https://doi.org/10.1016/j.physletb.2018.05.062), arXiv:[1801.01846](https://arxiv.org/abs/1801.01846) [hep-ex]
- A.M. Sirunyan et al., **Search for narrow resonances in the b-tagged dijet mass spectrum in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 120 (2018) 201801, doi:[10.1103/PhysRevLett.120.201801](https://doi.org/10.1103/PhysRevLett.120.201801), arXiv:[1802.06149](https://arxiv.org/abs/1802.06149) [hep-ex]
- A.M. Sirunyan et al., **Search for single production of vector-like quarks decaying to a b quark and a Higgs boson**, *JHEP*. 06 (2018) 031, doi:[10.1007/JHEP06\(2018\)031](https://doi.org/10.1007/JHEP06(2018)031), arXiv:[1802.01486](https://arxiv.org/abs/1802.01486) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the weak mixing angle using the forward-backward asymmetry of Drell-Yan events in pp collisions at 8 TeV**, *Eur. Phys. J. C*. 78 (2018) 701, doi:[10.1140/epjc/s10052-018-6148-7](https://doi.org/10.1140/epjc/s10052-018-6148-7), arXiv:[1806.00863](https://arxiv.org/abs/1806.00863) [hep-ex]
- A.M. Sirunyan et al., **Search for resonances in the mass spectrum of muon pairs produced in association with b quark jets in proton-proton collisions at  $\sqrt{s} = 8$  and 13 TeV**, *JHEP*. 11 (2018) 161, doi:[10.1007/JHEP11\(2018\)161](https://doi.org/10.1007/JHEP11(2018)161), arXiv:[1808.01890](https://arxiv.org/abs/1808.01890) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy resonances decaying into a vector boson and a Higgs boson in final states with charged leptons, neutrinos and b quarks at  $\sqrt{s} = 13$  TeV**, *JHEP*. 11 (2018) 172, doi:[10.1007/JHEP11\(2018\)172](https://doi.org/10.1007/JHEP11(2018)172), arXiv:[1807.02826](https://arxiv.org/abs/1807.02826) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $Z\gamma^* \rightarrow \tau\tau$  cross section in pp collisions at  $\sqrt{s} = 13$  TeV and validation of  $\tau$  lepton analysis techniques**, *Eur. Phys. J. C*. 78 (2018) 708, doi:[10.1140/epjc/s10052-018-6146-9](https://doi.org/10.1140/epjc/s10052-018-6146-9), arXiv:[1801.03535](https://arxiv.org/abs/1801.03535) [hep-ex]
- A.M. Sirunyan et al., **Elliptic flow of charm and strange hadrons in high-multiplicity pPb collisions at  $\sqrt{s_{NN}} = 8.16$  TeV**, *Phys. Rev. Lett.* 121 (2018) 082301, doi:[10.1103/PhysRevLett.121.082301](https://doi.org/10.1103/PhysRevLett.121.082301), arXiv:[1804.09767](https://arxiv.org/abs/1804.09767) [hep-ex]
- A.M. Sirunyan et al., **Measurement of differential cross sections for Z boson production in association with jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 78 (2018) 965, doi:[10.1140/epjc/s10052-018-6373-0](https://doi.org/10.1140/epjc/s10052-018-6373-0), arXiv:[1804.05252](https://arxiv.org/abs/1804.05252) [hep-ex]
- A.M. Sirunyan et al., **Search for narrow and broad dijet resonances in proton-proton collisions at  $\sqrt{s} = 13$  TeV and constraints on dark matter mediators and other new particles**, *JHEP*. 08 (2018) 130, doi:[10.1007/JHEP08\(2018\)130](https://doi.org/10.1007/JHEP08(2018)130), arXiv:[1806.00843](https://arxiv.org/abs/1806.00843) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the inelastic proton-proton cross section at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2018) 161, doi:[10.1007/JHEP07\(2018\)161](https://doi.org/10.1007/JHEP07(2018)161), arXiv:[1802.02613](https://arxiv.org/abs/1802.02613) [hep-ex]
- A.M. Sirunyan et al., **Observation of Medium-Induced Modifications of Jet Fragmentation in Pb-Pb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV Using Isolated Photon-Tagged Jets**, *Phys. Rev. Lett.* 121 (2018) 242301, doi:[10.1103/PhysRevLett.121.242301](https://doi.org/10.1103/PhysRevLett.121.242301), arXiv:[1801.04895](https://arxiv.org/abs/1801.04895) [hep-ex]

- A.M. Sirunyan et al., **Search for pair-produced resonances decaying to quark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 98 (2018) 112014, doi:[10.1103/PhysRevD.98.112014](https://doi.org/10.1103/PhysRevD.98.112014), arXiv:[1808.03124](https://arxiv.org/abs/1808.03124) [hep-ex]
- A.M. Sirunyan et al., **Search for the decay of a Higgs boson in the  $\ell\ell\gamma$  channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 152, doi:[10.1007/JHEP11\(2018\)152](https://doi.org/10.1007/JHEP11(2018)152), arXiv:[1806.05996](https://arxiv.org/abs/1806.05996) [hep-ex]
- A.M. Sirunyan et al., **Search for natural and split supersymmetry in proton-proton collisions at  $\sqrt{s} = 13$  TeV in final states with jets and missing transverse momentum**, *JHEP.* 05 (2018) 025, doi:[10.1007/JHEP05\(2018\)025](https://doi.org/10.1007/JHEP05(2018)025), arXiv:[1802.02110](https://arxiv.org/abs/1802.02110) [hep-ex]
- A.M. Sirunyan et al., **Measurement of charged particle spectra in minimum-bias events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 697, doi:[10.1140/epjc/s10052-018-6144-y](https://doi.org/10.1140/epjc/s10052-018-6144-y), arXiv:[1806.11245](https://arxiv.org/abs/1806.11245) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter produced in association with a Higgs boson decaying to  $\gamma\gamma$  or  $\tau^+\tau^-$  at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2018) 046, doi:[10.1007/JHEP09\(2018\)046](https://doi.org/10.1007/JHEP09(2018)046), arXiv:[1806.04771](https://arxiv.org/abs/1806.04771) [hep-ex]
- A.M. Sirunyan et al., **Observation of Higgs boson decay to bottom quarks**, *Phys. Rev. Lett.* 121 (2018) 121801, doi:[10.1103/PhysRevLett.121.121801](https://doi.org/10.1103/PhysRevLett.121.121801), arXiv:[1808.08242](https://arxiv.org/abs/1808.08242) [hep-ex]
- A.M. Sirunyan et al., **Search for leptoquarks coupled to third-generation quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 121 (2018) 241802, doi:[10.1103/PhysRevLett.121.241802](https://doi.org/10.1103/PhysRevLett.121.241802), arXiv:[1809.05558](https://arxiv.org/abs/1809.05558) [hep-ex]
- A.M. Sirunyan et al., **Search for black holes and sphalerons in high-multiplicity final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 042, doi:[10.1007/JHEP11\(2018\)042](https://doi.org/10.1007/JHEP11(2018)042), arXiv:[1805.06013](https://arxiv.org/abs/1805.06013) [hep-ex]
- A.M. Sirunyan et al., **Search for pair-produced resonances each decaying into at least four quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 121 (2018) 141802, doi:[10.1103/PhysRevLett.121.141802](https://doi.org/10.1103/PhysRevLett.121.141802), arXiv:[1806.01058](https://arxiv.org/abs/1806.01058) [hep-ex]
- A.M. Sirunyan et al., **Measurements of Higgs boson properties in the diphoton decay channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 185, doi:[10.1007/JHEP11\(2018\)185](https://doi.org/10.1007/JHEP11(2018)185), arXiv:[1804.02716](https://arxiv.org/abs/1804.02716) [hep-ex]
- A.M. Sirunyan et al., **Angular analysis of the decay  $B^+ \rightarrow K^+\mu^+\mu^-$  in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 98 (2018) 112011, doi:[10.1103/PhysRevD.98.112011](https://doi.org/10.1103/PhysRevD.98.112011), arXiv:[1806.00636](https://arxiv.org/abs/1806.00636) [hep-ex]
- A.M. Sirunyan et al., **Search for resonant pair production of Higgs bosons decaying to bottom quark-antiquark pairs in proton-proton collisions at 13 TeV**, *JHEP.* 08 (2018) 152, doi:[10.1007/JHEP08\(2018\)152](https://doi.org/10.1007/JHEP08(2018)152), arXiv:[1806.03548](https://arxiv.org/abs/1806.03548) [hep-ex]
- A.M. Sirunyan et al., **Constraints on models of scalar and vector leptoquarks decaying to a quark and a neutrino at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 98 (2018) 032005, doi:[10.1103/PhysRevD.98.032005](https://doi.org/10.1103/PhysRevD.98.032005), arXiv:[1805.10228](https://arxiv.org/abs/1805.10228) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark mass with lepton+jets final states using  $pp$  collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 891, doi:[10.1140/epjc/s10052-018-6332-9](https://doi.org/10.1140/epjc/s10052-018-6332-9), arXiv:[1805.01428](https://arxiv.org/abs/1805.01428) [hep-ex]
- A.M. Sirunyan et al., **Search for an exotic decay of the Higgs boson to a pair of light pseudoscalars in the final state of two muons and two  $\tau$  leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 018, doi:[10.1007/JHEP11\(2018\)018](https://doi.org/10.1007/JHEP11(2018)018), arXiv:[1805.04865](https://arxiv.org/abs/1805.04865) [hep-ex]
- A.M. Sirunyan et al., **Search for disappearing tracks as a signature of new long-lived particles in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 08 (2018) 016, doi:[10.1007/JHEP08\(2018\)016](https://doi.org/10.1007/JHEP08(2018)016), arXiv:[1804.07321](https://arxiv.org/abs/1804.07321) [hep-ex]
- A.M. Sirunyan et al., **Search for additional neutral MSSM Higgs bosons in the  $\tau\tau$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2018) 007, doi:[10.1007/JHEP09\(2018\)007](https://doi.org/10.1007/JHEP09(2018)007), arXiv:[1803.06553](https://arxiv.org/abs/1803.06553) [hep-ex]
- A.M. Sirunyan et al., **Performance of the CMS muon detector and muon reconstruction with proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JINST.* 13 (2018) P06015, doi:[10.1088/1748-0221/13/06/P06015](https://doi.org/10.1088/1748-0221/13/06/P06015), arXiv:[1804.04528](https://arxiv.org/abs/1804.04528) [physics.ins-det]
- A.M. Sirunyan et al., **Search for  $t\bar{t}H$  production in the all-jet final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2018) 101, doi:[10.1007/JHEP06\(2018\)101](https://doi.org/10.1007/JHEP06(2018)101), arXiv:[1803.06986](https://arxiv.org/abs/1803.06986) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy resonance decaying into a Z boson and a Z or W boson in  $2\ell 2q$  final states at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2018) 101, doi:[10.1007/JHEP09\(2018\)101](https://doi.org/10.1007/JHEP09(2018)101), arXiv:[1803.10093](https://arxiv.org/abs/1803.10093) [hep-ex]
- A.M. Sirunyan et al., **Search for top squarks decaying via four-body or chargino-mediated modes in single-lepton final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 09 (2018) 065, doi:[10.1007/JHEP09\(2018\)065](https://doi.org/10.1007/JHEP09(2018)065), arXiv:[1805.05784](https://arxiv.org/abs/1805.05784) [hep-ex]



- A.M. Sirunyan et al., **Event shape variables measured using multijet final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2018) 117, doi:[10.1007/JHEP12\(2018\)117](https://doi.org/10.1007/JHEP12(2018)117), arXiv:[1811.00588](https://arxiv.org/abs/1811.00588) [hep-ex]
- A.M. Sirunyan et al., **Search for third-generation scalar leptoquarks decaying to a top quark and a  $\tau$  lepton at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 78 (2018) 707, doi:[10.1140/epjc/s10052-018-6143-z](https://doi.org/10.1140/epjc/s10052-018-6143-z), arXiv:[1803.02864](https://arxiv.org/abs/1803.02864) [hep-ex]
- A.M. Sirunyan et al., **Combined search for electroweak production of charginos and neutralinos in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2018) 160, doi:[10.1007/JHEP03\(2018\)160](https://doi.org/10.1007/JHEP03(2018)160), arXiv:[1801.03957](https://arxiv.org/abs/1801.03957) [hep-ex]
- A.M. Sirunyan et al., **Measurements of differential cross sections of top quark pair production as a function of kinematic event variables in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 06 (2018) 002, doi:[10.1007/JHEP06\(2018\)002](https://doi.org/10.1007/JHEP06(2018)002), arXiv:[1803.03991](https://arxiv.org/abs/1803.03991) [hep-ex]
- A.M. Sirunyan et al., **Search for long-lived particles with displaced vertices in multijet events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 98 (2018) 092011, doi:[10.1103/PhysRevD.98.092011](https://doi.org/10.1103/PhysRevD.98.092011), arXiv:[1808.03078](https://arxiv.org/abs/1808.03078) [hep-ex]
- A.M. Sirunyan et al., **Search for a singly produced third-generation scalar leptoquark decaying to a  $\tau$  lepton and a bottom quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2018) 115, doi:[10.1007/JHEP07\(2018\)115](https://doi.org/10.1007/JHEP07(2018)115), arXiv:[1806.03472](https://arxiv.org/abs/1806.03472) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in dijet angular distributions using proton-proton collisions at  $\sqrt{s} = 13$  TeV and constraints on dark matter and other models**, *Eur. Phys. J. C.* 78 (2018) 789, doi:[10.1140/epjc/s10052-018-6242-x](https://doi.org/10.1140/epjc/s10052-018-6242-x), arXiv:[1803.08030](https://arxiv.org/abs/1803.08030) [hep-ex]
- A.M. Sirunyan et al., **Observation of proton-tagged, central (semi)exclusive production of high-mass lepton pairs in pp collisions at 13 TeV with the CMS-TOTEM precision proton spectrometer**, *JHEP.* 07 (2018) 153, doi:[10.1007/JHEP07\(2018\)153](https://doi.org/10.1007/JHEP07(2018)153), arXiv:[1803.04496](https://arxiv.org/abs/1803.04496) [hep-ex]
- A.M. Sirunyan et al., **Observation of  $t\bar{t}H$  production**, *Phys. Rev. Lett.* 120 (2018) 231801, doi:[10.1103/PhysRevLett.120.231801](https://doi.org/10.1103/PhysRevLett.120.231801), arXiv:[1804.02610](https://arxiv.org/abs/1804.02610) [hep-ex]
- A.M. Sirunyan et al., **Observation of the  $Z \rightarrow \psi \ell^+ \ell^-$  decay in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 121 (2018) 141801, doi:[10.1103/PhysRevLett.121.141801](https://doi.org/10.1103/PhysRevLett.121.141801), arXiv:[1806.04213](https://arxiv.org/abs/1806.04213) [hep-ex]
- A.M. Sirunyan et al., **Observation of the  $\chi_{b1}(3P)$  and  $\chi_{b2}(3P)$  and measurement of their masses**, *Phys. Rev. Lett.* 121 (2018) 092002, doi:[10.1103/PhysRevLett.121.092002](https://doi.org/10.1103/PhysRevLett.121.092002), arXiv:[1805.11192](https://arxiv.org/abs/1805.11192) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the differential jet cross section as a function of the jet mass in dijet events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 113, doi:[10.1007/JHEP11\(2018\)113](https://doi.org/10.1007/JHEP11(2018)113), arXiv:[1807.05974](https://arxiv.org/abs/1807.05974) [hep-ex]
- A.M. Sirunyan et al., **Studies of  $B_{s2}^*(5840)^0$  and  $B_{s1}(5830)^0$  mesons including the observation of the  $B_{s2}^*(5840)^0 \rightarrow B^0 K_S^0$  decay in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 78 (2018) 939, doi:[10.1140/epjc/s10052-018-6390-z](https://doi.org/10.1140/epjc/s10052-018-6390-z), arXiv:[1809.03578](https://arxiv.org/abs/1809.03578) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $\Lambda_b$  polarization and angular parameters in  $\Lambda_b \rightarrow J/\psi \Lambda$  decays from pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *Phys. Rev. D.* 97 (2018) 072010, doi:[10.1103/PhysRevD.97.072010](https://doi.org/10.1103/PhysRevD.97.072010), arXiv:[1802.04867](https://arxiv.org/abs/1802.04867) [hep-ex]
- A.M. Sirunyan et al., **Precision measurement of the structure of the CMS inner tracking system using nuclear interactions**, *JINST.* 13 (2018) P10034, doi:[10.1088/1748-0221/13/10/P10034](https://doi.org/10.1088/1748-0221/13/10/P10034), arXiv:[1807.03289](https://arxiv.org/abs/1807.03289) [physics.ins-det]
- A.M. Sirunyan et al., **Searches for pair production of charginos and top squarks in final states with two oppositely charged leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 079, doi:[10.1007/JHEP11\(2018\)079](https://doi.org/10.1007/JHEP11(2018)079), arXiv:[1807.07799](https://arxiv.org/abs/1807.07799) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in events with a  $\tau$  lepton pair and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2018) 151, doi:[10.1007/JHEP11\(2018\)151](https://doi.org/10.1007/JHEP11(2018)151), arXiv:[1807.02048](https://arxiv.org/abs/1807.02048) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy resonance decaying into a Z boson and a vector boson in the  $\nu\bar{\nu}q\bar{q}$  final state**, *JHEP.* 07 (2018) 075, doi:[10.1007/JHEP07\(2018\)075](https://doi.org/10.1007/JHEP07(2018)075), arXiv:[1803.03838](https://arxiv.org/abs/1803.03838) [hep-ex]
- A.M. Sirunyan et al., **Measurement of jet substructure observables in  $t\bar{t}$  events from proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 98 (2018) 092014, doi:[10.1103/PhysRevD.98.092014](https://doi.org/10.1103/PhysRevD.98.092014), arXiv:[1808.07340](https://arxiv.org/abs/1808.07340) [hep-ex]
- A.M. Sirunyan et al., **Charged-particle nuclear modification factors in XeXe collisions at  $\sqrt{s_{NN}} = 5.44$  TeV**, *JHEP.* 10 (2018) 138, doi:[10.1007/JHEP10\(2018\)138](https://doi.org/10.1007/JHEP10(2018)138), arXiv:[1809.00201](https://arxiv.org/abs/1809.00201) [hep-ex]

- A.M. Sirunyan et al., **Search for vector-like T and B quark pairs in final states with leptons at  $\sqrt{s} = 13$  TeV**, *JHEP*. 08 (2018) 177, doi:[10.1007/JHEP08\(2018\)177](https://doi.org/10.1007/JHEP08(2018)177), arXiv:[1805.04758](https://arxiv.org/abs/1805.04758) [hep-ex]
- A.M. Sirunyan et al., **Search for an exotic decay of the Higgs boson to a pair of light pseudoscalars in the final state with two b quarks and two  $\tau$  leptons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 785 (2018) 462, doi:[10.1016/j.physletb.2018.08.057](https://doi.org/10.1016/j.physletb.2018.08.057), arXiv:[1805.10191](https://arxiv.org/abs/1805.10191) [hep-ex]
- A.M. Sirunyan et al., **Jet properties in PbPb and pp collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP*. 05 (2018) 006, doi:[10.1007/JHEP05\(2018\)006](https://doi.org/10.1007/JHEP05(2018)006), arXiv:[1803.00042](https://arxiv.org/abs/1803.00042) [nucl-ex]
- O. Gutsche et al., **CMS Analysis and Data Reduction with Apache Spark**, *J. Phys. Conf. Ser.* 1085 (2018) 042030, doi:[10.1088/1742-6596/1085/4/042030](https://doi.org/10.1088/1742-6596/1085/4/042030), arXiv:[1711.00375](https://arxiv.org/abs/1711.00375) [cs.DC]
- V. Khachatryan et al., **Search for narrow resonances in dilepton mass spectra in proton-proton collisions at  $\sqrt{s} = 13$  TeV and combination with 8 TeV data**, *Phys. Lett. B*. 768 (2017) 57–80, doi:[10.1016/j.physletb.2017.02.010](https://doi.org/10.1016/j.physletb.2017.02.010), arXiv:[1609.05391](https://arxiv.org/abs/1609.05391) [hep-ex]
- V. Khachatryan et al., **Measurements of the  $t\bar{t}$  production cross section in lepton+jets final states in pp collisions at 8 TeV and ratio of 8 to 7 TeV cross sections**, *Eur. Phys. J. C*. 77 (2017) 15, doi:[10.1140/epjc/s10052-016-4504-z](https://doi.org/10.1140/epjc/s10052-016-4504-z), arXiv:[1602.09024](https://arxiv.org/abs/1602.09024) [hep-ex]
- V. Khachatryan et al., **Searches for invisible decays of the Higgs boson in pp collisions at  $\sqrt{s} = 7, 8$ , and 13 TeV**, *JHEP*. 02 (2017) 135, doi:[10.1007/JHEP02\(2017\)135](https://doi.org/10.1007/JHEP02(2017)135), arXiv:[1610.09218](https://arxiv.org/abs/1610.09218) [hep-ex]
- V. Khachatryan et al., **Search for single production of a heavy vector-like T quark decaying to a Higgs boson and a top quark with a lepton and jets in the final state**, *Phys. Lett. B*. 771 (2017) 80–105, doi:[10.1016/j.physletb.2017.05.019](https://doi.org/10.1016/j.physletb.2017.05.019), arXiv:[1612.00999](https://arxiv.org/abs/1612.00999) [hep-ex]
- V. Khachatryan et al., **A search for new phenomena in pp collisions at  $\sqrt{s} = 13$  TeV in final states with missing transverse momentum and at least one jet using the  $\alpha_T$  variable**, *Eur. Phys. J. C*. 77 (2017) 294, doi:[10.1140/epjc/s10052-017-4787-8](https://doi.org/10.1140/epjc/s10052-017-4787-8), arXiv:[1611.00338](https://arxiv.org/abs/1611.00338) [hep-ex]
- V. Khachatryan et al., **Measurement of the production cross section of a W boson in association with two b jets in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 77 (2017) 92, doi:[10.1140/epjc/s10052-016-4573-z](https://doi.org/10.1140/epjc/s10052-016-4573-z), arXiv:[1608.07561](https://arxiv.org/abs/1608.07561) [hep-ex]
- V. Khachatryan et al., **Pseudorapidity dependence of long-range two-particle correlations in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. C*. 96 (2017) 014915, doi:[10.1103/PhysRevC.96.014915](https://doi.org/10.1103/PhysRevC.96.014915), arXiv:[1604.05347](https://arxiv.org/abs/1604.05347) [nucl-ex]
- V. Khachatryan et al., **Evidence for collectivity in pp collisions at the LHC**, *Phys. Lett. B*. 765 (2017) 193–220, doi:[10.1016/j.physletb.2016.12.009](https://doi.org/10.1016/j.physletb.2016.12.009), arXiv:[1606.06198](https://arxiv.org/abs/1606.06198) [nucl-ex]
- V. Khachatryan et al., **Search for heavy resonances decaying into a vector boson and a Higgs boson in final states with charged leptons, neutrinos, and b quarks**, *Phys. Lett. B*. 768 (2017) 137–162, doi:[10.1016/j.physletb.2017.02.040](https://doi.org/10.1016/j.physletb.2017.02.040), arXiv:[1610.08066](https://arxiv.org/abs/1610.08066) [hep-ex]
- V. Khachatryan et al., **Search for heavy neutrinos or third-generation leptoquarks in final states with two hadronically decaying  $\tau$  leptons and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 03 (2017) 077, doi:[10.1007/JHEP03\(2017\)077](https://doi.org/10.1007/JHEP03(2017)077), arXiv:[1612.01190](https://arxiv.org/abs/1612.01190) [hep-ex]
- V. Khachatryan et al., **Measurement of electroweak-induced production of W  $\gamma$  with two jets in pp collisions at  $\sqrt{s} = 8$  TeV and constraints on anomalous quartic gauge couplings**, *JHEP*. 06 (2017) 106, doi:[10.1007/JHEP06\(2017\)106](https://doi.org/10.1007/JHEP06(2017)106), arXiv:[1612.09256](https://arxiv.org/abs/1612.09256) [hep-ex]
- V. Khachatryan et al., **Search for electroweak production of charginos in final states with two  $\tau$  leptons in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 04 (2017) 018, doi:[10.1007/JHEP04\(2017\)018](https://doi.org/10.1007/JHEP04(2017)018), arXiv:[1610.04870](https://arxiv.org/abs/1610.04870) [hep-ex]
- V. Khachatryan et al., **Measurements of the associated production of a Z boson and b jets in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 77 (2017) 751, doi:[10.1140/epjc/s10052-017-5140-y](https://doi.org/10.1140/epjc/s10052-017-5140-y), arXiv:[1611.06507](https://arxiv.org/abs/1611.06507) [hep-ex]
- A.M. Sirunyan et al., **Search for dijet resonances in proton-proton collisions at  $\sqrt{s} = 13$  TeV and constraints on dark matter and other models**, *Phys. Lett. B*. 769 (2017) 520–542, doi:[10.1016/j.physletb.2017.02.012](https://doi.org/10.1016/j.physletb.2017.02.012), arXiv:[1611.03568](https://arxiv.org/abs/1611.03568) [hep-ex]
- V. Khachatryan et al., **Measurement of the  $t\bar{t}$  production cross section using events in the  $e \mu$  final state in pp collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C*. 77 (2017) 172, doi:[10.1140/epjc/s10052-017-4718-8](https://doi.org/10.1140/epjc/s10052-017-4718-8), arXiv:[1611.04040](https://arxiv.org/abs/1611.04040) [hep-ex]

- V. Khachatryan et al., **Search for heavy gauge  $W'$  boson in events with an energetic lepton and large missing transverse momentum at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 770 (2017) 278–301, doi:[10.1016/j.physletb.2017.04.043](https://doi.org/10.1016/j.physletb.2017.04.043), arXiv:[1612.09274](https://arxiv.org/abs/1612.09274) [hep-ex]
- V. Khachatryan et al., **Inclusive search for supersymmetry using razor variables in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 95 (2017) 012003, doi:[10.1103/PhysRevD.95.012003](https://doi.org/10.1103/PhysRevD.95.012003), arXiv:[1609.07658](https://arxiv.org/abs/1609.07658) [hep-ex]
- V. Khachatryan et al., **Measurement of the transverse momentum spectrum of the Higgs boson produced in pp collisions at  $\sqrt{s} = 8$  TeV using  $H \rightarrow WW$  decays**, *JHEP.* 03 (2017) 032, doi:[10.1007/JHEP03\(2017\)032](https://doi.org/10.1007/JHEP03(2017)032), arXiv:[1606.01522](https://arxiv.org/abs/1606.01522) [hep-ex]
- V. Khachatryan et al., **Coherent  $J/\psi$  photoproduction in ultra-peripheral PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV with the CMS experiment**, *Phys. Lett. B.* 772 (2017) 489–511, doi:[10.1016/j.physletb.2017.07.001](https://doi.org/10.1016/j.physletb.2017.07.001), arXiv:[1605.06966](https://arxiv.org/abs/1605.06966) [nucl-ex]
- A.M. Sirunyan et al., **Search for electroweak production of a vector-like quark decaying to a top quark and a Higgs boson using boosted topologies in fully hadronic final states**, *JHEP.* 04 (2017) 136, doi:[10.1007/JHEP04\(2017\)136](https://doi.org/10.1007/JHEP04(2017)136), arXiv:[1612.05336](https://arxiv.org/abs/1612.05336) [hep-ex]
- V. Khachatryan et al., **Measurement of the WZ production cross section in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 766 (2017) 268–290, doi:[10.1016/j.physletb.2017.01.011](https://doi.org/10.1016/j.physletb.2017.01.011), arXiv:[1607.06943](https://arxiv.org/abs/1607.06943) [hep-ex]
- V. Khachatryan et al., **Search for high-mass diphoton resonances in proton-proton collisions at 13 TeV and combination with 8 TeV search**, *Phys. Lett. B.* 767 (2017) 147–170, doi:[10.1016/j.physletb.2017.01.027](https://doi.org/10.1016/j.physletb.2017.01.027), arXiv:[1609.02507](https://arxiv.org/abs/1609.02507) [hep-ex]
- A.M. Sirunyan et al., **Cross section measurement of  $t$ -channel single top quark production in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 772 (2017) 752–776, doi:[10.1016/j.physletb.2017.07.047](https://doi.org/10.1016/j.physletb.2017.07.047), arXiv:[1610.00678](https://arxiv.org/abs/1610.00678) [hep-ex]
- S. Chatrchyan et al., **Measurement of the mass difference between top quark and antiquark in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 770 (2017) 50–71, doi:[10.1016/j.physletb.2017.04.028](https://doi.org/10.1016/j.physletb.2017.04.028), arXiv:[1610.09551](https://arxiv.org/abs/1610.09551) [hep-ex]
- V. Khachatryan et al., **Observation of  $\Upsilon(1S)$  pair production in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 05 (2017) 013, doi:[10.1007/JHEP05\(2017\)013](https://doi.org/10.1007/JHEP05(2017)013), arXiv:[1610.07095](https://arxiv.org/abs/1610.07095) [hep-ex]
- V. Khachatryan et al., **Jet energy scale and resolution in the CMS experiment in pp collisions at 8 TeV**, *JINST.* 12 (2017) P02014, doi:[10.1088/1748-0221/12/02/P02014](https://doi.org/10.1088/1748-0221/12/02/P02014), arXiv:[1607.03663](https://arxiv.org/abs/1607.03663) [hep-ex]
- V. Khachatryan et al., **Measurement and QCD analysis of double-differential inclusive jet cross sections in pp collisions at  $\sqrt{s} = 8$  TeV and cross section ratios to 2.76 and 7 TeV**, *JHEP.* 03 (2017) 156, doi:[10.1007/JHEP03\(2017\)156](https://doi.org/10.1007/JHEP03(2017)156), arXiv:[1609.05331](https://arxiv.org/abs/1609.05331) [hep-ex]
- V. Khachatryan et al., **Suppression and azimuthal anisotropy of prompt and nonprompt  $J/\psi$  production in PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Eur. Phys. J. C.* 77 (2017) 252, doi:[10.1140/epjc/s10052-017-4781-1](https://doi.org/10.1140/epjc/s10052-017-4781-1), arXiv:[1610.00613](https://arxiv.org/abs/1610.00613) [nucl-ex]
- V. Khachatryan et al., **Search for supersymmetry in events with photons and missing transverse energy in pp collisions at 13 TeV**, *Phys. Lett. B.* 769 (2017) 391–412, doi:[10.1016/j.physletb.2017.04.005](https://doi.org/10.1016/j.physletb.2017.04.005), arXiv:[1611.06604](https://arxiv.org/abs/1611.06604) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in events with one lepton and multiple jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 95 (2017) 012011, doi:[10.1103/PhysRevD.95.012011](https://doi.org/10.1103/PhysRevD.95.012011), arXiv:[1609.09386](https://arxiv.org/abs/1609.09386) [hep-ex]
- V. Khachatryan et al., **Measurement of the transverse momentum spectra of weak vector bosons produced in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 02 (2017) 096, doi:[10.1007/JHEP02\(2017\)096](https://doi.org/10.1007/JHEP02(2017)096), arXiv:[1606.05864](https://arxiv.org/abs/1606.05864) [hep-ex]
- V. Khachatryan et al., **The CMS trigger system**, *JINST.* 12 (2017) P01020, doi:[10.1088/1748-0221/12/01/P01020](https://doi.org/10.1088/1748-0221/12/01/P01020), arXiv:[1609.02366](https://arxiv.org/abs/1609.02366) [physics.ins-det]
- V. Khachatryan et al., **Measurement of differential cross sections for top quark pair production using the lepton+jets final state in proton-proton collisions at 13 TeV**, *Phys. Rev. D.* 95 (2017) 092001, doi:[10.1103/PhysRevD.95.092001](https://doi.org/10.1103/PhysRevD.95.092001), arXiv:[1610.04191](https://arxiv.org/abs/1610.04191) [hep-ex]
- V. Khachatryan et al., **Search for top quark decays via Higgs-boson-mediated flavor-changing neutral currents in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 02 (2017) 079, doi:[10.1007/JHEP02\(2017\)079](https://doi.org/10.1007/JHEP02(2017)079), arXiv:[1610.04857](https://arxiv.org/abs/1610.04857) [hep-ex]
- V. Khachatryan et al., **Measurements of differential production cross sections for a Z boson in association with jets in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 04 (2017) 022, doi:[10.1007/JHEP04\(2017\)022](https://doi.org/10.1007/JHEP04(2017)022), arXiv:[1611.03844](https://arxiv.org/abs/1611.03844) [hep-ex]

- V. Khachatryan et al., **Measurement of the total and differential inclusive  $B^+$  hadron cross sections in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 771 (2017) 435–456, doi:[10.1016/j.physletb.2017.05.074](https://doi.org/10.1016/j.physletb.2017.05.074), arXiv:[1609.00873](https://arxiv.org/abs/1609.00873) [hep-ex]
- V. Khachatryan et al., **Measurement of the WZ production cross section in pp collisions at  $\sqrt{s} = 7$  and 8 TeV and search for anomalous triple gauge couplings at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 77 (2017) 236, doi:[10.1140/epjc/s10052-017-4730-z](https://doi.org/10.1140/epjc/s10052-017-4730-z), arXiv:[1609.05721](https://arxiv.org/abs/1609.05721) [hep-ex]
- V. Khachatryan et al., **Search for top squark pair production in compressed-mass-spectrum scenarios in proton-proton collisions at  $\sqrt{s} = 8$  TeV using the  $\alpha_T$  variable**, *Phys. Lett. B.* 767 (2017) 403–430, doi:[10.1016/j.physletb.2017.02.007](https://doi.org/10.1016/j.physletb.2017.02.007), arXiv:[1605.08993](https://arxiv.org/abs/1605.08993) [hep-ex]
- V. Khachatryan et al., **Suppression of  $\Upsilon(1S)$ ,  $\Upsilon(2S)$  and  $\Upsilon(3S)$  production in PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Lett. B.* 770 (2017) 357–379, doi:[10.1016/j.physletb.2017.04.031](https://doi.org/10.1016/j.physletb.2017.04.031), arXiv:[1611.01510](https://arxiv.org/abs/1611.01510) [nucl-ex]
- A.M. Sirunyan et al., **Search for massive resonances decaying into WW, WZ or ZZ bosons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 03 (2017) 162, doi:[10.1007/JHEP03\(2017\)162](https://doi.org/10.1007/JHEP03(2017)162), arXiv:[1612.09159](https://arxiv.org/abs/1612.09159) [hep-ex]
- V. Khachatryan et al., **Search for high-mass  $Z \gamma$  resonances in  $e^+e^-\gamma$  and  $\mu^+\mu^-\gamma$  final states in proton-proton collisions at  $\sqrt{s} = 8$  and 13 TeV**, *JHEP.* 01 (2017) 076, doi:[10.1007/JHEP01\(2017\)076](https://doi.org/10.1007/JHEP01(2017)076), arXiv:[1610.02960](https://arxiv.org/abs/1610.02960) [hep-ex]
- A.M. Sirunyan et al., **Searches for pair production of third-generation squarks in  $\sqrt{s} = 13$  TeV pp collisions**, *Eur. Phys. J. C.* 77 (2017) 327, doi:[10.1140/epjc/s10052-017-4853-2](https://doi.org/10.1140/epjc/s10052-017-4853-2), arXiv:[1612.03877](https://arxiv.org/abs/1612.03877) [hep-ex]
- V. Khachatryan et al., **Measurements of differential cross sections for associated production of a W boson and jets in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 95 (2017) 052002, doi:[10.1103/PhysRevD.95.052002](https://doi.org/10.1103/PhysRevD.95.052002), arXiv:[1610.04222](https://arxiv.org/abs/1610.04222) [hep-ex]
- V. Khachatryan et al., **Search for CP violation in  $t\bar{t}$  production and decay in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 03 (2017) 101, doi:[10.1007/JHEP03\(2017\)101](https://doi.org/10.1007/JHEP03(2017)101), arXiv:[1611.08931](https://arxiv.org/abs/1611.08931) [hep-ex]
- V. Khachatryan et al., **Search for Dark Matter and Supersymmetry with a Compressed Mass Spectrum in the Vector Boson Fusion Topology in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 118 (2017) 021802, doi:[10.1103/PhysRevLett.118.021802](https://doi.org/10.1103/PhysRevLett.118.021802), arXiv:[1605.09305](https://arxiv.org/abs/1605.09305) [hep-ex]
- V. Khachatryan et al., **Measurement of inclusive jet cross sections in pp and PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. C.* 96 (2017) 015202, doi:[10.1103/PhysRevC.96.015202](https://doi.org/10.1103/PhysRevC.96.015202), arXiv:[1609.05383](https://arxiv.org/abs/1609.05383) [nucl-ex]
- V. Khachatryan et al., **Search for anomalous Wtb couplings and flavour-changing neutral currents in t-channel single top quark production in pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP.* 02 (2017) 028, doi:[10.1007/JHEP02\(2017\)028](https://doi.org/10.1007/JHEP02(2017)028), arXiv:[1610.03545](https://arxiv.org/abs/1610.03545) [hep-ex]
- V. Khachatryan et al., **Search for new phenomena in events with high jet multiplicity and low missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 770 (2017) 257–267, doi:[10.1016/j.physletb.2017.01.073](https://doi.org/10.1016/j.physletb.2017.01.073), arXiv:[1608.01224](https://arxiv.org/abs/1608.01224) [hep-ex]
- V. Khachatryan et al., **Search for R-parity violating supersymmetry with displaced vertices in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 95 (2017) 012009, doi:[10.1103/PhysRevD.95.012009](https://doi.org/10.1103/PhysRevD.95.012009), arXiv:[1610.05133](https://arxiv.org/abs/1610.05133) [hep-ex]
- V. Khachatryan et al., **Observation of the decay  $B^+ \rightarrow \psi(2S)\phi(1020)K^+$  in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 764 (2017) 66–86, doi:[10.1016/j.physletb.2016.11.001](https://doi.org/10.1016/j.physletb.2016.11.001), arXiv:[1607.02638](https://arxiv.org/abs/1607.02638) [hep-ex]
- V. Khachatryan et al., **Observation of charge-dependent azimuthal correlations in p-Pb collisions and its implication for the search for the chiral magnetic effect**, *Phys. Rev. Lett.* 118 (2017) 122301, doi:[10.1103/PhysRevLett.118.122301](https://doi.org/10.1103/PhysRevLett.118.122301), arXiv:[1610.00263](https://arxiv.org/abs/1610.00263) [nucl-ex]
- A.M. Sirunyan et al., **Relative Modification of Prompt  $\psi(2S)$  and  $J/\psi$  Yields from pp to PbPb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 118 (2017) 162301, doi:[10.1103/PhysRevLett.118.162301](https://doi.org/10.1103/PhysRevLett.118.162301), arXiv:[1611.01438](https://arxiv.org/abs/1611.01438) [nucl-ex]
- A.M. Sirunyan et al., **Search for high-mass  $Z\gamma$  resonances in proton-proton collisions at  $\sqrt{s} = 8$  and 13 TeV using jet substructure techniques**, *Phys. Lett. B.* 772 (2017) 363–387, doi:[10.1016/j.physletb.2017.06.062](https://doi.org/10.1016/j.physletb.2017.06.062), arXiv:[1612.09516](https://arxiv.org/abs/1612.09516) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the charm jet cross section and nuclear modification factor in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 772 (2017) 306–329, doi:[10.1016/j.physletb.2017.06.053](https://doi.org/10.1016/j.physletb.2017.06.053), arXiv:[1612.08972](https://arxiv.org/abs/1612.08972) [nucl-ex]



- V. Khachatryan et al., **Search for heavy resonances decaying to tau lepton pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 02 (2017) 048, doi:[10.1007/JHEP02\(2017\)048](https://doi.org/10.1007/JHEP02(2017)048), arXiv:[1611.06594](https://arxiv.org/abs/1611.06594) [hep-ex]
- V. Khachatryan et al., **Charged-particle nuclear modification factors in PbPb and pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *JHEP.* 04 (2017) 039, doi:[10.1007/JHEP04\(2017\)039](https://doi.org/10.1007/JHEP04(2017)039), arXiv:[1611.01664](https://arxiv.org/abs/1611.01664) [nucl-ex]
- V. Khachatryan et al., **Multiplicity and rapidity dependence of strange hadron production in pp, pPb, and PbPb collisions at the LHC**, *Phys. Lett. B.* 768 (2017) 103–129, doi:[10.1016/j.physletb.2017.01.075](https://doi.org/10.1016/j.physletb.2017.01.075), arXiv:[1605.06699](https://arxiv.org/abs/1605.06699) [nucl-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in multijet events with missing transverse momentum in proton-proton collisions at 13 TeV**, *Phys. Rev. D.* 96 (2017) 032003, doi:[10.1103/PhysRevD.96.032003](https://doi.org/10.1103/PhysRevD.96.032003), arXiv:[1704.07781](https://arxiv.org/abs/1704.07781) [hep-ex]
- A.M. Sirunyan et al., **Searches for  $W'$  bosons decaying to a top quark and a bottom quark in proton-proton collisions at 13 TeV**, *JHEP.* 08 (2017) 029, doi:[10.1007/JHEP08\(2017\)029](https://doi.org/10.1007/JHEP08(2017)029), arXiv:[1706.04260](https://arxiv.org/abs/1706.04260) [hep-ex]
- A.M. Sirunyan et al., **Search for black holes in high-multiplicity final states in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 774 (2017) 279–307, doi:[10.1016/j.physletb.2017.09.053](https://doi.org/10.1016/j.physletb.2017.09.053), arXiv:[1705.01403](https://arxiv.org/abs/1705.01403) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics with dijet angular distributions in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 07 (2017) 013, doi:[10.1007/JHEP07\(2017\)013](https://doi.org/10.1007/JHEP07(2017)013), arXiv:[1703.09986](https://arxiv.org/abs/1703.09986) [hep-ex]
- A.M. Sirunyan et al., **Mechanical stability of the CMS strip tracker measured with a laser alignment system**, *JINST.* 12 (2017) P04023, doi:[10.1088/1748-0221/12/04/P04023](https://doi.org/10.1088/1748-0221/12/04/P04023), arXiv:[1701.02022](https://arxiv.org/abs/1701.02022) [physics.ins-det]
- A.M. Sirunyan et al., **Search for dark matter produced in association with heavy-flavor quark pairs in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 77 (2017) 845, doi:[10.1140/epjc/s10052-017-5317-4](https://doi.org/10.1140/epjc/s10052-017-5317-4), arXiv:[1706.02581](https://arxiv.org/abs/1706.02581) [hep-ex]
- A.M. Sirunyan et al., **Measurements of properties of the Higgs boson decaying into the four-lepton final state in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 11 (2017) 047, doi:[10.1007/JHEP11\(2017\)047](https://doi.org/10.1007/JHEP11(2017)047), arXiv:[1706.09936](https://arxiv.org/abs/1706.09936) [hep-ex]
- V. Khachatryan et al., **Search for light bosons in decays of the 125 GeV Higgs boson in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 10 (2017) 076, doi:[10.1007/JHEP10\(2017\)076](https://doi.org/10.1007/JHEP10(2017)076), arXiv:[1701.02032](https://arxiv.org/abs/1701.02032) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the inclusive energy spectrum in the very forward direction in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 08 (2017) 046, doi:[10.1007/JHEP08\(2017\)046](https://doi.org/10.1007/JHEP08(2017)046), arXiv:[1701.08695](https://arxiv.org/abs/1701.08695) [hep-ex]
- A.M. Sirunyan et al., **Combination of searches for heavy resonances decaying to  $WW$ ,  $WZ$ ,  $ZZ$ ,  $WH$ , and  $ZH$  boson pairs in proton-proton collisions at  $\sqrt{s} = 8$  and 13 TeV**, *Phys. Lett. B.* 774 (2017) 533–558, doi:[10.1016/j.physletb.2017.09.083](https://doi.org/10.1016/j.physletb.2017.09.083), arXiv:[1705.09171](https://arxiv.org/abs/1705.09171) [hep-ex]
- A.M. Sirunyan et al., **Search for anomalous couplings in boosted  $WW/WZ \rightarrow \ell\nu q\bar{q}$  production in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 772 (2017) 21–42, doi:[10.1016/j.physletb.2017.06.009](https://doi.org/10.1016/j.physletb.2017.06.009), arXiv:[1703.06095](https://arxiv.org/abs/1703.06095) [hep-ex]
- A.M. Sirunyan et al., **Measurement of charged pion, kaon, and proton production in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 96 (2017) 112003, doi:[10.1103/PhysRevD.96.112003](https://doi.org/10.1103/PhysRevD.96.112003), arXiv:[1706.10194](https://arxiv.org/abs/1706.10194) [hep-ex]
- A.M. Sirunyan et al., **Study of Jet Quenching with  $Z + jet$  Correlations in Pb-Pb and  $pp$  Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Rev. Lett.* 119 (2017) 082301, doi:[10.1103/PhysRevLett.119.082301](https://doi.org/10.1103/PhysRevLett.119.082301), arXiv:[1702.01060](https://arxiv.org/abs/1702.01060) [nucl-ex]
- A.M. Sirunyan et al., **Measurement of prompt and nonprompt  $J/\psi$  production in  $pp$  and  $pPb$  collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C.* 77 (2017) 269, doi:[10.1140/epjc/s10052-017-4828-3](https://doi.org/10.1140/epjc/s10052-017-4828-3), arXiv:[1702.01462](https://arxiv.org/abs/1702.01462) [nucl-ex]
- A.M. Sirunyan et al., **Search for Charged Higgs Bosons Produced via Vector Boson Fusion and Decaying into a Pair of  $W$  and  $Z$  Bosons Using  $pp$  Collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 119 (2017) 141802, doi:[10.1103/PhysRevLett.119.141802](https://doi.org/10.1103/PhysRevLett.119.141802), arXiv:[1705.02942](https://arxiv.org/abs/1705.02942) [hep-ex]
- A.M. Sirunyan et al., **Search for single production of vector-like quarks decaying into a  $b$  quark and a  $W$  boson in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B.* 772 (2017) 634–656, doi:[10.1016/j.physletb.2017.07.022](https://doi.org/10.1016/j.physletb.2017.07.022), arXiv:[1701.08328](https://arxiv.org/abs/1701.08328) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the differential cross sections for the associated production of a  $W$  boson and jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 96 (2017) 072005, doi:[10.1103/PhysRevD.96.072005](https://doi.org/10.1103/PhysRevD.96.072005), arXiv:[1707.05979](https://arxiv.org/abs/1707.05979) [hep-ex]
- A.M. Sirunyan et al., **Search for top squark pair production in  $pp$  collisions at  $\sqrt{s} = 13$  TeV using single lepton events**, *JHEP.* 10 (2017) 019, doi:[10.1007/JHEP10\(2017\)019](https://doi.org/10.1007/JHEP10(2017)019), arXiv:[1706.04402](https://arxiv.org/abs/1706.04402) [hep-ex]

- A.M. Sirunyan et al., **Search for single production of vector-like quarks decaying to a Z boson and a top or a bottom quark in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 05 (2017) 029, doi:[10.1007/JHEP05\(2017\)029](https://doi.org/10.1007/JHEP05(2017)029), arXiv:[1701.07409](https://arxiv.org/abs/1701.07409) [hep-ex]
- A.M. Sirunyan et al., **Observation of top quark production in proton-nucleus collisions**, *Phys. Rev. Lett.* 119 (2017) 242001, doi:[10.1103/PhysRevLett.119.242001](https://doi.org/10.1103/PhysRevLett.119.242001), arXiv:[1709.07411](https://arxiv.org/abs/1709.07411) [nucl-ex]
- A.M. Sirunyan et al., **Search for a heavy resonance decaying to a top quark and a vector-like top quark at  $\sqrt{s} = 13$  TeV**, *JHEP*. 09 (2017) 053, doi:[10.1007/JHEP09\(2017\)053](https://doi.org/10.1007/JHEP09(2017)053), arXiv:[1703.06352](https://arxiv.org/abs/1703.06352) [hep-ex]
- V. Khachatryan et al., **Search for new phenomena with multiple charged leptons in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C*. 77 (2017) 635, doi:[10.1140/epjc/s10052-017-5182-1](https://doi.org/10.1140/epjc/s10052-017-5182-1), arXiv:[1701.06940](https://arxiv.org/abs/1701.06940) [hep-ex]
- A.M. Sirunyan et al., **Measurement of double-differential cross sections for top quark pair production in pp collisions at  $\sqrt{s} = 8\text{TeV}$  and impact on parton distribution functions**, *Eur. Phys. J. C*. 77 (2017) 459, doi:[10.1140/epjc/s10052-017-4984-5](https://doi.org/10.1140/epjc/s10052-017-4984-5), arXiv:[1703.01630](https://arxiv.org/abs/1703.01630) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in the all-hadronic final state using top quark tagging in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D*. 96 (2017) 012004, doi:[10.1103/PhysRevD.96.012004](https://doi.org/10.1103/PhysRevD.96.012004), arXiv:[1701.01954](https://arxiv.org/abs/1701.01954) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter produced with an energetic jet or a hadronically decaying W or Z boson at  $\sqrt{s} = 13$  TeV**, *JHEP*. 07 (2017) 014, doi:[10.1007/JHEP07\(2017\)014](https://doi.org/10.1007/JHEP07(2017)014), arXiv:[1703.01651](https://arxiv.org/abs/1703.01651) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the triple-differential dijet cross section in proton-proton collisions at  $\sqrt{s} = 8\text{TeV}$  and constraints on parton distribution functions**, *Eur. Phys. J. C*. 77 (2017) 746, doi:[10.1140/epjc/s10052-017-5286-7](https://doi.org/10.1140/epjc/s10052-017-5286-7), arXiv:[1705.02628](https://arxiv.org/abs/1705.02628) [hep-ex]
- A.M. Sirunyan et al., **Search for pair production of vector-like T and B quarks in single-lepton final states using boosted jet substructure in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 11 (2017) 085, doi:[10.1007/JHEP11\(2017\)085](https://doi.org/10.1007/JHEP11(2017)085), arXiv:[1706.03408](https://arxiv.org/abs/1706.03408) [hep-ex]
- L. Bauerdick et al., **Experience in using commercial clouds in CMS**, *J. Phys. Conf. Ser.* 898 (2017) 052019, doi:[10.1088/1742-6596/898/5/052019](https://doi.org/10.1088/1742-6596/898/5/052019)
- A.M. Sirunyan et al., **Search for electroweak production of charginos and neutralinos in WH events in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 11 (2017) 029, doi:[10.1007/JHEP11\(2017\)029](https://doi.org/10.1007/JHEP11(2017)029), arXiv:[1706.09933](https://arxiv.org/abs/1706.09933) [hep-ex]
- A.M. Sirunyan et al., **Constraints on anomalous Higgs boson couplings using production and decay information in the four-lepton final state**, *Phys. Lett. B*. 775 (2017) 1–24, doi:[10.1016/j.physletb.2017.10.021](https://doi.org/10.1016/j.physletb.2017.10.021), arXiv:[1707.00541](https://arxiv.org/abs/1707.00541) [hep-ex]
- A.M. Sirunyan et al., **Search for direct production of supersymmetric partners of the top quark in the all-jets final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 10 (2017) 005, doi:[10.1007/JHEP10\(2017\)005](https://doi.org/10.1007/JHEP10(2017)005), arXiv:[1707.03316](https://arxiv.org/abs/1707.03316) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark mass using single top quark events in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 77 (2017) 354, doi:[10.1140/epjc/s10052-017-4912-8](https://doi.org/10.1140/epjc/s10052-017-4912-8), arXiv:[1703.02530](https://arxiv.org/abs/1703.02530) [hep-ex]
- A.M. Sirunyan et al., **Search for top quark partners with charge 5/3 in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *JHEP*. 08 (2017) 073, doi:[10.1007/JHEP08\(2017\)073](https://doi.org/10.1007/JHEP08(2017)073), arXiv:[1705.10967](https://arxiv.org/abs/1705.10967) [hep-ex]
- A.M. Sirunyan et al., **Principal-component analysis of two-particle azimuthal correlations in PbPb and pPb collisions at CMS**, *Phys. Rev. C*. 96 (2017) 064902, doi:[10.1103/PhysRevC.96.064902](https://doi.org/10.1103/PhysRevC.96.064902), arXiv:[1708.07113](https://arxiv.org/abs/1708.07113) [nucl-ex]
- A.M. Sirunyan et al., **Search for a light pseudoscalar Higgs boson produced in association with bottom quarks in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 11 (2017) 010, doi:[10.1007/JHEP11\(2017\)010](https://doi.org/10.1007/JHEP11(2017)010), arXiv:[1707.07283](https://arxiv.org/abs/1707.07283) [hep-ex]
- A.M. Sirunyan et al., **Search for standard model production of four top quarks in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 772 (2017) 336–358, doi:[10.1016/j.physletb.2017.06.064](https://doi.org/10.1016/j.physletb.2017.06.064), arXiv:[1702.06164](https://arxiv.org/abs/1702.06164) [hep-ex]
- A.M. Sirunyan et al., **Search for Low Mass Vector Resonances Decaying to Quark-Antiquark Pairs in Proton-Proton Collisions at  $\sqrt{s} = 13\text{TeV}$** , *Phys. Rev. Lett.* 119 (2017) 111802, doi:[10.1103/PhysRevLett.119.111802](https://doi.org/10.1103/PhysRevLett.119.111802), arXiv:[1705.10532](https://arxiv.org/abs/1705.10532) [hep-ex]
- A.M. Sirunyan et al., **Search for new phenomena with the  $M_{T2}$  variable in the all-hadronic final state produced in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C*. 77 (2017) 710, doi:[10.1140/epjc/s10052-017-5267-x](https://doi.org/10.1140/epjc/s10052-017-5267-x), arXiv:[1705.04650](https://arxiv.org/abs/1705.04650) [hep-ex]

- A.M. Sirunyan et al., **Measurement of the jet mass in highly boosted  $t\bar{t}$  events from pp collisions at  $\sqrt{s} = 8\text{TeV}$** , *Eur. Phys. J. C.* 77 (2017) 467, doi:[10.1140/epjc/s10052-017-5030-3](https://doi.org/10.1140/epjc/s10052-017-5030-3), arXiv:[1703.06330](https://arxiv.org/abs/1703.06330) [hep-ex]
- A.M. Sirunyan et al., **Search for associated production of dark matter with a Higgs boson decaying to  $b\bar{b}$  or  $\gamma\gamma$  at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 10 (2017) 180, doi:[10.1007/JHEP10\(2017\)180](https://doi.org/10.1007/JHEP10(2017)180), arXiv:[1703.05236](https://arxiv.org/abs/1703.05236) [hep-ex]
- A.M. Sirunyan et al., **Search for supersymmetry in events with at least one photon, missing transverse momentum, and large transverse event activity in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 12 (2017) 142, doi:[10.1007/JHEP12\(2017\)142](https://doi.org/10.1007/JHEP12(2017)142), arXiv:[1707.06193](https://arxiv.org/abs/1707.06193) [hep-ex]
- A.M. Sirunyan et al., **Search for new physics in the monophoton final state in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 10 (2017) 073, doi:[10.1007/JHEP10\(2017\)073](https://doi.org/10.1007/JHEP10(2017)073), arXiv:[1706.03794](https://arxiv.org/abs/1706.03794) [hep-ex]
- A.M. Sirunyan et al., **Search for dark matter and unparticles in events with a Z boson and missing transverse momentum in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 03 (2017) 061, doi:[10.1007/JHEP03\(2017\)061](https://doi.org/10.1007/JHEP03(2017)061), arXiv:[1701.02042](https://arxiv.org/abs/1701.02042) [hep-ex]
- V. Khachatryan et al., **Measurement of the cross section for electroweak production of Z  $\gamma$  in association with two jets and constraints on anomalous quartic gauge couplings in protonproton collisions at  $\sqrt{s} = 8\text{ TeV}$** , *Phys. Lett. B.* 770 (2017) 380–402, doi:[10.1016/j.physletb.2017.04.071](https://doi.org/10.1016/j.physletb.2017.04.071), arXiv:[1702.03025](https://arxiv.org/abs/1702.03025) [hep-ex]
- A.M. Sirunyan et al., **Search for heavy resonances that decay into a vector boson and a Higgs boson in hadronic final states at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 77 (2017) 636, doi:[10.1140/epjc/s10052-017-5192-z](https://doi.org/10.1140/epjc/s10052-017-5192-z), arXiv:[1707.01303](https://arxiv.org/abs/1707.01303) [hep-ex]
- A.M. Sirunyan et al., **Search for a heavy composite Majorana neutrino in the final state with two leptons and two quarks at  $\sqrt{s} = 13\text{ TeV}$** , *Phys. Lett. B.* 775 (2017) 315–337, doi:[10.1016/j.physletb.2017.11.001](https://doi.org/10.1016/j.physletb.2017.11.001), arXiv:[1706.08578](https://arxiv.org/abs/1706.08578) [hep-ex]
- V. Khachatryan et al., **Search for leptophobic Z' bosons decaying into four-lepton final states in protonproton collisions at  $\sqrt{s} = 8\text{TeV}$** , *Phys. Lett. B.* 773 (2017) 563–584, doi:[10.1016/j.physletb.2017.08.069](https://doi.org/10.1016/j.physletb.2017.08.069), arXiv:[1701.01345](https://arxiv.org/abs/1701.01345) [hep-ex]
- A.M. Sirunyan et al., **Search for physics beyond the standard model in events with two leptons of same sign, missing transverse momentum, and jets in protonproton collisions at  $\sqrt{s} = 13\text{TeV}$** , *Eur. Phys. J. C.* 77 (2017) 578, doi:[10.1140/epjc/s10052-017-5079-z](https://doi.org/10.1140/epjc/s10052-017-5079-z), arXiv:[1704.07323](https://arxiv.org/abs/1704.07323) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the semileptonic  $t\bar{t} + \gamma$  production cross section in pp collisions at  $\sqrt{s} = 8\text{ TeV}$** , *JHEP.* 10 (2017) 006, doi:[10.1007/JHEP10\(2017\)006](https://doi.org/10.1007/JHEP10(2017)006), arXiv:[1706.08128](https://arxiv.org/abs/1706.08128) [hep-ex]
- A.M. Sirunyan et al., **Measurements of the  $pp \rightarrow W\gamma\gamma$  and  $pp \rightarrow Z\gamma\gamma$  cross sections and limits on anomalous quartic gauge couplings at  $\sqrt{s} = 8\text{ TeV}$** , *JHEP.* 10 (2017) 072, doi:[10.1007/JHEP10\(2017\)072](https://doi.org/10.1007/JHEP10(2017)072), arXiv:[1704.00366](https://arxiv.org/abs/1704.00366) [hep-ex]
- A.M. Sirunyan et al., **Search for  $t\bar{t}$  resonances in highly boosted lepton+jets and fully hadronic final states in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 07 (2017) 001, doi:[10.1007/JHEP07\(2017\)001](https://doi.org/10.1007/JHEP07(2017)001), arXiv:[1704.03366](https://arxiv.org/abs/1704.03366) [hep-ex]
- A.M. Sirunyan et al., **Search for Supersymmetry in pp Collisions at  $\sqrt{s} = 13\text{TeV}$  in the Single-Lepton Final State Using the Sum of Masses of Large-Radius Jets**, *Phys. Rev. Lett.* 119 (2017) 151802, doi:[10.1103/PhysRevLett.119.151802](https://doi.org/10.1103/PhysRevLett.119.151802), arXiv:[1705.04673](https://arxiv.org/abs/1705.04673) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $B^\pm$  Meson Nuclear Modification Factor in Pb-Pb Collisions at  $\sqrt{s_{NN}} = 5.02\text{TeV}$** , *Phys. Rev. Lett.* 119 (2017) 152301, doi:[10.1103/PhysRevLett.119.152301](https://doi.org/10.1103/PhysRevLett.119.152301), arXiv:[1705.04727](https://arxiv.org/abs/1705.04727) [hep-ex]
- A.M. Sirunyan et al., **Search for associated production of a Z boson with a single top quark and for tZ flavour-changing interactions in pp collisions at  $\sqrt{s} = 8\text{ TeV}$** , *JHEP.* 07 (2017) 003, doi:[10.1007/JHEP07\(2017\)003](https://doi.org/10.1007/JHEP07(2017)003), arXiv:[1702.01404](https://arxiv.org/abs/1702.01404) [hep-ex]
- A.M. Sirunyan et al., **Search for third-generation scalar leptoquarks and heavy right-handed neutrinos in final states with two tau leptons and two jets in proton-proton collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 07 (2017) 121, doi:[10.1007/JHEP07\(2017\)121](https://doi.org/10.1007/JHEP07(2017)121), arXiv:[1703.03995](https://arxiv.org/abs/1703.03995) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the  $t\bar{t}$  production cross section using events with one lepton and at least one jet in pp collisions at  $\sqrt{s} = 13\text{ TeV}$** , *JHEP.* 09 (2017) 051, doi:[10.1007/JHEP09\(2017\)051](https://doi.org/10.1007/JHEP09(2017)051), arXiv:[1701.06228](https://arxiv.org/abs/1701.06228) [hep-ex]
- A.M. Sirunyan et al., **Search for Evidence of the Type-III Seesaw Mechanism in Multilepton Final States in Proton-Proton Collisions at  $\sqrt{s} = 13\text{TeV}$** , *Phys. Rev. Lett.* 119 (2017) 221802, doi:[10.1103/PhysRevLett.119.221802](https://doi.org/10.1103/PhysRevLett.119.221802), arXiv:[1708.07962](https://arxiv.org/abs/1708.07962) [hep-ex]

- A.M. Sirunyan et al., **Measurements of jet charge with dijet events in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 10 (2017) 131, doi:[10.1007/JHEP10\(2017\)131](https://doi.org/10.1007/JHEP10(2017)131), arXiv:[1706.05868](https://arxiv.org/abs/1706.05868) [hep-ex]
- A.M. Sirunyan et al., **Particle-flow reconstruction and global event description with the CMS detector**, *JINST*. 12 (2017) P10003, doi:[10.1088/1748-0221/12/10/P10003](https://doi.org/10.1088/1748-0221/12/10/P10003), arXiv:[1706.04965](https://arxiv.org/abs/1706.04965) [physics.ins-det]
- A.M. Sirunyan et al., **Search for Higgs boson pair production in the  $b\bar{b}\tau\tau$  final state in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 96 (2017) 072004, doi:[10.1103/PhysRevD.96.072004](https://doi.org/10.1103/PhysRevD.96.072004), arXiv:[1707.00350](https://arxiv.org/abs/1707.00350) [hep-ex]
- A.M. Sirunyan et al., **Measurement of vector boson scattering and constraints on anomalous quartic couplings from events with four leptons and two jets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 774 (2017) 682–705, doi:[10.1016/j.physletb.2017.10.020](https://doi.org/10.1016/j.physletb.2017.10.020), arXiv:[1708.02812](https://arxiv.org/abs/1708.02812) [hep-ex]
- A.M. Sirunyan et al., **Measurement of the top quark mass in the dileptonic  $t\bar{t}$  decay channel using the mass observables  $M_{b\ell}$ ,  $M_{T2}$ , and  $M_{b\ell\nu}$  in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 96 (2017) 032002, doi:[10.1103/PhysRevD.96.032002](https://doi.org/10.1103/PhysRevD.96.032002), arXiv:[1704.06142](https://arxiv.org/abs/1704.06142) [hep-ex]
- O. Gutsche, **Dark Matter and Super Symmetry: Exploring and Explaining the Universe with Simulations at the LHC**, in: **Winter Simulation Conference: Simulating Complex Service Systems**, 2017: pp. 4–13, doi:[10.1109/WSC.2016.7822075](https://doi.org/10.1109/WSC.2016.7822075)
- O. Gutsche et al., **Big Data in HEP: A comprehensive use case study**, *J. Phys. Conf. Ser.* 898 (2017) 072012, doi:[10.1088/1742-6596/898/7/072012](https://doi.org/10.1088/1742-6596/898/7/072012), arXiv:[1703.04171](https://arxiv.org/abs/1703.04171) [cs.DC]
- B. Holzman et al., **HEPcloud, a New Paradigm for HEP Facilities: CMS Amazon Web Services Investigation**, *Comput. Softw. Big Sci.* 1 (2017) 1, doi:[10.1007/s41781-017-0001-9](https://doi.org/10.1007/s41781-017-0001-9), arXiv:[1710.00100](https://arxiv.org/abs/1710.00100) [cs.DC]
- G. Aad et al., **Measurements of the Higgs boson production and decay rates and constraints on its couplings from a combined ATLAS and CMS analysis of the LHC pp collision data at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 08 (2016) 045, doi:[10.1007/JHEP08\(2016\)045](https://doi.org/10.1007/JHEP08(2016)045), arXiv:[1606.02266](https://arxiv.org/abs/1606.02266) [hep-ex]
- V. Khachatryan et al., **Search for new phenomena in monophoton final states in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 755 (2016) 102–124, doi:[10.1016/j.physletb.2016.01.057](https://doi.org/10.1016/j.physletb.2016.01.057), arXiv:[1410.8812](https://arxiv.org/abs/1410.8812) [hep-ex]
- V. Khachatryan et al., **Measurement of the CP-violating weak phase  $\phi_s$  and the decay width difference  $\Delta\Gamma_s$  using the  $B_s^0 \rightarrow J/\psi\phi(1020)$  decay channel in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 757 (2016) 97–120, doi:[10.1016/j.physletb.2016.03.046](https://doi.org/10.1016/j.physletb.2016.03.046), arXiv:[1507.07527](https://arxiv.org/abs/1507.07527) [hep-ex]
- V. Khachatryan et al., **Measurement of the  $t\bar{t}$  production cross section in the all-jets final state in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 76 (2016) 128, doi:[10.1140/epjc/s10052-016-3956-5](https://doi.org/10.1140/epjc/s10052-016-3956-5), arXiv:[1509.06076](https://arxiv.org/abs/1509.06076) [hep-ex]
- V. Khachatryan et al., **Angular analysis of the decay  $B^0 \rightarrow K^{*0}\mu^+\mu^-$  from pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 753 (2016) 424–448, doi:[10.1016/j.physletb.2015.12.020](https://doi.org/10.1016/j.physletb.2015.12.020), arXiv:[1507.08126](https://arxiv.org/abs/1507.08126) [hep-ex]
- V. Khachatryan et al., **Measurement of Spin Correlations in  $t\bar{t}$  Production using the Matrix Element Method in the Muon+Jets Final State in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 758 (2016) 321–346, doi:[10.1016/j.physletb.2016.05.005](https://doi.org/10.1016/j.physletb.2016.05.005), arXiv:[1511.06170](https://arxiv.org/abs/1511.06170) [hep-ex]
- V. Khachatryan et al., **Measurement of Top Quark Polarisation in T-Channel Single Top Quark Production**, *JHEP*. 04 (2016) 073, doi:[10.1007/JHEP04\(2016\)073](https://doi.org/10.1007/JHEP04(2016)073), arXiv:[1511.02138](https://arxiv.org/abs/1511.02138) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in events with soft leptons, low jet multiplicity, and missing transverse energy in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 759 (2016) 9–35, doi:[10.1016/j.physletb.2016.05.033](https://doi.org/10.1016/j.physletb.2016.05.033), arXiv:[1512.08002](https://arxiv.org/abs/1512.08002) [hep-ex]
- V. Khachatryan et al., **Search for a massive resonance decaying into a Higgs boson and a W or Z boson in hadronic final states in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 02 (2016) 145, doi:[10.1007/JHEP02\(2016\)145](https://doi.org/10.1007/JHEP02(2016)145), arXiv:[1506.01443](https://arxiv.org/abs/1506.01443) [hep-ex]
- V. Khachatryan et al., **Measurement of long-range near-side two-particle angular correlations in pp collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 116 (2016) 172302, doi:[10.1103/PhysRevLett.116.172302](https://doi.org/10.1103/PhysRevLett.116.172302), arXiv:[1510.03068](https://arxiv.org/abs/1510.03068) [nucl-ex]
- V. Khachatryan et al., **Search for resonant  $t\bar{t}$  production in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 93 (2016) 012001, doi:[10.1103/PhysRevD.93.012001](https://doi.org/10.1103/PhysRevD.93.012001), arXiv:[1506.03062](https://arxiv.org/abs/1506.03062) [hep-ex]
- V. Khachatryan et al., **Measurement of the charge asymmetry in top quark pair production in pp collisions at  $\sqrt{s} = 8$  TeV using a template method**, *Phys. Rev. D*. 93 (2016) 034014, doi:[10.1103/PhysRevD.93.034014](https://doi.org/10.1103/PhysRevD.93.034014), arXiv:[1508.03862](https://arxiv.org/abs/1508.03862) [hep-ex]



- V. Khachatryan et al., **Transverse momentum spectra of inclusive b jets in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 754 (2016) 59, doi:[10.1016/j.physletb.2016.01.010](https://doi.org/10.1016/j.physletb.2016.01.010), arXiv:[1510.03373](https://arxiv.org/abs/1510.03373) [nucl-ex]
- V. Khachatryan et al., **Search for pair production of first and second generation leptoquarks in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 93 (2016) 032004, doi:[10.1103/PhysRevD.93.032004](https://doi.org/10.1103/PhysRevD.93.032004), arXiv:[1509.03744](https://arxiv.org/abs/1509.03744) [hep-ex]
- V. Khachatryan et al., **Measurement of transverse momentum relative to dijet systems in PbPb and pp collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *JHEP.* 01 (2016) 006, doi:[10.1007/JHEP01\(2016\)006](https://doi.org/10.1007/JHEP01(2016)006), arXiv:[1509.09029](https://arxiv.org/abs/1509.09029) [nucl-ex]
- V. Khachatryan et al., **Search for  $W'$  decaying to tau lepton and neutrino in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 755 (2016) 196–216, doi:[10.1016/j.physletb.2016.02.002](https://doi.org/10.1016/j.physletb.2016.02.002), arXiv:[1508.04308](https://arxiv.org/abs/1508.04308) [hep-ex]
- V. Khachatryan et al., **Search for pair-produced vectorlike B quarks in proton-proton collisions at  $\sqrt{s}=8$  TeV**, *Phys. Rev. D.* 93 (2016) 112009, doi:[10.1103/PhysRevD.93.112009](https://doi.org/10.1103/PhysRevD.93.112009), arXiv:[1507.07129](https://arxiv.org/abs/1507.07129) [hep-ex]
- V. Khachatryan et al., **Search for exotic decays of a Higgs boson into undetectable particles and one or more photons**, *Phys. Lett. B.* 753 (2016) 363–388, doi:[10.1016/j.physletb.2015.12.017](https://doi.org/10.1016/j.physletb.2015.12.017), arXiv:[1507.00359](https://arxiv.org/abs/1507.00359) [hep-ex]
- V. Khachatryan et al., **Measurement of  $t\bar{t}$  production with additional jet activity, including b quark jets, in the dilepton decay channel using pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 76 (2016) 379, doi:[10.1140/epjc/s10052-016-4105-x](https://doi.org/10.1140/epjc/s10052-016-4105-x), arXiv:[1510.03072](https://arxiv.org/abs/1510.03072) [hep-ex]
- V. Khachatryan et al., **Measurement of the inclusive jet cross section in pp collisions at  $\sqrt{s} = 2.76$  TeV**, *Eur. Phys. J. C.* 76 (2016) 265, doi:[10.1140/epjc/s10052-016-4083-z](https://doi.org/10.1140/epjc/s10052-016-4083-z), arXiv:[1512.06212](https://arxiv.org/abs/1512.06212) [hep-ex]
- V. Khachatryan et al., **Search for the production of an excited bottom quark decaying to  $tW$  in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 01 (2016) 166, doi:[10.1007/JHEP01\(2016\)166](https://doi.org/10.1007/JHEP01(2016)166), arXiv:[1509.08141](https://arxiv.org/abs/1509.08141) [hep-ex]
- V. Khachatryan et al., **Search for Anomalous Single Top Quark Production in Association with a Photon in pp Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 04 (2016) 035, doi:[10.1007/JHEP04\(2016\)035](https://doi.org/10.1007/JHEP04(2016)035), arXiv:[1511.03951](https://arxiv.org/abs/1511.03951) [hep-ex]
- V. Khachatryan et al., **Search for  $W' \rightarrow tb$  in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 02 (2016) 122, doi:[10.1007/JHEP02\(2016\)122](https://doi.org/10.1007/JHEP02(2016)122), arXiv:[1509.06051](https://arxiv.org/abs/1509.06051) [hep-ex]
- V. Khachatryan et al., **Measurement of the top quark mass using proton-proton data at  $\sqrt{s} = 7$  and 8 TeV**, *Phys. Rev. D.* 93 (2016) 072004, doi:[10.1103/PhysRevD.93.072004](https://doi.org/10.1103/PhysRevD.93.072004), arXiv:[1509.04044](https://arxiv.org/abs/1509.04044) [hep-ex]
- V. Khachatryan et al., **Search for Excited Leptons in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 03 (2016) 125, doi:[10.1007/JHEP03\(2016\)125](https://doi.org/10.1007/JHEP03(2016)125), arXiv:[1511.01407](https://arxiv.org/abs/1511.01407) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in events with a photon, a lepton, and missing transverse momentum in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 757 (2016) 6–31, doi:[10.1016/j.physletb.2016.03.039](https://doi.org/10.1016/j.physletb.2016.03.039), arXiv:[1508.01218](https://arxiv.org/abs/1508.01218) [hep-ex]
- V. Khachatryan et al., **Search for vector-like charge 2/3 T quarks in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 93 (2016) 012003, doi:[10.1103/PhysRevD.93.012003](https://doi.org/10.1103/PhysRevD.93.012003), arXiv:[1509.04177](https://arxiv.org/abs/1509.04177) [hep-ex]
- V. Khachatryan et al., **A search for pair production of new light bosons decaying into muons**, *Phys. Lett. B.* 752 (2016) 146–168, doi:[10.1016/j.physletb.2015.10.067](https://doi.org/10.1016/j.physletb.2015.10.067), arXiv:[1506.00424](https://arxiv.org/abs/1506.00424) [hep-ex]
- V. Khachatryan et al., **Measurement of the inelastic cross section in protonlead collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 759 (2016) 641–662, doi:[10.1016/j.physletb.2016.06.027](https://doi.org/10.1016/j.physletb.2016.06.027), arXiv:[1509.03893](https://arxiv.org/abs/1509.03893) [hep-ex]
- V. Khachatryan et al., **Search for the associated production of a Higgs boson with a single top quark in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 06 (2016) 177, doi:[10.1007/JHEP06\(2016\)177](https://doi.org/10.1007/JHEP06(2016)177), arXiv:[1509.08159](https://arxiv.org/abs/1509.08159) [hep-ex]
- V. Khachatryan et al., **Search for neutral MSSM Higgs bosons decaying to  $\mu^+\mu^-$  in pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *Phys. Lett. B.* 752 (2016) 221–246, doi:[10.1016/j.physletb.2015.11.042](https://doi.org/10.1016/j.physletb.2015.11.042), arXiv:[1508.01437](https://arxiv.org/abs/1508.01437) [hep-ex]
- V. Khachatryan et al., **Reconstruction and identification of  $\tau$  lepton decays to hadrons and  $\nu_\tau$  at CMS**, *JINST.* 11 (2016) P01019, doi:[10.1088/1748-0221/11/01/P01019](https://doi.org/10.1088/1748-0221/11/01/P01019), arXiv:[1510.07488](https://arxiv.org/abs/1510.07488) [physics.ins-det]
- V. Khachatryan et al., **Inclusive and differential measurements of the  $t\bar{t}$  charge asymmetry in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 757 (2016) 154–179, doi:[10.1016/j.physletb.2016.03.060](https://doi.org/10.1016/j.physletb.2016.03.060), arXiv:[1507.03119](https://arxiv.org/abs/1507.03119) [hep-ex]
- V. Khachatryan et al., **Measurement of differential cross sections for Higgs boson production in the diphoton decay channel in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 76 (2016) 13, doi:[10.1140/epjc/s10052-015-3853-3](https://doi.org/10.1140/epjc/s10052-015-3853-3), arXiv:[1508.07819](https://arxiv.org/abs/1508.07819) [hep-ex]

- V. Khachatryan et al., **Search for a Low-Mass Pseudoscalar Higgs Boson Produced in Association with a  $b\bar{b}$  Pair in  $pp$  Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 758 (2016) 296–320, doi:[10.1016/j.physletb.2016.05.003](https://doi.org/10.1016/j.physletb.2016.05.003), arXiv:[1511.03610](https://arxiv.org/abs/1511.03610) [hep-ex]
- V. Khachatryan et al., **Search for dark matter and unparticles produced in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 93 (2016) 052011, doi:[10.1103/PhysRevD.93.052011](https://doi.org/10.1103/PhysRevD.93.052011), arXiv:[1511.09375](https://arxiv.org/abs/1511.09375) [hep-ex]
- V. Khachatryan et al., **Study of B Meson Production in p + Pb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV Using Exclusive Hadronic Decays**, *Phys. Rev. Lett.* 116 (2016) 032301, doi:[10.1103/PhysRevLett.116.032301](https://doi.org/10.1103/PhysRevLett.116.032301), arXiv:[1508.06678](https://arxiv.org/abs/1508.06678) [nucl-ex]
- V. Khachatryan et al., **Measurement of the  $W^+W^-$  cross section in pp collisions at  $\sqrt{s} = 8$  TeV and limits on anomalous gauge couplings**, *Eur. Phys. J. C.* 76 (2016) 401, doi:[10.1140/epjc/s10052-016-4219-1](https://doi.org/10.1140/epjc/s10052-016-4219-1), arXiv:[1507.03268](https://arxiv.org/abs/1507.03268) [hep-ex]
- V. Khachatryan et al., **Search for a very light NMSSM Higgs boson produced in decays of the 125 GeV scalar boson and decaying into  $\tau$  leptons in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 01 (2016) 079, doi:[10.1007/JHEP01\(2016\)079](https://doi.org/10.1007/JHEP01(2016)079), arXiv:[1510.06534](https://arxiv.org/abs/1510.06534) [hep-ex]
- V. Khachatryan et al., **Search for a Higgs boson decaying into  $\gamma^*\gamma \rightarrow \ell\ell\gamma$  with low dilepton mass in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 753 (2016) 341–362, doi:[10.1016/j.physletb.2015.12.039](https://doi.org/10.1016/j.physletb.2015.12.039), arXiv:[1507.03031](https://arxiv.org/abs/1507.03031) [hep-ex]
- V. Khachatryan et al., **Observation of top quark pairs produced in association with a vector boson in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 01 (2016) 096, doi:[10.1007/JHEP01\(2016\)096](https://doi.org/10.1007/JHEP01(2016)096), arXiv:[1510.01131](https://arxiv.org/abs/1510.01131) [hep-ex]
- V. Khachatryan et al., **Searches for a heavy scalar boson H decaying to a pair of 125 GeV Higgs bosons hh or for a heavy pseudoscalar boson A decaying to Zh, in the final states with  $h \rightarrow \tau\tau$** , *Phys. Lett. B.* 755 (2016) 217–244, doi:[10.1016/j.physletb.2016.01.056](https://doi.org/10.1016/j.physletb.2016.01.056), arXiv:[1510.01181](https://arxiv.org/abs/1510.01181) [hep-ex]
- V. Khachatryan et al., **Event generator tunes obtained from underlying event and multiparton scattering measurements**, *Eur. Phys. J. C.* 76 (2016) 155, doi:[10.1140/epjc/s10052-016-3988-x](https://doi.org/10.1140/epjc/s10052-016-3988-x), arXiv:[1512.00815](https://arxiv.org/abs/1512.00815) [hep-ex]
- V. Khachatryan et al., **Search for narrow resonances decaying to dijets in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 116 (2016) 071801, doi:[10.1103/PhysRevLett.116.071801](https://doi.org/10.1103/PhysRevLett.116.071801), arXiv:[1512.01224](https://arxiv.org/abs/1512.01224) [hep-ex]
- V. Khachatryan et al., **Search for single production of scalar leptoquarks in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 93 (2016) 032005, doi:[10.1103/PhysRevD.93.032005](https://doi.org/10.1103/PhysRevD.93.032005), arXiv:[1509.03750](https://arxiv.org/abs/1509.03750) [hep-ex]
- V. Khachatryan et al., **Measurement of the top quark pair production cross section in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. Lett.* 116 (2016) 052002, doi:[10.1103/PhysRevLett.116.052002](https://doi.org/10.1103/PhysRevLett.116.052002), arXiv:[1510.05302](https://arxiv.org/abs/1510.05302) [hep-ex]
- V. Khachatryan et al., **Study of Z boson production in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 759 (2016) 36–57, doi:[10.1016/j.physletb.2016.05.044](https://doi.org/10.1016/j.physletb.2016.05.044), arXiv:[1512.06461](https://arxiv.org/abs/1512.06461) [hep-ex]
- V. Khachatryan et al., **Measurement of differential and integrated fiducial cross sections for Higgs boson production in the four-lepton decay channel in pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP.* 04 (2016) 005, doi:[10.1007/JHEP04\(2016\)005](https://doi.org/10.1007/JHEP04(2016)005), arXiv:[1512.08377](https://arxiv.org/abs/1512.08377) [hep-ex]
- V. Khachatryan et al., **Measurement of the ratio  $B(B_s^0 \rightarrow J/\psi f_0(980)) / B(B_s^0 \rightarrow J/\psi \phi(1020))$  in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 756 (2016) 84–102, doi:[10.1016/j.physletb.2016.02.047](https://doi.org/10.1016/j.physletb.2016.02.047), arXiv:[1501.06089](https://arxiv.org/abs/1501.06089) [hep-ex]
- V. Khachatryan et al., **Measurement of dijet azimuthal decorrelation in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 76 (2016) 536, doi:[10.1140/epjc/s10052-016-4346-8](https://doi.org/10.1140/epjc/s10052-016-4346-8), arXiv:[1602.04384](https://arxiv.org/abs/1602.04384) [hep-ex]
- V. Khachatryan et al., **Search for heavy Majorana neutrinos in  $e^+e^+ + \text{jets}$  and  $e^\pm\mu^\pm + \text{jets}$  events in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 04 (2016) 169, doi:[10.1007/JHEP04\(2016\)169](https://doi.org/10.1007/JHEP04(2016)169), arXiv:[1603.02248](https://arxiv.org/abs/1603.02248) [hep-ex]
- V. Khachatryan et al., **Measurement of the W boson helicity fractions in the decays of top quark pairs to lepton + jets final states produced in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 762 (2016) 512–534, doi:[10.1016/j.physletb.2016.10.007](https://doi.org/10.1016/j.physletb.2016.10.007), arXiv:[1605.09047](https://arxiv.org/abs/1605.09047) [hep-ex]
- V. Khachatryan et al., **Search for lepton flavour violating decays of heavy resonances and quantum black holes to an  $e\mu$  pair in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 76 (2016) 317, doi:[10.1140/epjc/s10052-016-4149-y](https://doi.org/10.1140/epjc/s10052-016-4149-y), arXiv:[1604.05239](https://arxiv.org/abs/1604.05239) [hep-ex]
- V. Khachatryan et al., **Forwardbackward asymmetry of DrellYan lepton pairs in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 76 (2016) 325, doi:[10.1140/epjc/s10052-016-4156-z](https://doi.org/10.1140/epjc/s10052-016-4156-z), arXiv:[1601.04768](https://arxiv.org/abs/1601.04768) [hep-ex]

- V. Khachatryan et al., **Measurement of the  $Z\gamma \rightarrow \nu\bar{\nu}\gamma$  production cross section in pp collisions at  $\sqrt{s} = 8$  TeV and limits on anomalous  $ZZ\gamma$  and  $Z\gamma\gamma$  trilinear gauge boson couplings**, *Phys. Lett. B.* 760 (2016) 448–468, doi:[10.1016/j.physletb.2016.06.080](https://doi.org/10.1016/j.physletb.2016.06.080), arXiv:[1602.07152](https://arxiv.org/abs/1602.07152) [hep-ex]
- V. Khachatryan et al., **Search for two Higgs bosons in final states containing two photons and two bottom quarks in proton-proton collisions at 8 TeV**, *Phys. Rev. D.* 94 (2016) 052012, doi:[10.1103/PhysRevD.94.052012](https://doi.org/10.1103/PhysRevD.94.052012), arXiv:[1603.06896](https://arxiv.org/abs/1603.06896) [hep-ex]
- V. Khachatryan et al., **Search for lepton flavour violating decays of the Higgs boson to  $e\tau$  and  $e\mu$  in protonproton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 763 (2016) 472–500, doi:[10.1016/j.physletb.2016.09.062](https://doi.org/10.1016/j.physletb.2016.09.062), arXiv:[1607.03561](https://arxiv.org/abs/1607.03561) [hep-ex]
- V. Khachatryan et al., **Decomposing transverse momentum balance contributions for quenched jets in PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *JHEP.* 11 (2016) 055, doi:[10.1007/JHEP11\(2016\)055](https://doi.org/10.1007/JHEP11(2016)055), arXiv:[1609.02466](https://arxiv.org/abs/1609.02466) [nucl-ex]
- V. Khachatryan et al., **Search for new physics with the  $M_{T2}$  variable in all-jets final states produced in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 10 (2016) 006, doi:[10.1007/JHEP10\(2016\)006](https://doi.org/10.1007/JHEP10(2016)006), arXiv:[1603.04053](https://arxiv.org/abs/1603.04053) [hep-ex]
- V. Khachatryan et al., **Search for new physics in final states with two opposite-sign, same-flavor leptons, jets, and missing transverse momentum in pp collisions at  $\sqrt{s} = 13$  TeV**, *JHEP.* 12 (2016) 013, doi:[10.1007/JHEP12\(2016\)013](https://doi.org/10.1007/JHEP12(2016)013), arXiv:[1607.00915](https://arxiv.org/abs/1607.00915) [hep-ex]
- V. Khachatryan et al., **Search for dark matter particles in proton-proton collisions at  $\sqrt{s} = 8$  TeV using the razor variables**, *JHEP.* 12 (2016) 088, doi:[10.1007/JHEP12\(2016\)088](https://doi.org/10.1007/JHEP12(2016)088), arXiv:[1603.08914](https://arxiv.org/abs/1603.08914) [hep-ex]
- V. Khachatryan et al., **Search for massive WH resonances decaying into the  $\ell\nu b\bar{b}$  final state at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 76 (2016) 237, doi:[10.1140/epjc/s10052-016-4067-z](https://doi.org/10.1140/epjc/s10052-016-4067-z), arXiv:[1601.06431](https://arxiv.org/abs/1601.06431) [hep-ex]
- V. Khachatryan et al., **Measurement of the top quark mass using charged particles in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 93 (2016) 092006, doi:[10.1103/PhysRevD.93.092006](https://doi.org/10.1103/PhysRevD.93.092006), arXiv:[1603.06536](https://arxiv.org/abs/1603.06536) [hep-ex]
- V. Khachatryan et al., **Measurement of the mass of the top quark in decays with a  $J/\psi$  meson in pp collisions at 8 TeV**, *JHEP.* 12 (2016) 123, doi:[10.1007/JHEP12\(2016\)123](https://doi.org/10.1007/JHEP12(2016)123), arXiv:[1608.03560](https://arxiv.org/abs/1608.03560) [hep-ex]
- V. Khachatryan et al., **Measurement of the double-differential inclusive jet cross section in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 76 (2016) 451, doi:[10.1140/epjc/s10052-016-4286-3](https://doi.org/10.1140/epjc/s10052-016-4286-3), arXiv:[1605.04436](https://arxiv.org/abs/1605.04436) [hep-ex]
- V. Khachatryan et al., **Search for heavy resonances decaying to two Higgs bosons in final states containing four b quarks**, *Eur. Phys. J. C.* 76 (2016) 371, doi:[10.1140/epjc/s10052-016-4206-6](https://doi.org/10.1140/epjc/s10052-016-4206-6), arXiv:[1602.08762](https://arxiv.org/abs/1602.08762) [hep-ex]
- V. Khachatryan et al., **Search for long-lived charged particles in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Rev. D.* 94 (2016) 112004, doi:[10.1103/PhysRevD.94.112004](https://doi.org/10.1103/PhysRevD.94.112004), arXiv:[1609.08382](https://arxiv.org/abs/1609.08382) [hep-ex]
- V. Khachatryan et al., **Studies of inclusive four-jet production with two b-tagged jets in proton-proton collisions at 7 TeV**, *Phys. Rev. D.* 94 (2016) 112005, doi:[10.1103/PhysRevD.94.112005](https://doi.org/10.1103/PhysRevD.94.112005), arXiv:[1609.03489](https://arxiv.org/abs/1609.03489) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in pp collisions at  $\sqrt{s} = 13$  TeV in the single-lepton final state using the sum of masses of large-radius jets**, *JHEP.* 08 (2016) 122, doi:[10.1007/JHEP08\(2016\)122](https://doi.org/10.1007/JHEP08(2016)122), arXiv:[1605.04608](https://arxiv.org/abs/1605.04608) [hep-ex]
- V. Khachatryan et al., **Phenomenological MSSM interpretation of CMS searches in pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP.* 10 (2016) 129, doi:[10.1007/JHEP10\(2016\)129](https://doi.org/10.1007/JHEP10(2016)129), arXiv:[1606.03577](https://arxiv.org/abs/1606.03577) [hep-ex]
- V. Khachatryan et al., **Search for narrow resonances in dijet final states at  $\sqrt{s} = 8$  TeV with the novel CMS technique of data scouting**, *Phys. Rev. Lett.* 117 (2016) 031802, doi:[10.1103/PhysRevLett.117.031802](https://doi.org/10.1103/PhysRevLett.117.031802), arXiv:[1604.08907](https://arxiv.org/abs/1604.08907) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in pp collisions at  $\sqrt{s} = 8$  TeV in final states with boosted W bosons and b jets using razor variables**, *Phys. Rev. D.* 93 (2016) 092009, doi:[10.1103/PhysRevD.93.092009](https://doi.org/10.1103/PhysRevD.93.092009), arXiv:[1602.02917](https://arxiv.org/abs/1602.02917) [hep-ex]
- V. Khachatryan et al., **Search for new physics in same-sign dilepton events in protonproton collisions at  $\sqrt{s} = 13$  TeV**, *Eur. Phys. J. C.* 76 (2016) 439, doi:[10.1140/epjc/s10052-016-4261-z](https://doi.org/10.1140/epjc/s10052-016-4261-z), arXiv:[1605.03171](https://arxiv.org/abs/1605.03171) [hep-ex]
- V. Khachatryan et al., **Measurement of electroweak production of a W boson and two forward jets in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 11 (2016) 147, doi:[10.1007/JHEP11\(2016\)147](https://doi.org/10.1007/JHEP11(2016)147), arXiv:[1607.06975](https://arxiv.org/abs/1607.06975) [hep-ex]

- V. Khachatryan et al., **Search for direct pair production of scalar top quarks in the single- and dilepton channels in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 07 (2016) 027, doi:[10.1007/JHEP07\(2016\)027](https://doi.org/10.1007/JHEP07(2016)027), arXiv:[1602.03169](https://arxiv.org/abs/1602.03169) [hep-ex]
- V. Khachatryan et al., **Measurement of the ZZ production cross section and  $Z \rightarrow \ell^+ \ell^- \ell'^+ \ell'^-$  branching fraction in pp collisions at  $\sqrt{s}=13$  TeV**, *Phys. Lett. B*. 763 (2016) 280–303, doi:[10.1016/j.physletb.2016.10.054](https://doi.org/10.1016/j.physletb.2016.10.054), arXiv:[1607.08834](https://arxiv.org/abs/1607.08834) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in the multijet and missing transverse momentum final state in pp collisions at 13 TeV**, *Phys. Lett. B*. 758 (2016) 152–180, doi:[10.1016/j.physletb.2016.05.002](https://doi.org/10.1016/j.physletb.2016.05.002), arXiv:[1602.06581](https://arxiv.org/abs/1602.06581) [hep-ex]
- V. Khachatryan et al., **Search for R-parity violating decays of a top squark in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 760 (2016) 178–201, doi:[10.1016/j.physletb.2016.06.039](https://doi.org/10.1016/j.physletb.2016.06.039), arXiv:[1602.04334](https://arxiv.org/abs/1602.04334) [hep-ex]
- V. Khachatryan et al., **Measurements of t t-bar spin correlations and top quark polarization using dilepton final states in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 93 (2016) 052007, doi:[10.1103/PhysRevD.93.052007](https://doi.org/10.1103/PhysRevD.93.052007), arXiv:[1601.01107](https://arxiv.org/abs/1601.01107) [hep-ex]
- V. Khachatryan et al., **Search for Higgs boson off-shell production in proton-proton collisions at 7 and 8 TeV and derivation of constraints on its total decay width**, *JHEP*. 09 (2016) 051, doi:[10.1007/JHEP09\(2016\)051](https://doi.org/10.1007/JHEP09(2016)051), arXiv:[1605.02329](https://arxiv.org/abs/1605.02329) [hep-ex]
- V. Khachatryan et al., **Measurement of the integrated and differential  $t\bar{t}$  production cross sections for high- $p_t$  top quarks in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 94 (2016) 072002, doi:[10.1103/PhysRevD.94.072002](https://doi.org/10.1103/PhysRevD.94.072002), arXiv:[1605.00116](https://arxiv.org/abs/1605.00116) [hep-ex]
- V. Khachatryan et al., **Azimuthal decorrelation of jets widely separated in rapidity in pp collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 08 (2016) 139, doi:[10.1007/JHEP08\(2016\)139](https://doi.org/10.1007/JHEP08(2016)139), arXiv:[1601.06713](https://arxiv.org/abs/1601.06713) [hep-ex]
- V. Khachatryan et al., **Correlations between jets and charged particles in PbPb and pp collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *JHEP*. 02 (2016) 156, doi:[10.1007/JHEP02\(2016\)156](https://doi.org/10.1007/JHEP02(2016)156), arXiv:[1601.00079](https://arxiv.org/abs/1601.00079) [nucl-ex]
- V. Khachatryan et al., **Search for direct pair production of supersymmetric top quarks decaying to all-hadronic final states in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 76 (2016) 460, doi:[10.1140/epjc/s10052-016-4292-5](https://doi.org/10.1140/epjc/s10052-016-4292-5), arXiv:[1603.00765](https://arxiv.org/abs/1603.00765) [hep-ex]
- V. Khachatryan et al., **Measurement of the differential cross section and charge asymmetry for inclusive  $pp \rightarrow W^\pm + X$  production at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 76 (2016) 469, doi:[10.1140/epjc/s10052-016-4293-4](https://doi.org/10.1140/epjc/s10052-016-4293-4), arXiv:[1603.01803](https://arxiv.org/abs/1603.01803) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in electroweak production with photons and large missing transverse energy in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 759 (2016) 479–500, doi:[10.1016/j.physletb.2016.05.088](https://doi.org/10.1016/j.physletb.2016.05.088), arXiv:[1602.08772](https://arxiv.org/abs/1602.08772) [hep-ex]
- V. Khachatryan et al., **Evidence for exclusive  $\gamma\gamma \rightarrow W^+W^-$  production and constraints on anomalous quartic gauge couplings in pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 08 (2016) 119, doi:[10.1007/JHEP08\(2016\)119](https://doi.org/10.1007/JHEP08(2016)119), arXiv:[1604.04464](https://arxiv.org/abs/1604.04464) [hep-ex]
- V. Khachatryan et al., **Measurement of the differential cross sections for top quark pair production as a function of kinematic event variables in pp collisions at  $\sqrt{s}=7$  and 8 TeV**, *Phys. Rev. D*. 94 (2016) 052006, doi:[10.1103/PhysRevD.94.052006](https://doi.org/10.1103/PhysRevD.94.052006), arXiv:[1607.00837](https://arxiv.org/abs/1607.00837) [hep-ex]
- V. Khachatryan et al., **Measurement of inclusive jet production and nuclear modifications in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C*. 76 (2016) 372, doi:[10.1140/epjc/s10052-016-4205-7](https://doi.org/10.1140/epjc/s10052-016-4205-7), arXiv:[1601.02001](https://arxiv.org/abs/1601.02001) [nucl-ex]
- V. Khachatryan et al., **Combined search for anomalous pseudoscalar HVV couplings in  $VH(H \rightarrow b\bar{b})$  production and  $H \rightarrow VV$  decay**, *Phys. Lett. B*. 759 (2016) 672–696, doi:[10.1016/j.physletb.2016.06.004](https://doi.org/10.1016/j.physletb.2016.06.004), arXiv:[1602.04305](https://arxiv.org/abs/1602.04305) [hep-ex]
- V. Khachatryan et al., **Search for Resonant Production of High-Mass Photon Pairs in Proton-Proton Collisions at  $\sqrt{s} = 8$  and 13 TeV**, *Phys. Rev. Lett.*. 117 (2016) 051802, doi:[10.1103/PhysRevLett.117.051802](https://doi.org/10.1103/PhysRevLett.117.051802), arXiv:[1606.04093](https://arxiv.org/abs/1606.04093) [hep-ex]
- V. Khachatryan et al., **Search for neutral resonances decaying into a Z boson and a pair of b jets or  $\tau$  leptons**, *Phys. Lett. B*. 759 (2016) 369–394, doi:[10.1016/j.physletb.2016.05.087](https://doi.org/10.1016/j.physletb.2016.05.087), arXiv:[1603.02991](https://arxiv.org/abs/1603.02991) [hep-ex]



- V. Khachatryan et al., **Search for s channel single top quark production in pp collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 09 (2016) 027, doi:[10.1007/JHEP09\(2016\)027](https://doi.org/10.1007/JHEP09(2016)027), arXiv:[1603.02555](https://arxiv.org/abs/1603.02555) [hep-ex]
- V. Khachatryan et al.,  **$\Upsilon(nS)$  polarizations versus particle multiplicity in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 761 (2016) 31–52, doi:[10.1016/j.physletb.2016.07.065](https://doi.org/10.1016/j.physletb.2016.07.065), arXiv:[1603.02913](https://arxiv.org/abs/1603.02913) [hep-ex]
- V. Khachatryan et al., **Search for dark matter in proton-proton collisions at 8 TeV with missing transverse momentum and vector boson tagged jets**, *JHEP*. 12 (2016) 083, doi:[10.1007/JHEP12\(2016\)083](https://doi.org/10.1007/JHEP12(2016)083), arXiv:[1607.05764](https://arxiv.org/abs/1607.05764) [hep-ex]
- V. Khachatryan et al., **Measurements of  $t\bar{t}$  charge asymmetry using dilepton final states in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 760 (2016) 365–386, doi:[10.1016/j.physletb.2016.07.006](https://doi.org/10.1016/j.physletb.2016.07.006), arXiv:[1603.06221](https://arxiv.org/abs/1603.06221) [hep-ex]
- V. Khachatryan et al., **Measurement of the t-tbar production cross section in the e-mu channel in proton-proton collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 08 (2016) 029, doi:[10.1007/JHEP08\(2016\)029](https://doi.org/10.1007/JHEP08(2016)029), arXiv:[1603.02303](https://arxiv.org/abs/1603.02303) [hep-ex]
- V. Khachatryan et al., **Searches for R-parity-violating supersymmetry in pp collisions at  $\sqrt{s} = 8$  TeV in final states with 0-4 leptons**, *Phys. Rev. D*. 94 (2016) 112009, doi:[10.1103/PhysRevD.94.112009](https://doi.org/10.1103/PhysRevD.94.112009), arXiv:[1606.08076](https://arxiv.org/abs/1606.08076) [hep-ex]
- A. Apyan et al., **Pooling the resources of the CMS Tier-1 sites**, *J. Phys. Conf. Ser.* 664 (2015) 042056, doi:[10.1088/1742-6596/664/4/042056](https://doi.org/10.1088/1742-6596/664/4/042056)
- G. Aad et al., **Combined Measurement of the Higgs Boson Mass in pp Collisions at  $\sqrt{s} = 7$  and 8 TeV with the ATLAS and CMS Experiments**, *Phys. Rev. Lett.* 114 (2015) 191803, doi:[10.1103/PhysRevLett.114.191803](https://doi.org/10.1103/PhysRevLett.114.191803), arXiv:[1503.07589](https://arxiv.org/abs/1503.07589) [hep-ex]
- J. Balcas et al., **Using the GlideinWMS System as a Common Resource Provisioning Layer in CMS**, *J. Phys. Conf. Ser.* 664 (2015) 062031, doi:[10.1088/1742-6596/664/6/062031](https://doi.org/10.1088/1742-6596/664/6/062031)
- J. Balcas et al., **Pushing HTCondor and glideinWMS to 200K+ Jobs in a Global Pool for CMS before Run 2**, *J. Phys. Conf. Ser.* 664 (2015) 062030, doi:[10.1088/1742-6596/664/6/062030](https://doi.org/10.1088/1742-6596/664/6/062030)
- V. Khachatryan et al., **Measurements of jet multiplicity and differential production cross sections of  $Z +$  jets events in proton-proton collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D*. 91 (2015) 052008, doi:[10.1103/PhysRevD.91.052008](https://doi.org/10.1103/PhysRevD.91.052008), arXiv:[1408.3104](https://arxiv.org/abs/1408.3104) [hep-ex]
- V. Khachatryan et al., **Measurement of the production cross section ratio  $\sigma(\text{Xb}2(1\text{P})) / \sigma(\text{Xb}1(1\text{P}))$  in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 743 (2015) 383–402, doi:[10.1016/j.physletb.2015.02.048](https://doi.org/10.1016/j.physletb.2015.02.048), arXiv:[1409.5761](https://arxiv.org/abs/1409.5761) [hep-ex]
- V. Khachatryan et al., **Searches for supersymmetry based on events with b jets and four W bosons in pp collisions at 8 TeV**, *Phys. Lett. B*. 745 (2015) 5–28, doi:[10.1016/j.physletb.2015.04.002](https://doi.org/10.1016/j.physletb.2015.04.002), arXiv:[1412.4109](https://arxiv.org/abs/1412.4109) [hep-ex]
- V. Khachatryan et al., **Search for a standard model-like Higgs boson in the  $\mu^+\mu^-$  and  $e^+e^-$  decay channels at the LHC**, *Phys. Lett. B*. 744 (2015) 184–207, doi:[10.1016/j.physletb.2015.03.048](https://doi.org/10.1016/j.physletb.2015.03.048), arXiv:[1410.6679](https://arxiv.org/abs/1410.6679) [hep-ex]
- S. Chatrchyan et al., **Study of Z production in PbPb and pp collisions at  $\sqrt{s_{NN}} = 2.76$  TeV in the dimuon and dielectron decay channels**, *JHEP*. 03 (2015) 022, doi:[10.1007/JHEP03\(2015\)022](https://doi.org/10.1007/JHEP03(2015)022), arXiv:[1410.4825](https://arxiv.org/abs/1410.4825) [nucl-ex]
- V. Khachatryan et al., **Search for quark contact interactions and extra spatial dimensions using di-jet angular distributions in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 746 (2015) 79–99, doi:[10.1016/j.physletb.2015.04.042](https://doi.org/10.1016/j.physletb.2015.04.042), arXiv:[1411.2646](https://arxiv.org/abs/1411.2646) [hep-ex]
- V. Khachatryan et al., **Search for stealth supersymmetry in events with jets, either photons or leptons, and low missing transverse momentum in pp collisions at 8 TeV**, *Phys. Lett. B*. 743 (2015) 503–525, doi:[10.1016/j.physletb.2015.03.017](https://doi.org/10.1016/j.physletb.2015.03.017), arXiv:[1411.7255](https://arxiv.org/abs/1411.7255) [hep-ex]
- V. Khachatryan et al., **Search for physics beyond the standard model in final states with a lepton and missing transverse energy in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 91 (2015) 092005, doi:[10.1103/PhysRevD.91.092005](https://doi.org/10.1103/PhysRevD.91.092005), arXiv:[1408.2745](https://arxiv.org/abs/1408.2745) [hep-ex]
- V. Khachatryan et al., **Precise determination of the mass of the Higgs boson and tests of compatibility of its couplings with the standard model predictions using proton collisions at 7 and 8 TeV**, *Eur. Phys. J. C*. 75 (2015) 212, doi:[10.1140/epjc/s10052-015-3351-7](https://doi.org/10.1140/epjc/s10052-015-3351-7), arXiv:[1412.8662](https://arxiv.org/abs/1412.8662) [hep-ex]
- V. Khachatryan et al., **Search for disappearing tracks in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 01 (2015) 096, doi:[10.1007/JHEP01\(2015\)096](https://doi.org/10.1007/JHEP01(2015)096), arXiv:[1411.6006](https://arxiv.org/abs/1411.6006) [hep-ex]

- V. Khachatryan et al., **Search for long-lived particles that decay into final states containing two electrons or two muons in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 91 (2015) 052012, doi:[10.1103/PhysRevD.91.052012](https://doi.org/10.1103/PhysRevD.91.052012), arXiv:[1411.6977](https://arxiv.org/abs/1411.6977) [hep-ex]
- V. Khachatryan et al., **Measurements of differential and double-differential Drell-Yan cross sections in proton-proton collisions at 8 TeV**, *Eur. Phys. J. C.* 75 (2015) 147, doi:[10.1140/epjc/s10052-015-3364-2](https://doi.org/10.1140/epjc/s10052-015-3364-2), arXiv:[1412.1115](https://arxiv.org/abs/1412.1115) [hep-ex]
- V. Khachatryan et al., **Search for New Resonances Decaying via WZ to Leptons in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 740 (2015) 83–104, doi:[10.1016/j.physletb.2014.11.026](https://doi.org/10.1016/j.physletb.2014.11.026), arXiv:[1407.3476](https://arxiv.org/abs/1407.3476) [hep-ex]
- V. Khachatryan et al., **Search for dark matter, extra dimensions, and unparticles in monojet events in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 75 (2015) 235, doi:[10.1140/epjc/s10052-015-3451-4](https://doi.org/10.1140/epjc/s10052-015-3451-4), arXiv:[1408.3583](https://arxiv.org/abs/1408.3583) [hep-ex]
- S. Chatrchyan et al., **Measurement of jet multiplicity distributions in  $t\bar{t}$  production in pp collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 74 (2015) 3014, doi:[10.1140/epjc/s10052-014-3014-0](https://doi.org/10.1140/epjc/s10052-014-3014-0), arXiv:[1404.3171](https://arxiv.org/abs/1404.3171) [hep-ex]
- V. Khachatryan et al., **Search for physics beyond the standard model in dilepton mass spectra in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 04 (2015) 025, doi:[10.1007/JHEP04\(2015\)025](https://doi.org/10.1007/JHEP04(2015)025), arXiv:[1412.6302](https://arxiv.org/abs/1412.6302) [hep-ex]
- V. Khachatryan et al., **Measurement of the inclusive 3-jet production differential cross section in protonproton collisions at 7 TeV and determination of the strong coupling constant in the TeV range**, *Eur. Phys. J. C.* 75 (2015) 186, doi:[10.1140/epjc/s10052-015-3376-y](https://doi.org/10.1140/epjc/s10052-015-3376-y), arXiv:[1412.1633](https://arxiv.org/abs/1412.1633) [hep-ex]
- V. Khachatryan et al., **Study of vector boson scattering and search for new physics in events with two same-sign leptons and two jets**, *Phys. Rev. Lett.* 114 (2015) 051801, doi:[10.1103/PhysRevLett.114.051801](https://doi.org/10.1103/PhysRevLett.114.051801), arXiv:[1410.6315](https://arxiv.org/abs/1410.6315) [hep-ex]
- V. Khachatryan et al., **Constraints on the spin-parity and anomalous HVV couplings of the Higgs boson in proton collisions at 7 and 8 TeV**, *Phys. Rev. D.* 92 (2015) 012004, doi:[10.1103/PhysRevD.92.012004](https://doi.org/10.1103/PhysRevD.92.012004), arXiv:[1411.3441](https://arxiv.org/abs/1411.3441) [hep-ex]
- V. Khachatryan et al., **Search for Monotop Signatures in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 114 (2015) 101801, doi:[10.1103/PhysRevLett.114.101801](https://doi.org/10.1103/PhysRevLett.114.101801), arXiv:[1410.1149](https://arxiv.org/abs/1410.1149) [hep-ex]
- V. Khachatryan et al., **Differential Cross Section Measurements for the Production of a W Boson in Association with Jets in ProtonProton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 741 (2015) 12–37, doi:[10.1016/j.physletb.2014.12.003](https://doi.org/10.1016/j.physletb.2014.12.003), arXiv:[1406.7533](https://arxiv.org/abs/1406.7533) [hep-ex]
- V. Khachatryan et al., **Measurement of the ratio of the production cross sections times branching fractions of  $B_c^\pm \rightarrow J/\psi\pi^\pm$  and  $B^\pm \rightarrow J/\psi K^\pm$  and  $\mathcal{B}(B_c^\pm \rightarrow J/\psi\pi^\pm\pi^\pm\pi^\mp)/\mathcal{B}(B_c^\pm \rightarrow J/\psi\pi^\pm)$  in pp collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2015) 063, doi:[10.1007/JHEP01\(2015\)063](https://doi.org/10.1007/JHEP01(2015)063), arXiv:[1410.5729](https://arxiv.org/abs/1410.5729) [hep-ex]
- V. Khachatryan et al., **Constraints on parton distribution functions and extraction of the strong coupling constant from the inclusive jet cross section in pp collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 75 (2015) 288, doi:[10.1140/epjc/s10052-015-3499-1](https://doi.org/10.1140/epjc/s10052-015-3499-1), arXiv:[1410.6765](https://arxiv.org/abs/1410.6765) [hep-ex]
- V. Khachatryan et al., **Measurement of electroweak production of two jets in association with a Z boson in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 75 (2015) 66, doi:[10.1140/epjc/s10052-014-3232-5](https://doi.org/10.1140/epjc/s10052-014-3232-5), arXiv:[1410.3153](https://arxiv.org/abs/1410.3153) [hep-ex]
- V. Khachatryan et al., **Search for pair-produced resonances decaying to jet pairs in protonproton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 747 (2015) 98–119, doi:[10.1016/j.physletb.2015.04.045](https://doi.org/10.1016/j.physletb.2015.04.045), arXiv:[1412.7706](https://arxiv.org/abs/1412.7706) [hep-ex]
- V. Khachatryan et al., **Long-range two-particle correlations of strange hadrons with charged particles in pPb and PbPb collisions at LHC energies**, *Phys. Lett. B.* 742 (2015) 200–224, doi:[10.1016/j.physletb.2015.01.034](https://doi.org/10.1016/j.physletb.2015.01.034), arXiv:[1409.3392](https://arxiv.org/abs/1409.3392) [nucl-ex]
- V. Khachatryan et al., **Measurement of the W boson helicity in events with a single reconstructed top quark in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 01 (2015) 053, doi:[10.1007/JHEP01\(2015\)053](https://doi.org/10.1007/JHEP01(2015)053), arXiv:[1410.1154](https://arxiv.org/abs/1410.1154) [hep-ex]
- V. Khachatryan et al., **Search for Long-Lived Neutral Particles Decaying to Quark-Antiquark Pairs in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 91 (2015) 012007, doi:[10.1103/PhysRevD.91.012007](https://doi.org/10.1103/PhysRevD.91.012007), arXiv:[1411.6530](https://arxiv.org/abs/1411.6530) [hep-ex]
- V. Khachatryan et al., **Observation of the rare  $B_s^0 \rightarrow \mu^+\mu^-$  decay from the combined analysis of CMS and LHCb data**, *Nature.* 522 (2015) 68–72, doi:[10.1038/nature14474](https://doi.org/10.1038/nature14474), arXiv:[1411.4413](https://arxiv.org/abs/1411.4413) [hep-ex]

- V. Khachatryan et al., **Measurement of the  $pp \rightarrow ZZ$  Production Cross Section and Constraints on Anomalous Triple Gauge Couplings in Four-Lepton Final States at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 740 (2015) 250–272, doi:[10.1016/j.physletb.2016.04.010](https://doi.org/10.1016/j.physletb.2016.04.010), arXiv:[1406.0113](https://arxiv.org/abs/1406.0113) [hep-ex]
- V. Khachatryan et al., **Search for Displaced Supersymmetry in events with an electron and a muon with large impact parameters**, *Phys. Rev. Lett.* 114 (2015) 061801, doi:[10.1103/PhysRevLett.114.061801](https://doi.org/10.1103/PhysRevLett.114.061801), arXiv:[1409.4789](https://arxiv.org/abs/1409.4789) [hep-ex]
- V. Khachatryan et al., **Performance of the CMS missing transverse momentum reconstruction in pp data at  $\sqrt{s} = 8$  TeV**, *JINST.* 10 (2015) P02006, doi:[10.1088/1748-0221/10/02/P02006](https://doi.org/10.1088/1748-0221/10/02/P02006), arXiv:[1411.0511](https://arxiv.org/abs/1411.0511) [physics.ins-det]
- V. Khachatryan et al., **Measurement of the cross section ratio  $\sigma_{t\bar{t}b\bar{b}}/\sigma_{t\bar{t}jj}$  in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 746 (2015) 132–153, doi:[10.1016/j.physletb.2015.04.060](https://doi.org/10.1016/j.physletb.2015.04.060), arXiv:[1411.5621](https://arxiv.org/abs/1411.5621) [hep-ex]
- V. Khachatryan et al., **Search for Supersymmetry Using Razor Variables in Events with  $b$ -Tagged Jets in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 91 (2015) 052018, doi:[10.1103/PhysRevD.91.052018](https://doi.org/10.1103/PhysRevD.91.052018), arXiv:[1502.00300](https://arxiv.org/abs/1502.00300) [hep-ex]
- V. Khachatryan et al., **Production of leading charged particles and leading charged-particle jets at small transverse momenta in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 92 (2015) 112001, doi:[10.1103/PhysRevD.92.112001](https://doi.org/10.1103/PhysRevD.92.112001), arXiv:[1507.00233](https://arxiv.org/abs/1507.00233) [hep-ex]
- V. Khachatryan et al., **Searches for third-generation squark production in fully hadronic final states in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 06 (2015) 116, doi:[10.1007/JHEP06\(2015\)116](https://doi.org/10.1007/JHEP06(2015)116), arXiv:[1503.08037](https://arxiv.org/abs/1503.08037) [hep-ex]
- V. Khachatryan et al., **Limits on the Higgs boson lifetime and width from its decay to four charged leptons**, *Phys. Rev. D.* 92 (2015) 072010, doi:[10.1103/PhysRevD.92.072010](https://doi.org/10.1103/PhysRevD.92.072010), arXiv:[1507.06656](https://arxiv.org/abs/1507.06656) [hep-ex]
- V. Khachatryan et al., **Angular coefficients of Z bosons produced in pp collisions at  $\sqrt{s} = 8$  TeV and decaying to  $\mu^+\mu^-$  as a function of transverse momentum and rapidity**, *Phys. Lett. B.* 750 (2015) 154–175, doi:[10.1016/j.physletb.2015.08.061](https://doi.org/10.1016/j.physletb.2015.08.061), arXiv:[1504.03512](https://arxiv.org/abs/1504.03512) [hep-ex]
- V. Khachatryan et al., **Search for the standard model Higgs boson produced through vector boson fusion and decaying to  $b\bar{b}$** , *Phys. Rev. D.* 92 (2015) 032008, doi:[10.1103/PhysRevD.92.032008](https://doi.org/10.1103/PhysRevD.92.032008), arXiv:[1506.01010](https://arxiv.org/abs/1506.01010) [hep-ex]
- V. Khachatryan et al., **Study of W boson production in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Phys. Lett. B.* 750 (2015) 565–586, doi:[10.1016/j.physletb.2015.09.057](https://doi.org/10.1016/j.physletb.2015.09.057), arXiv:[1503.05825](https://arxiv.org/abs/1503.05825) [nucl-ex]
- V. Khachatryan et al., **Search for a Standard Model Higgs Boson Produced in Association with a Top-Quark Pair and Decaying to Bottom Quarks Using a Matrix Element Method**, *Eur. Phys. J. C.* 75 (2015) 251, doi:[10.1140/epjc/s10052-015-3454-1](https://doi.org/10.1140/epjc/s10052-015-3454-1), arXiv:[1502.02485](https://arxiv.org/abs/1502.02485) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry with photons in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 92 (2015) 072006, doi:[10.1103/PhysRevD.92.072006](https://doi.org/10.1103/PhysRevD.92.072006), arXiv:[1507.02898](https://arxiv.org/abs/1507.02898) [hep-ex]
- V. Khachatryan et al., **Search for Narrow High-Mass Resonances in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV Decaying to a Z and a Higgs Boson**, *Phys. Lett. B.* 748 (2015) 255–277, doi:[10.1016/j.physletb.2015.07.011](https://doi.org/10.1016/j.physletb.2015.07.011), arXiv:[1502.04994](https://arxiv.org/abs/1502.04994) [hep-ex]
- V. Khachatryan et al., **Searches for Supersymmetry using the  $M_{T2}$  Variable in Hadronic Events Produced in pp Collisions at 8 TeV**, *JHEP.* 05 (2015) 078, doi:[10.1007/JHEP05\(2015\)078](https://doi.org/10.1007/JHEP05(2015)078), arXiv:[1502.04358](https://arxiv.org/abs/1502.04358) [hep-ex]
- V. Khachatryan et al., **Search for a pseudoscalar boson decaying into a Z boson and the 125 GeV Higgs boson in  $\ell^+\ell^-b\bar{b}$  final states**, *Phys. Lett. B.* 748 (2015) 221–243, doi:[10.1016/j.physletb.2015.07.010](https://doi.org/10.1016/j.physletb.2015.07.010), arXiv:[1504.04710](https://arxiv.org/abs/1504.04710) [hep-ex]
- V. Khachatryan et al., **Search for neutral color-octet weak-triplet scalar particles in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 09 (2015) 201, doi:[10.1007/JHEP09\(2015\)201](https://doi.org/10.1007/JHEP09(2015)201), arXiv:[1505.08118](https://arxiv.org/abs/1505.08118) [hep-ex]
- V. Khachatryan et al., **Search for neutral MSSM Higgs bosons decaying into a pair of bottom quarks**, *JHEP.* 11 (2015) 071, doi:[10.1007/JHEP11\(2015\)071](https://doi.org/10.1007/JHEP11(2015)071), arXiv:[1506.08329](https://arxiv.org/abs/1506.08329) [hep-ex]
- V. Khachatryan et al., **Search for a Higgs boson in the mass range from 145 to 1000 GeV decaying to a pair of W or Z bosons**, *JHEP.* 10 (2015) 144, doi:[10.1007/JHEP10\(2015\)144](https://doi.org/10.1007/JHEP10(2015)144), arXiv:[1504.00936](https://arxiv.org/abs/1504.00936) [hep-ex]
- V. Khachatryan et al., **Measurement of the Z boson differential cross section in transverse momentum and rapidity in proton-proton collisions at 8 TeV**, *Phys. Lett. B.* 749 (2015) 187–209, doi:[10.1016/j.physletb.2015.07.065](https://doi.org/10.1016/j.physletb.2015.07.065), arXiv:[1504.03511](https://arxiv.org/abs/1504.03511) [hep-ex]
- V. Khachatryan et al., **Measurement of diffraction dissociation cross sections in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 92 (2015) 012003, doi:[10.1103/PhysRevD.92.012003](https://doi.org/10.1103/PhysRevD.92.012003), arXiv:[1503.08689](https://arxiv.org/abs/1503.08689) [hep-ex]

- V. Khachatryan et al., **Search for resonant pair production of Higgs bosons decaying to two bottom quark-antiquark pairs in proton-proton collisions at 8 TeV**, *Phys. Lett. B.* 749 (2015) 560–582, doi:[10.1016/j.physletb.2015.08.047](https://doi.org/10.1016/j.physletb.2015.08.047), arXiv:[1503.04114](https://arxiv.org/abs/1503.04114) [hep-ex]
- V. Khachatryan et al., **Search for supersymmetry in the vector-boson fusion topology in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 11 (2015) 189, doi:[10.1007/JHEP11\(2015\)189](https://doi.org/10.1007/JHEP11(2015)189), arXiv:[1508.07628](https://arxiv.org/abs/1508.07628) [hep-ex]
- V. Khachatryan et al., **Search for vector-like T quarks decaying to top quarks and Higgs bosons in the all-hadronic channel using jet substructure**, *JHEP.* 06 (2015) 080, doi:[10.1007/JHEP06\(2015\)080](https://doi.org/10.1007/JHEP06(2015)080), arXiv:[1503.01952](https://arxiv.org/abs/1503.01952) [hep-ex]
- V. Khachatryan et al., **Search for Physics Beyond the Standard Model in Events with Two Leptons, Jets, and Missing Transverse Momentum in pp Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 04 (2015) 124, doi:[10.1007/JHEP04\(2015\)124](https://doi.org/10.1007/JHEP04(2015)124), arXiv:[1502.06031](https://arxiv.org/abs/1502.06031) [hep-ex]
- V. Khachatryan et al., **Search for diphoton resonances in the mass range from 150 to 850 GeV in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 750 (2015) 494–519, doi:[10.1016/j.physletb.2015.09.062](https://doi.org/10.1016/j.physletb.2015.09.062), arXiv:[1506.02301](https://arxiv.org/abs/1506.02301) [hep-ex]
- V. Khachatryan et al., **Measurement of  $J/\psi$  and  $\psi(2S)$  Prompt Double-Differential Cross Sections in pp Collisions at  $\sqrt{s}=7$  TeV**, *Phys. Rev. Lett.* 114 (2015) 191802, doi:[10.1103/PhysRevLett.114.191802](https://doi.org/10.1103/PhysRevLett.114.191802), arXiv:[1502.04155](https://arxiv.org/abs/1502.04155) [hep-ex]
- V. Khachatryan et al., **Search for a charged Higgs boson in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 11 (2015) 018, doi:[10.1007/JHEP11\(2015\)018](https://doi.org/10.1007/JHEP11(2015)018), arXiv:[1508.07774](https://arxiv.org/abs/1508.07774) [hep-ex]
- V. Khachatryan et al., **Constraints on the pMSSM, AMSB model and on other models from the search for long-lived charged particles in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 75 (2015) 325, doi:[10.1140/epjc/s10052-015-3533-3](https://doi.org/10.1140/epjc/s10052-015-3533-3), arXiv:[1502.02522](https://arxiv.org/abs/1502.02522) [hep-ex]
- V. Khachatryan et al., **Distributions of Topological Observables in Inclusive Three- and Four-Jet Events in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 75 (2015) 302, doi:[10.1140/epjc/s10052-015-3491-9](https://doi.org/10.1140/epjc/s10052-015-3491-9), arXiv:[1502.04785](https://arxiv.org/abs/1502.04785) [hep-ex]
- V. Khachatryan et al., **Search for Decays of Stopped Long-Lived Particles Produced in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 75 (2015) 151, doi:[10.1140/epjc/s10052-015-3367-z](https://doi.org/10.1140/epjc/s10052-015-3367-z), arXiv:[1501.05603](https://arxiv.org/abs/1501.05603) [hep-ex]
- V. Khachatryan et al., **Performance of Photon Reconstruction and Identification with the CMS Detector in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *JINST.* 10 (2015) P08010, doi:[10.1088/1748-0221/10/08/P08010](https://doi.org/10.1088/1748-0221/10/08/P08010), arXiv:[1502.02702](https://arxiv.org/abs/1502.02702) [physics.ins-det]
- V. Khachatryan et al., **Search for Third-Generation Scalar Leptoquarks in the  $t \tau$  Channel in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 07 (2015) 042, doi:[10.1007/JHEP11\(2016\)056](https://doi.org/10.1007/JHEP11(2016)056), arXiv:[1503.09049](https://arxiv.org/abs/1503.09049) [hep-ex]
- V. Khachatryan et al., **Comparison of the  $Z/\gamma^* + \text{jets}$  to  $\gamma + \text{jets}$  cross sections in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 10 (2015) 128, doi:[10.1007/JHEP04\(2016\)010](https://doi.org/10.1007/JHEP04(2016)010), arXiv:[1505.06520](https://arxiv.org/abs/1505.06520) [hep-ex]
- V. Khachatryan et al., **Search for Lepton-Flavour-Violating Decays of the Higgs Boson**, *Phys. Lett. B.* 749 (2015) 337–362, doi:[10.1016/j.physletb.2015.07.053](https://doi.org/10.1016/j.physletb.2015.07.053), arXiv:[1502.07400](https://arxiv.org/abs/1502.07400) [hep-ex]
- V. Khachatryan et al., **Measurements of the  $ZZ$  production cross sections in the  $2l2\nu$  channel in proton-proton collisions at  $\sqrt{s} = 7$  and 8 TeV and combined constraints on triple gauge couplings**, *Eur. Phys. J. C.* 75 (2015) 511, doi:[10.1140/epjc/s10052-015-3706-0](https://doi.org/10.1140/epjc/s10052-015-3706-0), arXiv:[1503.05467](https://arxiv.org/abs/1503.05467) [hep-ex]
- V. Khachatryan et al., **Search for heavy Majorana neutrinos in  $\mu^\pm\mu^\pm + \text{jets}$  events in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 748 (2015) 144–166, doi:[10.1016/j.physletb.2015.06.070](https://doi.org/10.1016/j.physletb.2015.06.070), arXiv:[1501.05566](https://arxiv.org/abs/1501.05566) [hep-ex]
- V. Khachatryan et al., **Search for resonances and quantum black holes using dijet mass spectra in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 91 (2015) 052009, doi:[10.1103/PhysRevD.91.052009](https://doi.org/10.1103/PhysRevD.91.052009), arXiv:[1501.04198](https://arxiv.org/abs/1501.04198) [hep-ex]
- V. Khachatryan et al., **Measurement of the differential cross section for top quark pair production in pp collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 75 (2015) 542, doi:[10.1140/epjc/s10052-015-3709-x](https://doi.org/10.1140/epjc/s10052-015-3709-x), arXiv:[1505.04480](https://arxiv.org/abs/1505.04480) [hep-ex]
- V. Khachatryan et al., **Study of Final-State Radiation in Decays of Z Bosons Produced in pp Collisions at 7 TeV**, *Phys. Rev. D.* 91 (2015) 092012, doi:[10.1103/PhysRevD.91.092012](https://doi.org/10.1103/PhysRevD.91.092012), arXiv:[1502.07940](https://arxiv.org/abs/1502.07940) [hep-ex]
- V. Khachatryan et al., **Nuclear Effects on the Transverse Momentum Spectra of Charged Particles in pPb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C.* 75 (2015) 237, doi:[10.1140/epjc/s10052-015-3435-4](https://doi.org/10.1140/epjc/s10052-015-3435-4), arXiv:[1502.05387](https://arxiv.org/abs/1502.05387) [nucl-ex]



- V. Khachatryan et al., **Measurement of the  $Z\gamma$  Production Cross Section in pp Collisions at 8 TeV and Search for Anomalous Triple Gauge Boson Couplings**, *JHEP*. 04 (2015) 164, doi:[10.1007/JHEP04\(2015\)164](https://doi.org/10.1007/JHEP04(2015)164), arXiv:[1502.05664](https://arxiv.org/abs/1502.05664) [hep-ex]
- V. Khachatryan et al., **Performance of Electron Reconstruction and Selection with the CMS Detector in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *JINST*. 10 (2015) P06005, doi:[10.1088/1748-0221/10/06/P06005](https://doi.org/10.1088/1748-0221/10/06/P06005), arXiv:[1502.02701](https://arxiv.org/abs/1502.02701) [physics.ins-det]
- V. Khachatryan et al., **Evidence for transverse momentum and pseudorapidity dependent event plane fluctuations in PbPb and pPb collisions**, *Phys. Rev. C*. 92 (2015) 034911, doi:[10.1103/PhysRevC.92.034911](https://doi.org/10.1103/PhysRevC.92.034911), arXiv:[1503.01692](https://arxiv.org/abs/1503.01692) [nucl-ex]
- V. Khachatryan et al., **Measurements of the  $\Upsilon(1S)$ ,  $\Upsilon(2S)$ , and  $\Upsilon(3S)$  differential cross sections in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 749 (2015) 14–34, doi:[10.1016/j.physletb.2015.07.037](https://doi.org/10.1016/j.physletb.2015.07.037), arXiv:[1501.07750](https://arxiv.org/abs/1501.07750) [hep-ex]
- V. Khachatryan et al., **Measurement of the underlying event activity using charged-particle jets in proton-proton collisions at  $\sqrt{s} = 2.76$  TeV**, *JHEP*. 09 (2015) 137, doi:[10.1007/JHEP09\(2015\)137](https://doi.org/10.1007/JHEP09(2015)137), arXiv:[1507.07229](https://arxiv.org/abs/1507.07229) [hep-ex]
- V. Khachatryan et al., **Evidence for Collective Multiparticle Correlations in p-Pb Collisions**, *Phys. Rev. Lett.* 115 (2015) 012301, doi:[10.1103/PhysRevLett.115.012301](https://doi.org/10.1103/PhysRevLett.115.012301), arXiv:[1502.05382](https://arxiv.org/abs/1502.05382) [nucl-ex]
- V. Khachatryan et al., **Search for a light charged Higgs boson decaying to  $c\bar{s}$  in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 12 (2015) 178, doi:[10.1007/JHEP12\(2015\)178](https://doi.org/10.1007/JHEP12(2015)178), arXiv:[1510.04252](https://arxiv.org/abs/1510.04252) [hep-ex]
- V. Khachatryan et al., **Pseudorapidity distribution of charged hadrons in proton-proton collisions at  $\sqrt{s} = 13$  TeV**, *Phys. Lett. B*. 751 (2015) 143–163, doi:[10.1016/j.physletb.2015.10.004](https://doi.org/10.1016/j.physletb.2015.10.004), arXiv:[1507.05915](https://arxiv.org/abs/1507.05915) [hep-ex]
- V. Khachatryan et al., **Search for the production of dark matter in association with top-quark pairs in the single-lepton final state in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 06 (2015) 121, doi:[10.1007/JHEP06\(2015\)121](https://doi.org/10.1007/JHEP06(2015)121), arXiv:[1504.03198](https://arxiv.org/abs/1504.03198) [hep-ex]
- G. Garzoglio et al., **Diversity in Computing Technologies and Strategies for Dynamic Resource Allocation**, *J. Phys. Conf. Ser.* 664 (2015) 012001, doi:[10.1088/1742-6596/664/1/012001](https://doi.org/10.1088/1742-6596/664/1/012001)
- C. Group et al., **Fermilab Computing at the Intensity Frontier**, *J. Phys. Conf. Ser.* 664 (2015) 032012, doi:[10.1088/1742-6596/664/3/032012](https://doi.org/10.1088/1742-6596/664/3/032012)
- S. Belforte et al., **Evolution of the Pilot Infrastructure of CMS: Towards a Single GlideinWMS Pool**, *J. Phys. Conf. Ser.* 513 (2014) 032041, doi:[10.1088/1742-6596/513/3/032041](https://doi.org/10.1088/1742-6596/513/3/032041)
- S. Campana et al., **Deployment of a WLCG network monitoring infrastructure based on the perfSONAR-PS technology**, *J. Phys. Conf. Ser.* 513 (2014) 062008, doi:[10.1088/1742-6596/513/6/062008](https://doi.org/10.1088/1742-6596/513/6/062008)
- S. Chatrchyan et al., **Studies of Azimuthal Dihadron Correlations in Ultra-Central PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *JHEP*. 02 (2014) 088, doi:[10.1007/JHEP02\(2014\)088](https://doi.org/10.1007/JHEP02(2014)088), arXiv:[1312.1845](https://arxiv.org/abs/1312.1845) [nucl-ex]
- S. Chatrchyan et al., **Probing Color Coherence Effects in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C*. 74 (2014) 2901, doi:[10.1140/epjc/s10052-014-2901-8](https://doi.org/10.1140/epjc/s10052-014-2901-8), arXiv:[1311.5815](https://arxiv.org/abs/1311.5815) [hep-ex]
- J. Adelman et al., **CMS Computing Operations During Run 1**, *J. Phys. Conf. Ser.* 513 (2014) 032040, doi:[10.1088/1742-6596/513/3/032040](https://doi.org/10.1088/1742-6596/513/3/032040)
- S. Chatrchyan et al., **Measurement of the Properties of a Higgs Boson in the Four-Lepton Final State**, *Phys. Rev. D*. 89 (2014) 092007, doi:[10.1103/PhysRevD.89.092007](https://doi.org/10.1103/PhysRevD.89.092007), arXiv:[1312.5353](https://arxiv.org/abs/1312.5353) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  production cross section in the dilepton channel in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 02 (2014) 024, doi:[10.1007/JHEP02\(2014\)024](https://doi.org/10.1007/JHEP02(2014)024), arXiv:[1312.7582](https://arxiv.org/abs/1312.7582) [hep-ex]
- S. Chatrchyan et al., **Study of Double Parton Scattering Using  $W + 2$ -Jet Events in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 03 (2014) 032, doi:[10.1007/JHEP03\(2014\)032](https://doi.org/10.1007/JHEP03(2014)032), arXiv:[1312.5729](https://arxiv.org/abs/1312.5729) [hep-ex]
- S. Chatrchyan et al., **Inclusive Search for a Vector-Like T Quark with Charge  $\frac{2}{3}$  in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 729 (2014) 149–171, doi:[10.1016/j.physletb.2014.01.006](https://doi.org/10.1016/j.physletb.2014.01.006), arXiv:[1311.7667](https://arxiv.org/abs/1311.7667) [hep-ex]
- S. Chatrchyan et al., **Observation of a Peaking Structure in the  $J/\psi\phi$  Mass Spectrum from  $B^\pm \rightarrow J/\psi\phi K^\pm$  Decays**, *Phys. Lett. B*. 734 (2014) 261–281, doi:[10.1016/j.physletb.2014.05.055](https://doi.org/10.1016/j.physletb.2014.05.055), arXiv:[1309.6920](https://arxiv.org/abs/1309.6920) [hep-ex]

- S. Chatrchyan et al., **Event Activity Dependence of  $Y(nS)$  Production in  $\sqrt{s_{NN}}=5.02$  TeV pPb and  $\sqrt{s}=2.76$  TeV pp Collisions**, *JHEP*. 04 (2014) 103, doi:[10.1007/JHEP04\(2014\)103](https://doi.org/10.1007/JHEP04(2014)103), arXiv:[1312.6300](https://arxiv.org/abs/1312.6300) [nucl-ex]
- S. Chatrchyan et al., **Search for Flavor-Changing Neutral Currents in Top-Quark Decays  $t \rightarrow Zq$  in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 112 (2014) 171802, doi:[10.1103/PhysRevLett.112.171802](https://doi.org/10.1103/PhysRevLett.112.171802), arXiv:[1312.4194](https://arxiv.org/abs/1312.4194) [hep-ex]
- S. Chatrchyan et al., **Modification of Jet Shapes in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Lett. B*. 730 (2014) 243–263, doi:[10.1016/j.physletb.2014.01.042](https://doi.org/10.1016/j.physletb.2014.01.042), arXiv:[1310.0878](https://arxiv.org/abs/1310.0878) [nucl-ex]
- S. Chatrchyan et al., **Measurement of the Top-Quark Mass in All-Jets  $t\bar{t}$  Events in pp Collisions at  $\sqrt{s}=7$  TeV**, *Eur. Phys. J. C*. 74 (2014) 2758, doi:[10.1140/epjc/s10052-014-2758-x](https://doi.org/10.1140/epjc/s10052-014-2758-x), arXiv:[1307.4617](https://arxiv.org/abs/1307.4617) [hep-ex]
- S. Chatrchyan et al., **Search for Top Squark and Higgsino Production using Diphoton Higgs Boson Decays**, *Phys. Rev. Lett.* 112 (2014) 161802, doi:[10.1103/PhysRevLett.112.161802](https://doi.org/10.1103/PhysRevLett.112.161802), arXiv:[1312.3310](https://arxiv.org/abs/1312.3310) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Triple-Differential Cross Section for Photon+Jets Production in Proton-Proton Collisions at  $\sqrt{s}=7$  TeV**, *JHEP*. 06 (2014) 009, doi:[10.1007/JHEP06\(2014\)009](https://doi.org/10.1007/JHEP06(2014)009), arXiv:[1311.6141](https://arxiv.org/abs/1311.6141) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in pp Collisions at  $\sqrt{s}=8$  TeV in Events with a Single Lepton, Large Jet Multiplicity, and Multiple b Jets**, *Phys. Lett. B*. 733 (2014) 328–353, doi:[10.1016/j.physletb.2014.04.023](https://doi.org/10.1016/j.physletb.2014.04.023), arXiv:[1311.4937](https://arxiv.org/abs/1311.4937) [hep-ex]
- S. Chatrchyan et al., **Study of the Production of Charged Pions, Kaons, and Protons in pPb Collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C*. 74 (2014) 2847, doi:[10.1140/epjc/s10052-014-2847-x](https://doi.org/10.1140/epjc/s10052-014-2847-x), arXiv:[1307.3442](https://arxiv.org/abs/1307.3442) [hep-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson Produced in Association with a W or a Z Boson and Decaying to Bottom Quarks**, *Phys. Rev. D*. 89 (2014) 012003, doi:[10.1103/PhysRevD.89.012003](https://doi.org/10.1103/PhysRevD.89.012003), arXiv:[1310.3687](https://arxiv.org/abs/1310.3687) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Muon Charge Asymmetry in Inclusive  $pp \rightarrow W + X$  Production at  $\sqrt{s} = 7$  TeV and an Improved Determination of Light Parton Distribution Functions**, *Phys. Rev. D*. 90 (2014) 032004, doi:[10.1103/PhysRevD.90.032004](https://doi.org/10.1103/PhysRevD.90.032004), arXiv:[1312.6283](https://arxiv.org/abs/1312.6283) [hep-ex]
- S. Chatrchyan et al., **Evidence of b-Jet Quenching in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 113 (2014) 132301, doi:[10.1103/PhysRevLett.113.132301](https://doi.org/10.1103/PhysRevLett.113.132301), arXiv:[1312.4198](https://arxiv.org/abs/1312.4198) [nucl-ex]
- S. Chatrchyan et al., **Measurements of  $t\bar{t}$  Spin Correlations and Top-Quark Polarization Using Dilepton Final States in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 112 (2014) 182001, doi:[10.1103/PhysRevLett.112.182001](https://doi.org/10.1103/PhysRevLett.112.182001), arXiv:[1311.3924](https://arxiv.org/abs/1311.3924) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $W\gamma$  and  $Z\gamma$  Inclusive Cross Sections in pp Collisions at  $\sqrt{s} = 7$  TeV and Limits on Anomalous Triple Gauge Boson Couplings**, *Phys. Rev. D*. 89 (2014) 092005, doi:[10.1103/PhysRevD.89.092005](https://doi.org/10.1103/PhysRevD.89.092005), arXiv:[1308.6832](https://arxiv.org/abs/1308.6832) [hep-ex]
- S. Chatrchyan et al., **Measurement of Four-Jet Production in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D*. 89 (2014) 092010, doi:[10.1103/PhysRevD.89.092010](https://doi.org/10.1103/PhysRevD.89.092010), arXiv:[1312.6440](https://arxiv.org/abs/1312.6440) [hep-ex]
- S. Chatrchyan et al., **Search for Pair Production of Excited Top Quarks in the Lepton + Jets Final State**, *JHEP*. 06 (2014) 125, doi:[10.1007/JHEP06\(2014\)125](https://doi.org/10.1007/JHEP06(2014)125), arXiv:[1311.5357](https://arxiv.org/abs/1311.5357) [hep-ex]
- S. Chatrchyan et al., **Measurement of Higher-Order Harmonic Azimuthal Anisotropy in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. C*. 89 (2014) 044906, doi:[10.1103/PhysRevC.89.044906](https://doi.org/10.1103/PhysRevC.89.044906), arXiv:[1310.8651](https://arxiv.org/abs/1310.8651) [nucl-ex]
- S. Chatrchyan et al., **Search for Top-Quark Partners with Charge 5/3 in the Same-Sign Dilepton Final State**, *Phys. Rev. Lett.* 112 (2014) 171801, doi:[10.1103/PhysRevLett.112.171801](https://doi.org/10.1103/PhysRevLett.112.171801), arXiv:[1312.2391](https://arxiv.org/abs/1312.2391) [hep-ex]
- S. Chatrchyan et al., **Measurement of Associated W + Charm Production in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 02 (2014) 013, doi:[10.1007/JHEP02\(2014\)013](https://doi.org/10.1007/JHEP02(2014)013), arXiv:[1310.1138](https://arxiv.org/abs/1310.1138) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics in Events with Same-Sign Dileptons and Jets in pp Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 01 (2014) 163, doi:[10.1007/JHEP01\(2014\)163](https://doi.org/10.1007/JHEP01(2014)163), arXiv:[1311.6736](https://arxiv.org/abs/1311.6736) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Production Cross Section for a W Boson and Two b Jets in pp Collisions at  $\sqrt{s}=7$  TeV**, *Phys. Lett. B*. 735 (2014) 204–225, doi:[10.1016/j.physletb.2014.06.041](https://doi.org/10.1016/j.physletb.2014.06.041), arXiv:[1312.6608](https://arxiv.org/abs/1312.6608) [hep-ex]
- S. Chatrchyan et al., **Searches for Light- and Heavy-Flavour Three-Jet Resonances in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 730 (2014) 193–214, doi:[10.1016/j.physletb.2014.01.049](https://doi.org/10.1016/j.physletb.2014.01.049), arXiv:[1311.1799](https://arxiv.org/abs/1311.1799) [hep-ex]

- S. Chatrchyan et al., **Measurement of Higgs Boson Production and Properties in the WW Decay Channel with Leptonic Final States**, *JHEP*. 01 (2014) 096, doi:[10.1007/JHEP01\(2014\)096](https://doi.org/10.1007/JHEP01(2014)096), arXiv:[1312.1129](https://arxiv.org/abs/1312.1129) [hep-ex]
- S. Chatrchyan et al., **Search for Baryon Number Violation in Top-Quark Decays**, *Phys. Lett. B*. 731 (2014) 173–196, doi:[10.1016/j.physletb.2014.02.033](https://doi.org/10.1016/j.physletb.2014.02.033), arXiv:[1310.1618](https://arxiv.org/abs/1310.1618) [hep-ex]
- V. Khachatryan et al., **Observation of the Diphoton Decay of the Higgs Boson and Measurement of Its Properties**, *Eur. Phys. J. C*. 74 (2014) 3076, doi:[10.1140/epjc/s10052-014-3076-z](https://doi.org/10.1140/epjc/s10052-014-3076-z), arXiv:[1407.0558](https://arxiv.org/abs/1407.0558) [hep-ex]
- S. Chatrchyan et al., **Search for  $W' \rightarrow tb$  decays in the lepton + jets final state in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 05 (2014) 108, doi:[10.1007/JHEP05\(2014\)108](https://doi.org/10.1007/JHEP05(2014)108), arXiv:[1402.2176](https://arxiv.org/abs/1402.2176) [hep-ex]
- V. Khachatryan et al., **Measurement of the  $t\bar{t}$  Production Cross Section in pp Collisions at  $\sqrt{s} = 8$  TeV in Dilepton Final States Containing One  $\tau$  Lepton**, *Phys. Lett. B*. 739 (2014) 23–43, doi:[10.1016/j.physletb.2014.10.032](https://doi.org/10.1016/j.physletb.2014.10.032), arXiv:[1407.6643](https://arxiv.org/abs/1407.6643) [hep-ex]
- V. Khachatryan et al., **Search for neutral MSSM Higgs bosons decaying to a pair of tau leptons in pp collisions**, *JHEP*. 10 (2014) 160, doi:[10.1007/JHEP10\(2014\)160](https://doi.org/10.1007/JHEP10(2014)160), arXiv:[1408.3316](https://arxiv.org/abs/1408.3316) [hep-ex]
- S. Chatrchyan et al., **Search for  $WW\gamma$  and  $WZ\gamma$  production and constraints on anomalous quartic gauge couplings in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 90 (2014) 032008, doi:[10.1103/PhysRevD.90.032008](https://doi.org/10.1103/PhysRevD.90.032008), arXiv:[1404.4619](https://arxiv.org/abs/1404.4619) [hep-ex]
- V. Khachatryan et al., **Measurement of Prompt  $J/\psi$  Pair Production in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 09 (2014) 094, doi:[10.1007/JHEP09\(2014\)094](https://doi.org/10.1007/JHEP09(2014)094), arXiv:[1406.0484](https://arxiv.org/abs/1406.0484) [hep-ex]
- V. Khachatryan et al., **Search for Excited Quarks in the  $\gamma +$  Jet Final State in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B*. 738 (2014) 274–293, doi:[10.1016/j.physletb.2014.09.048](https://doi.org/10.1016/j.physletb.2014.09.048), arXiv:[1406.5171](https://arxiv.org/abs/1406.5171) [hep-ex]
- V. Khachatryan et al., **Searches for electroweak production of charginos, neutralinos, and sleptons decaying to leptons and W, Z, and Higgs bosons in pp collisions at 8 TeV**, *Eur. Phys. J. C*. 74 (2014) 3036, doi:[10.1140/epjc/s10052-014-3036-7](https://doi.org/10.1140/epjc/s10052-014-3036-7), arXiv:[1405.7570](https://arxiv.org/abs/1405.7570) [hep-ex]
- V. Khachatryan et al., **Measurement of Top Quark-Antiquark Pair Production in Association with a W or Z Boson in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 74 (2014) 3060, doi:[10.1140/epjc/s10052-014-3060-7](https://doi.org/10.1140/epjc/s10052-014-3060-7), arXiv:[1406.7830](https://arxiv.org/abs/1406.7830) [hep-ex]
- S. Chatrchyan et al., **Alignment of the CMS tracker with LHC and cosmic ray data**, *JINST*. 9 (2014) P06009, doi:[10.1088/1748-0221/9/06/P06009](https://doi.org/10.1088/1748-0221/9/06/P06009), arXiv:[1403.2286](https://arxiv.org/abs/1403.2286) [physics.ins-det]
- S. Chatrchyan et al., **Observation of the associated production of a single top quark and a W boson in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 112 (2014) 231802, doi:[10.1103/PhysRevLett.112.231802](https://doi.org/10.1103/PhysRevLett.112.231802), arXiv:[1401.2942](https://arxiv.org/abs/1401.2942) [hep-ex]
- S. Chatrchyan et al., **Search for invisible decays of Higgs bosons in the vector boson fusion and associated ZH production modes**, *Eur. Phys. J. C*. 74 (2014) 2980, doi:[10.1140/epjc/s10052-014-2980-6](https://doi.org/10.1140/epjc/s10052-014-2980-6), arXiv:[1404.1344](https://arxiv.org/abs/1404.1344) [hep-ex]
- V. Khachatryan et al., **Search for massive resonances in dijet systems containing jets tagged as W or Z boson decays in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP*. 08 (2014) 173, doi:[10.1007/JHEP08\(2014\)173](https://doi.org/10.1007/JHEP08(2014)173), arXiv:[1405.1994](https://arxiv.org/abs/1405.1994) [hep-ex]
- S. Chatrchyan et al., **Measurement of Jet Fragmentation in PbPb and pp Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. C*. 90 (2014) 024908, doi:[10.1103/PhysRevC.90.024908](https://doi.org/10.1103/PhysRevC.90.024908), arXiv:[1406.0932](https://arxiv.org/abs/1406.0932) [nucl-ex]
- V. Khachatryan et al., **Searches for heavy Higgs bosons in two-Higgs-doublet models and for  $t \rightarrow ch$  decay using multilepton and diphoton final states in pp collisions at 8 TeV**, *Phys. Rev. D*. 90 (2014) 112013, doi:[10.1103/PhysRevD.90.112013](https://doi.org/10.1103/PhysRevD.90.112013), arXiv:[1410.2751](https://arxiv.org/abs/1410.2751) [hep-ex]
- S. Chatrchyan et al., **Measurement of the production cross sections for a Z boson and one or more b jets in pp collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 06 (2014) 120, doi:[10.1007/JHEP06\(2014\)120](https://doi.org/10.1007/JHEP06(2014)120), arXiv:[1402.1521](https://arxiv.org/abs/1402.1521) [hep-ex]
- S. Chatrchyan et al., **Measurement of pseudorapidity distributions of charged particles in proton-proton collisions at  $\sqrt{s} = 8$  TeV by the CMS and TOTEM experiments**, *Eur. Phys. J. C*. 74 (2014) 3053, doi:[10.1140/epjc/s10052-014-3053-6](https://doi.org/10.1140/epjc/s10052-014-3053-6), arXiv:[1405.0722](https://arxiv.org/abs/1405.0722) [hep-ex]
- P. Kreuzer et al., **Opportunistic Resource Usage in CMS**, *J. Phys. Conf. Ser.* 513 (2014) 062028, doi:[10.1088/1742-6596/513/6/062028](https://doi.org/10.1088/1742-6596/513/6/062028)

- V. Khachatryan et al., **Searches for electroweak neutralino and chargino production in channels with Higgs, Z, and W bosons in pp collisions at 8 TeV**, *Phys. Rev. D.* 90 (2014) 092007, doi:[10.1103/PhysRevD.90.092007](https://doi.org/10.1103/PhysRevD.90.092007), arXiv:[1409.3168](https://arxiv.org/abs/1409.3168) [hep-ex]
- V. Khachatryan et al., **Search for jet extinction in the inclusive jet-  $p_t$  spectrum from proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 90 (2014) 032005, doi:[10.1103/PhysRevD.90.032005](https://doi.org/10.1103/PhysRevD.90.032005), arXiv:[1405.7653](https://arxiv.org/abs/1405.7653) [hep-ex]
- V. Khachatryan et al., **Measurement of the t-channel single-top-quark production cross section and of the  $|V_{tb}|$  CKM matrix element in pp collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 06 (2014) 090, doi:[10.1007/JHEP06\(2014\)090](https://doi.org/10.1007/JHEP06(2014)090), arXiv:[1403.7366](https://arxiv.org/abs/1403.7366) [hep-ex]
- S. Chatrchyan et al., **Measurement of differential cross sections for the production of a pair of isolated photons in pp collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 74 (2014) 3129, doi:[10.1140/epjc/s10052-014-3129-3](https://doi.org/10.1140/epjc/s10052-014-3129-3), arXiv:[1405.7225](https://arxiv.org/abs/1405.7225) [hep-ex]
- V. Khachatryan et al., **Search for massive resonances decaying into pairs of boosted bosons in semi-leptonic final states at  $\sqrt{s} = 8$  TeV**, *JHEP.* 08 (2014) 174, doi:[10.1007/JHEP08\(2014\)174](https://doi.org/10.1007/JHEP08(2014)174), arXiv:[1405.3447](https://arxiv.org/abs/1405.3447) [hep-ex]
- V. Khachatryan et al., **Measurement of the ratio  $\mathcal{B}(t \rightarrow Wb)/\mathcal{B}(t \rightarrow Wq)$  in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 736 (2014) 33–57, doi:[10.1016/j.physletb.2014.06.076](https://doi.org/10.1016/j.physletb.2014.06.076), arXiv:[1404.2292](https://arxiv.org/abs/1404.2292) [hep-ex]
- V. Khachatryan et al., **Search for Heavy Neutrinos and W Bosons with Right-Handed Couplings in Proton-Proton Collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 74 (2014) 3149, doi:[10.1140/epjc/s10052-014-3149-z](https://doi.org/10.1140/epjc/s10052-014-3149-z), arXiv:[1407.3683](https://arxiv.org/abs/1407.3683) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Ratio of Inclusive Jet Cross Sections using the Anti- $k_T$  Algorithm with Radius Parameters  $R=0.5$  and  $0.7$  in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 90 (2014) 072006, doi:[10.1103/PhysRevD.90.072006](https://doi.org/10.1103/PhysRevD.90.072006), arXiv:[1406.0324](https://arxiv.org/abs/1406.0324) [hep-ex]
- S. Chatrchyan et al., **Description and performance of track and primary-vertex reconstruction with the CMS tracker**, *JINST.* 9 (2014) P10009, doi:[10.1088/1748-0221/9/10/P10009](https://doi.org/10.1088/1748-0221/9/10/P10009), arXiv:[1405.6569](https://arxiv.org/abs/1405.6569) [physics.ins-det]
- S. Chatrchyan et al., **Measurement of inclusive W and Z boson production cross sections in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. Lett.* 112 (2014) 191802, doi:[10.1103/PhysRevLett.112.191802](https://doi.org/10.1103/PhysRevLett.112.191802), arXiv:[1402.0923](https://arxiv.org/abs/1402.0923) [hep-ex]
- V. Khachatryan et al., **Constraints on the Higgs boson width from off-shell production and decay to Z-boson pairs**, *Phys. Lett. B.* 736 (2014) 64–85, doi:[10.1016/j.physletb.2014.06.077](https://doi.org/10.1016/j.physletb.2014.06.077), arXiv:[1405.3455](https://arxiv.org/abs/1405.3455) [hep-ex]
- S. Chatrchyan et al., **Studies of dijet transverse momentum balance and pseudorapidity distributions in pPb collisions at  $\sqrt{s_{NN}} = 5.02$  TeV**, *Eur. Phys. J. C.* 74 (2014) 2951, doi:[10.1140/epjc/s10052-014-2951-y](https://doi.org/10.1140/epjc/s10052-014-2951-y), arXiv:[1401.4433](https://arxiv.org/abs/1401.4433) [nucl-ex]
- S. Chatrchyan et al., **Search for supersymmetry with razor variables in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 90 (2014) 112001, doi:[10.1103/PhysRevD.90.112001](https://doi.org/10.1103/PhysRevD.90.112001), arXiv:[1405.3961](https://arxiv.org/abs/1405.3961) [hep-ex]
- S. Chatrchyan et al., **Measurements of the  $t\bar{t}$  charge asymmetry using the dilepton decay channel in pp collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 04 (2014) 191, doi:[10.1007/JHEP04\(2014\)191](https://doi.org/10.1007/JHEP04(2014)191), arXiv:[1402.3803](https://arxiv.org/abs/1402.3803) [hep-ex]
- S. Chatrchyan et al., **Determination of the Top-Quark Pole Mass and Strong Coupling Constant from the  $t\bar{t}$  Production Cross Section in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 728 (2014) 496–517, doi:[10.1016/j.physletb.2013.12.009](https://doi.org/10.1016/j.physletb.2013.12.009), arXiv:[1307.1907](https://arxiv.org/abs/1307.1907) [hep-ex]
- V. Khachatryan et al., **Identification techniques for highly boosted W bosons that decay into hadrons**, *JHEP.* 12 (2014) 017, doi:[10.1007/JHEP12\(2014\)017](https://doi.org/10.1007/JHEP12(2014)017), arXiv:[1410.4227](https://arxiv.org/abs/1410.4227) [hep-ex]
- S. Chatrchyan et al., **Evidence for the direct decay of the 125 GeV Higgs boson to fermions**, *Nature Phys.* 10 (2014) 557–560, doi:[10.1038/nphys3005](https://doi.org/10.1038/nphys3005), arXiv:[1401.6527](https://arxiv.org/abs/1401.6527) [hep-ex]
- V. Khachatryan et al., **Study of Hadronic Event-Shape Variables in Multijet Final States in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 10 (2014) 087, doi:[10.1007/JHEP10\(2014\)087](https://doi.org/10.1007/JHEP10(2014)087), arXiv:[1407.2856](https://arxiv.org/abs/1407.2856) [hep-ex]
- V. Khachatryan et al., **Search for the associated production of the Higgs boson with a top-quark pair**, *JHEP.* 09 (2014) 087, doi:[10.1007/JHEP09\(2014\)087](https://doi.org/10.1007/JHEP09(2014)087), arXiv:[1408.1682](https://arxiv.org/abs/1408.1682) [hep-ex]
- S. Chatrchyan et al., **Search for new physics in the multijet and missing transverse momentum final state in proton-proton collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 06 (2014) 055, doi:[10.1007/JHEP06\(2014\)055](https://doi.org/10.1007/JHEP06(2014)055), arXiv:[1402.4770](https://arxiv.org/abs/1402.4770) [hep-ex]



- V. Khachatryan et al., **Measurement of Prompt  $\psi(2S) \rightarrow J/\psi$  Yield Ratios in Pb-Pb and  $p - p$  Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 113 (2014) 262301, doi:[10.1103/PhysRevLett.113.262301](https://doi.org/10.1103/PhysRevLett.113.262301), arXiv:[1410.1804](https://arxiv.org/abs/1410.1804) [nucl-ex]
- S. Chatrchyan et al., **Evidence for the 125 GeV Higgs boson decaying to a pair of  $\tau$  leptons**, *JHEP.* 05 (2014) 104, doi:[10.1007/JHEP05\(2014\)104](https://doi.org/10.1007/JHEP05(2014)104), arXiv:[1401.5041](https://arxiv.org/abs/1401.5041) [hep-ex]
- V. Khachatryan et al., **Search for top-squark pairs decaying into Higgs or Z bosons in pp collisions at  $\sqrt{s}=8$  TeV**, *Phys. Lett. B.* 736 (2014) 371–397, doi:[10.1016/j.physletb.2014.07.053](https://doi.org/10.1016/j.physletb.2014.07.053), arXiv:[1405.3886](https://arxiv.org/abs/1405.3886) [hep-ex]
- V. Khachatryan et al., **Search for pair production of third-generation scalar leptoquarks and top squarks in protonproton collisions at  $\sqrt{s}=8$  TeV**, *Phys. Lett. B.* 739 (2014) 229–249, doi:[10.1016/j.physletb.2014.10.063](https://doi.org/10.1016/j.physletb.2014.10.063), arXiv:[1408.0806](https://arxiv.org/abs/1408.0806) [hep-ex]
- S. Chatrchyan et al., **Search for anomalous production of events with three or more leptons in pp collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D.* 90 (2014) 032006, doi:[10.1103/PhysRevD.90.032006](https://doi.org/10.1103/PhysRevD.90.032006), arXiv:[1404.5801](https://arxiv.org/abs/1404.5801) [hep-ex]
- V. Khachatryan et al., **Search for Standard Model Production of Four Top Quarks in the Lepton + Jets Channel in pp Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 11 (2014) 154, doi:[10.1007/JHEP11\(2014\)154](https://doi.org/10.1007/JHEP11(2014)154), arXiv:[1409.7339](https://arxiv.org/abs/1409.7339) [hep-ex]
- S. Chatrchyan et al., **Measurement of WZ and ZZ production in pp collisions at  $\sqrt{s} = 8$  TeV in final states with b-tagged jets**, *Eur. Phys. J. C.* 74 (2014) 2973, doi:[10.1140/epjc/s10052-014-2973-5](https://doi.org/10.1140/epjc/s10052-014-2973-5), arXiv:[1403.3047](https://arxiv.org/abs/1403.3047) [hep-ex]
- I. Dzhunov et al., **Towards a Centralized Grid Speedometer**, *J. Phys. Conf. Ser.* 513 (2014) 032028, doi:[10.1088/1742-6596/513/3/032028](https://doi.org/10.1088/1742-6596/513/3/032028)
- I. Sfiligoi et al., **CMS experience of running glideinWMS in High Availability mode**, *J. Phys. Conf. Ser.* 513 (2014) 032086, doi:[10.1088/1742-6596/513/3/032086](https://doi.org/10.1088/1742-6596/513/3/032086)
- S. Chatrchyan et al., **Search for Excited Leptons in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 720 (2013) 309–329, doi:[10.1016/j.physletb.2013.02.031](https://doi.org/10.1016/j.physletb.2013.02.031), arXiv:[1210.2422](https://arxiv.org/abs/1210.2422) [hep-ex]
- S. Chatrchyan et al., **Search in Leptonic Channels for Heavy Resonances Decaying to Long-Lived Neutral Particles**, *JHEP.* 02 (2013) 085, doi:[10.1007/JHEP02\(2013\)085](https://doi.org/10.1007/JHEP02(2013)085), arXiv:[1211.2472](https://arxiv.org/abs/1211.2472) [hep-ex]
- S. Chatrchyan et al., **Search for Long-Lived Particles Decaying to Photons and Missing Energy in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 722 (2013) 273–294, doi:[10.1016/j.physletb.2013.04.027](https://doi.org/10.1016/j.physletb.2013.04.027), arXiv:[1212.1838](https://arxiv.org/abs/1212.1838) [hep-ex]
- S. Chatrchyan et al., **Search for Pair Production of Third-Generation Leptoquarks and Top Squarks in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 110 (2013) 081801, doi:[10.1103/PhysRevLett.110.081801](https://doi.org/10.1103/PhysRevLett.110.081801), arXiv:[1210.5629](https://arxiv.org/abs/1210.5629) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $Y(1S)$ ,  $Y(2S)$  and  $Y(3S)$  Polarizations in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 110 (2013) 081802, doi:[10.1103/PhysRevLett.110.081802](https://doi.org/10.1103/PhysRevLett.110.081802), arXiv:[1209.2922](https://arxiv.org/abs/1209.2922) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Resonances in the W/Z-Tagged Dijet Mass Spectrum in pp Collisions at 7 TeV**, *Phys. Lett. B.* 723 (2013) 280–301, doi:[10.1016/j.physletb.2013.05.040](https://doi.org/10.1016/j.physletb.2013.05.040), arXiv:[1212.1910](https://arxiv.org/abs/1212.1910) [hep-ex]
- S. Chatrchyan et al., **Measurement of the ZZ Production Cross Section and Search for Anomalous Couplings in 2 l2l ' Final States in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2013) 063, doi:[10.1007/JHEP01\(2013\)063](https://doi.org/10.1007/JHEP01(2013)063), arXiv:[1211.4890](https://arxiv.org/abs/1211.4890) [hep-ex]
- S. Chatrchyan et al., **Identification of b-Quark Jets with the CMS Experiment**, *JINST.* 8 (2013) P04013, doi:[10.1088/1748-0221/8/04/P04013](https://doi.org/10.1088/1748-0221/8/04/P04013), arXiv:[1211.4462](https://arxiv.org/abs/1211.4462) [hep-ex]
- S. Chatrchyan et al., **Measurements of Differential Jet Cross Sections in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV with the CMS Detector**, *Phys. Rev. D.* 87 (2013) 112002, doi:[10.1103/PhysRevD.87.112002](https://doi.org/10.1103/PhysRevD.87.112002), arXiv:[1212.6660](https://arxiv.org/abs/1212.6660) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Inelastic Proton-Proton Cross Section at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 722 (2013) 5–27, doi:[10.1016/j.physletb.2013.03.024](https://doi.org/10.1016/j.physletb.2013.03.024), arXiv:[1210.6718](https://arxiv.org/abs/1210.6718) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  Production Cross Section in pp Collisions at  $\sqrt{s} = 7$  TeV with Lepton + Jets Final States**, *Phys. Lett. B.* 720 (2013) 83–104, doi:[10.1016/j.physletb.2013.02.021](https://doi.org/10.1016/j.physletb.2013.02.021), arXiv:[1212.6682](https://arxiv.org/abs/1212.6682) [hep-ex]
- S. Chatrchyan et al., **Measurement of Differential Top-Quark Pair Production Cross Sections in pp collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2339, doi:[10.1140/epjc/s10052-013-2339-4](https://doi.org/10.1140/epjc/s10052-013-2339-4), arXiv:[1211.2220](https://arxiv.org/abs/1211.2220) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Azimuthal Anisotropy of Neutral Pions in PbPb cCollisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 110 (2013) 042301, doi:[10.1103/PhysRevLett.110.042301](https://doi.org/10.1103/PhysRevLett.110.042301), arXiv:[1208.2470](https://arxiv.org/abs/1208.2470) [nucl-ex]

- S. Chatrchyan et al., **Search for Exotic Resonances Decaying into  $WZ/ZZ$  in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 02 (2013) 036, doi:[10.1007/JHEP02\(2013\)036](https://doi.org/10.1007/JHEP02(2013)036), arXiv:[1211.5779](https://arxiv.org/abs/1211.5779) [hep-ex]
- S. Chatrchyan et al., **Search for a Narrow Spin-2 Resonance Decaying to a Pair of Z Vector Bosons in the Semileptonic Final State**, *Phys. Lett. B.* 718 (2013) 1208–1228, doi:[10.1016/j.physletb.2012.11.063](https://doi.org/10.1016/j.physletb.2012.11.063), arXiv:[1209.3807](https://arxiv.org/abs/1209.3807) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Quarks Decaying into a Top Quark and a W or Z Boson using Lepton + Jets Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2013) 154, doi:[10.1007/JHEP01\(2013\)154](https://doi.org/10.1007/JHEP01(2013)154), arXiv:[1210.7471](https://arxiv.org/abs/1210.7471) [hep-ex]
- S. Chatrchyan et al., **Search for a  $W'$  Boson Decaying to a Bottom Quark and a Top Quark in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 718 (2013) 1229–1251, doi:[10.1016/j.physletb.2012.12.008](https://doi.org/10.1016/j.physletb.2012.12.008), arXiv:[1208.0956](https://arxiv.org/abs/1208.0956) [hep-ex]
- S. Chatrchyan et al., **Observation of a Diffractive Contribution to Dijet Production in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 87 (2013) 012006, doi:[10.1103/PhysRevD.87.012006](https://doi.org/10.1103/PhysRevD.87.012006), arXiv:[1209.1805](https://arxiv.org/abs/1209.1805) [hep-ex]
- S. Chatrchyan et al., **Search for Contact Interactions in  $\mu^+\mu^-$  Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 87 (2013) 032001, doi:[10.1103/PhysRevD.87.032001](https://doi.org/10.1103/PhysRevD.87.032001), arXiv:[1212.4563](https://arxiv.org/abs/1212.4563) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics in Events with Same-Sign Dileptons and  $b$  Jets in  $pp$  Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 03 (2013) 037, doi:[10.1007/JHEP03\(2013\)037](https://doi.org/10.1007/JHEP03(2013)037), arXiv:[1212.6194](https://arxiv.org/abs/1212.6194) [hep-ex]
- S. Chatrchyan et al., **Evidence for Associated Production of a Single Top Quark and W Boson in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 110 (2013) 022003, doi:[10.1103/PhysRevLett.110.022003](https://doi.org/10.1103/PhysRevLett.110.022003), arXiv:[1209.3489](https://arxiv.org/abs/1209.3489) [hep-ex]
- S. Chatrchyan et al., **Observation of Long-Range Near-Side Angular Correlations in Proton-Lead Collisions at the LHC**, *Phys. Lett. B.* 718 (2013) 795–814, doi:[10.1016/j.physletb.2012.11.025](https://doi.org/10.1016/j.physletb.2012.11.025), arXiv:[1210.5482](https://arxiv.org/abs/1210.5482) [nucl-ex]
- S. Chatrchyan et al., **Search for a Non-Standard-Model Higgs Boson Decaying to a Pair of New Light Bosons in Four-Muon Final States**, *Phys. Lett. B.* 726 (2013) 564–586, doi:[10.1016/j.physletb.2013.09.009](https://doi.org/10.1016/j.physletb.2013.09.009), arXiv:[1210.7619](https://arxiv.org/abs/1210.7619) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Final States with Missing Transverse Energy and 0, 1, 2, or at Least 3  $b$ -Quark Jets in 7 TeV  $pp$  Collisions using the Variable  $\alpha_T$** , *JHEP.* 01 (2013) 077, doi:[10.1007/JHEP01\(2013\)077](https://doi.org/10.1007/JHEP01(2013)077), arXiv:[1210.8115](https://arxiv.org/abs/1210.8115) [hep-ex]
- S. Chatrchyan et al., **Search for Anomalous Production of Highly Boosted Z Bosons Decaying to  $\mu^+\mu^-$  in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 722 (2013) 28–47, doi:[10.1016/j.physletb.2013.03.037](https://doi.org/10.1016/j.physletb.2013.03.037), arXiv:[1210.0867](https://arxiv.org/abs/1210.0867) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Narrow Dilepton Resonances in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV and  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 720 (2013) 63–82, doi:[10.1016/j.physletb.2013.02.003](https://doi.org/10.1016/j.physletb.2013.02.003), arXiv:[1212.6175](https://arxiv.org/abs/1212.6175) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Events with Photons and Low Missing Transverse Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 719 (2013) 42–61, doi:[10.1016/j.physletb.2012.12.055](https://doi.org/10.1016/j.physletb.2012.12.055), arXiv:[1210.2052](https://arxiv.org/abs/1210.2052) [hep-ex]
- S. Chatrchyan et al., **Study of the Mass and Spin-Parity of the Higgs Boson Candidate Via Its Decays to Z Boson Pairs**, *Phys. Rev. Lett.* 110 (2013) 081803, doi:[10.1103/PhysRevLett.110.081803](https://doi.org/10.1103/PhysRevLett.110.081803), arXiv:[1212.6639](https://arxiv.org/abs/1212.6639) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV in Events with a Single Lepton, Jets, and Missing Transverse Momentum**, *Eur. Phys. J. C.* 73 (2013) 2404, doi:[10.1140/epjc/s10052-013-2404-z](https://doi.org/10.1140/epjc/s10052-013-2404-z), arXiv:[1212.6428](https://arxiv.org/abs/1212.6428) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Final States with a Single Lepton,  $b$ -Quark Jets, and Missing Transverse Energy in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 87 (2013) 052006, doi:[10.1103/PhysRevD.87.052006](https://doi.org/10.1103/PhysRevD.87.052006), arXiv:[1211.3143](https://arxiv.org/abs/1211.3143) [hep-ex]
- S. Chatrchyan et al., **Search for Flavor Changing Neutral Currents in Top Quark Decays in  $pp$  Collisions at 7 TeV**, *Phys. Lett. B.* 718 (2013) 1252–1272, doi:[10.1016/j.physletb.2012.12.045](https://doi.org/10.1016/j.physletb.2012.12.045), arXiv:[1208.0957](https://arxiv.org/abs/1208.0957) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Sum of  $WW$  and  $WZ$  Production with  $W$ +Dijet Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2283, doi:[10.1140/epjc/s10052-013-2283-3](https://doi.org/10.1140/epjc/s10052-013-2283-3), arXiv:[1210.7544](https://arxiv.org/abs/1210.7544) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics in Events with Opposite-Sign Leptons, Jets, and Missing Transverse Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 718 (2013) 815–840, doi:[10.1016/j.physletb.2012.11.036](https://doi.org/10.1016/j.physletb.2012.11.036), arXiv:[1206.3949](https://arxiv.org/abs/1206.3949) [hep-ex]

- S. Chatrchyan et al., **Search for New Physics in Events with Photons, Jets, and Missing Transverse Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 03 (2013) 111, doi:[10.1007/JHEP03\(2013\)111](https://doi.org/10.1007/JHEP03(2013)111), arXiv:[1211.4784](https://arxiv.org/abs/1211.4784) [hep-ex]
- S. Chatrchyan et al., **Search for Fractionally Charged Particles in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D*. 87 (2013) 092008, doi:[10.1103/PhysRevD.87.092008](https://doi.org/10.1103/PhysRevD.87.092008), arXiv:[1210.2311](https://arxiv.org/abs/1210.2311) [hep-ex]
- S. Chatrchyan et al., **Search for Narrow Resonances and Quantum Black Holes in Inclusive and  $b$ -Tagged Dijet Mass Spectra from  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 01 (2013) 013, doi:[10.1007/JHEP01\(2013\)013](https://doi.org/10.1007/JHEP01(2013)013), arXiv:[1210.2387](https://arxiv.org/abs/1210.2387) [hep-ex]
- S. Chatrchyan et al., **Inclusive Search for Supersymmetry Using the Razor Variables in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 111 (2013) 081802, doi:[10.1103/PhysRevLett.111.081802](https://doi.org/10.1103/PhysRevLett.111.081802), arXiv:[1212.6961](https://arxiv.org/abs/1212.6961) [hep-ex]
- S. Chatrchyan et al., **Studies of Jet Quenching using Isolated-Photon + Jet Correlations in PbPb and  $pp$  Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Lett. B*. 718 (2013) 773–794, doi:[10.1016/j.physletb.2012.11.003](https://doi.org/10.1016/j.physletb.2012.11.003), arXiv:[1205.0206](https://arxiv.org/abs/1205.0206) [nucl-ex]
- S. Chatrchyan et al., **Measurement of the Elliptic Anisotropy of Charged Particles Produced in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. C*. 87 (2013) 014902, doi:[10.1103/PhysRevC.87.014902](https://doi.org/10.1103/PhysRevC.87.014902), arXiv:[1204.1409](https://arxiv.org/abs/1204.1409) [nucl-ex]
- S. Chatrchyan et al., **Forward-Backward Asymmetry of Drell-Yan Lepton Pairs in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 718 (2013) 752–772, doi:[10.1016/j.physletb.2012.10.082](https://doi.org/10.1016/j.physletb.2012.10.082), arXiv:[1207.3973](https://arxiv.org/abs/1207.3973) [hep-ex]
- S. Chatrchyan et al., **Search for  $Z'$  Resonances Decaying to  $t\bar{t}$  in Dilepton + Jets Final States in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D*. 87 (2013) 072002, doi:[10.1103/PhysRevD.87.072002](https://doi.org/10.1103/PhysRevD.87.072002), arXiv:[1211.3338](https://arxiv.org/abs/1211.3338) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $W^+W^-$  Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV and Limits on Anomalous  $WW\gamma$  and  $WWZ$  Couplings**, *Eur. Phys. J. C*. 73 (2013) 2610, doi:[10.1140/epjc/s10052-013-2610-8](https://doi.org/10.1140/epjc/s10052-013-2610-8), arXiv:[1306.1126](https://arxiv.org/abs/1306.1126) [hep-ex]
- S. Chatrchyan et al., **Search for a Higgs Boson Decaying into a  $b$ -Quark Pair and Produced in Association with  $b$  Quarks in Proton-Proton Collisions at 7 TeV**, *Phys. Lett. B*. 722 (2013) 207–232, doi:[10.1016/j.physletb.2013.04.017](https://doi.org/10.1016/j.physletb.2013.04.017), arXiv:[1302.2892](https://arxiv.org/abs/1302.2892) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $\Lambda_b^0$  Lifetime in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 07 (2013) 163, doi:[10.1007/JHEP07\(2013\)163](https://doi.org/10.1007/JHEP07(2013)163), arXiv:[1304.7495](https://arxiv.org/abs/1304.7495) [hep-ex]
- S. Chatrchyan et al., **Observation of a New Boson with Mass Near 125 GeV in  $pp$  Collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 06 (2013) 081, doi:[10.1007/JHEP06\(2013\)081](https://doi.org/10.1007/JHEP06(2013)081), arXiv:[1303.4571](https://arxiv.org/abs/1303.4571) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Hadronic Final States with Missing Transverse Energy Using the Variables  $\alpha_T$  and  $b$ -Quark Multiplicity in  $pp$  collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C*. 73 (2013) 2568, doi:[10.1140/epjc/s10052-013-2568-6](https://doi.org/10.1140/epjc/s10052-013-2568-6), arXiv:[1303.2985](https://arxiv.org/abs/1303.2985) [hep-ex]
- S. Chatrchyan et al., **Searches for Long-Lived Charged Particles in  $pp$  Collisions at  $\sqrt{s} = 7$  and 8 TeV**, *JHEP*. 07 (2013) 122, doi:[10.1007/JHEP07\(2013\)122](https://doi.org/10.1007/JHEP07(2013)122), arXiv:[1305.0491](https://arxiv.org/abs/1305.0491) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $B_s^0 \rightarrow \mu^+\mu^-$  Branching Fraction and Search for  $B^0 \rightarrow \mu^+\mu^-$  with the CMS Experiment**, *Phys. Rev. Lett.* 111 (2013) 101804, doi:[10.1103/PhysRevLett.111.101804](https://doi.org/10.1103/PhysRevLett.111.101804), arXiv:[1307.5025](https://arxiv.org/abs/1307.5025) [hep-ex]
- S. Chatrchyan et al., **Search for Narrow Resonances Using the Dijet Mass Spectrum in  $pp$  Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Rev. D*. 87 (2013) 114015, doi:[10.1103/PhysRevD.87.114015](https://doi.org/10.1103/PhysRevD.87.114015), arXiv:[1302.4794](https://arxiv.org/abs/1302.4794) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $X(3872)$  Production Cross Section Via Decays to  $J/\psi\pi^+\pi^-$  in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 04 (2013) 154, doi:[10.1007/JHEP04\(2013\)154](https://doi.org/10.1007/JHEP04(2013)154), arXiv:[1302.3968](https://arxiv.org/abs/1302.3968) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Hadronic Activity in Events with a  $Z$  and Two Jets and Extraction of the Cross Section for the Electroweak Production of a  $Z$  with Two Jets in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 10 (2013) 062, doi:[10.1007/JHEP10\(2013\)062](https://doi.org/10.1007/JHEP10(2013)062), arXiv:[1305.7389](https://arxiv.org/abs/1305.7389) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Prompt  $J/\psi$  and  $\psi(2S)$  Polarizations in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 727 (2013) 381–402, doi:[10.1016/j.physletb.2013.10.055](https://doi.org/10.1016/j.physletb.2013.10.055), arXiv:[1307.6070](https://arxiv.org/abs/1307.6070) [hep-ex]
- S. Chatrchyan et al., **Study of Exclusive Two-Photon Production of  $W^+W^-$  in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV and Constraints on Anomalous Quartic Gauge Couplings**, *JHEP*. 07 (2013) 116, doi:[10.1007/JHEP07\(2013\)116](https://doi.org/10.1007/JHEP07(2013)116), arXiv:[1305.5596](https://arxiv.org/abs/1305.5596) [hep-ex]

- S. Chatrchyan et al., **Search for Supersymmetry in Events with Opposite-Sign Dileptons and Missing Transverse Energy Using an Artificial Neural Network**, *Phys. Rev. D.* 87 (2013) 072001, doi:[10.1103/PhysRevD.87.072001](https://doi.org/10.1103/PhysRevD.87.072001), arXiv:[1301.0916](https://arxiv.org/abs/1301.0916) [hep-ex]
- S. Chatrchyan et al., **Search for Pair-Produced Dijet Resonances in Four-Jet Final States in pp Collisions at  $\sqrt{s}=7$  TeV**, *Phys. Rev. Lett.* 110 (2013) 141802, doi:[10.1103/PhysRevLett.110.141802](https://doi.org/10.1103/PhysRevLett.110.141802), arXiv:[1302.0531](https://arxiv.org/abs/1302.0531) [hep-ex]
- S. Chatrchyan et al., **Multiplicity and Transverse Momentum Dependence of Two- and Four-Particle Correlations in pPb and PbPb Collisions**, *Phys. Lett. B.* 724 (2013) 213–240, doi:[10.1016/j.physletb.2013.06.028](https://doi.org/10.1016/j.physletb.2013.06.028), arXiv:[1305.0609](https://arxiv.org/abs/1305.0609) [nucl-ex]
- S. Chatrchyan et al., **Rapidity Distributions in Exclusive Z + Jet and  $\gamma$  + Jet Events in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 88 (2013) 112009, doi:[10.1103/PhysRevD.88.112009](https://doi.org/10.1103/PhysRevD.88.112009), arXiv:[1310.3082](https://arxiv.org/abs/1310.3082) [hep-ex]
- S. Chatrchyan et al., **Studies of Jet Mass in Dijet and W/Z + Jet Events**, *JHEP.* 05 (2013) 090, doi:[10.1007/JHEP05\(2013\)090](https://doi.org/10.1007/JHEP05(2013)090), arXiv:[1303.4811](https://arxiv.org/abs/1303.4811) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics in Final States with a Lepton and Missing Transverse Energy in pp Collisions at the LHC**, *Phys. Rev. D.* 87 (2013) 072005, doi:[10.1103/PhysRevD.87.072005](https://doi.org/10.1103/PhysRevD.87.072005), arXiv:[1302.2812](https://arxiv.org/abs/1302.2812) [hep-ex]
- S. Chatrchyan et al., **Event Shapes and Azimuthal Correlations in Z + Jets Events in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 722 (2013) 238–261, doi:[10.1016/j.physletb.2013.04.025](https://doi.org/10.1016/j.physletb.2013.04.025), arXiv:[1301.1646](https://arxiv.org/abs/1301.1646) [hep-ex]
- S. Chatrchyan et al., **Energy Calibration and Resolution of the CMS Electromagnetic Calorimeter in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JINST.* 8 (2013) P09009, doi:[10.1088/1748-0221/8/09/P09009](https://doi.org/10.1088/1748-0221/8/09/P09009), arXiv:[1306.2016](https://arxiv.org/abs/1306.2016) [hep-ex]
- S. Chatrchyan et al., **Angular Analysis and Branching Fraction Measurement of the Decay  $B^0 \rightarrow K^{*0} \mu^+ \mu^-$** , *Phys. Lett. B.* 727 (2013) 77–100, doi:[10.1016/j.physletb.2013.10.017](https://doi.org/10.1016/j.physletb.2013.10.017), arXiv:[1308.3409](https://arxiv.org/abs/1308.3409) [hep-ex]
- S. Chatrchyan et al., **Search for Microscopic Black Holes in pp Collisions at  $\sqrt{s} = 8$  TeV**, *JHEP.* 07 (2013) 178, doi:[10.1007/JHEP07\(2013\)178](https://doi.org/10.1007/JHEP07(2013)178), arXiv:[1303.5338](https://arxiv.org/abs/1303.5338) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  Production Cross Section in the  $\tau$  + Jets Channel in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2386, doi:[10.1140/epjc/s10052-013-2386-x](https://doi.org/10.1140/epjc/s10052-013-2386-x), arXiv:[1301.5755](https://arxiv.org/abs/1301.5755) [hep-ex]
- S. Chatrchyan et al., **Search for Gluino Mediated Bottom- and Top-Squark Production in Multijet Final States in pp Collisions at 8 TeV**, *Phys. Lett. B.* 725 (2013) 243–270, doi:[10.1016/j.physletb.2013.06.058](https://doi.org/10.1016/j.physletb.2013.06.058), arXiv:[1305.2390](https://arxiv.org/abs/1305.2390) [hep-ex]
- S. Chatrchyan et al., **Searches for New Physics using the  $t\bar{t}$  Invariant Mass Distribution in pp Collisions at  $\sqrt{s}=8$  TeV**, *Phys. Rev. Lett.* 111 (2013) 211804, doi:[10.1103/PhysRevLett.111.211804](https://doi.org/10.1103/PhysRevLett.111.211804), arXiv:[1309.2030](https://arxiv.org/abs/1309.2030) [hep-ex]
- S. Chatrchyan et al., **Search for Physics Beyond the Standard Model in Events with  $\tau$  Leptons, Jets, and Large Transverse Momentum Imbalance in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2493, doi:[10.1140/epjc/s10052-013-2493-8](https://doi.org/10.1140/epjc/s10052-013-2493-8), arXiv:[1301.3792](https://arxiv.org/abs/1301.3792) [hep-ex]
- S. Chatrchyan et al., **Search for Top-Squark Pair Production in the Single-Lepton Final State in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2677, doi:[10.1140/epjc/s10052-013-2677-2](https://doi.org/10.1140/epjc/s10052-013-2677-2), arXiv:[1308.1586](https://arxiv.org/abs/1308.1586) [hep-ex]
- S. Chatrchyan et al., **Measurement of  $W^+W^-$  and ZZ Production Cross Sections in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 721 (2013) 190–211, doi:[10.1016/j.physletb.2013.03.027](https://doi.org/10.1016/j.physletb.2013.03.027), arXiv:[1301.4698](https://arxiv.org/abs/1301.4698) [hep-ex]
- S. Chatrchyan et al., **Search for Top Squarks in R-Parity-Violating Supersymmetry using Three or More Leptons and B-Tagged Jets**, *Phys. Rev. Lett.* 111 (2013) 221801, doi:[10.1103/PhysRevLett.111.221801](https://doi.org/10.1103/PhysRevLett.111.221801), arXiv:[1306.6643](https://arxiv.org/abs/1306.6643) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $\Upsilon(1S)$ ,  $\Upsilon(2S)$ , and  $\Upsilon(3S)$  Cross Sections in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 727 (2013) 101–125, doi:[10.1016/j.physletb.2013.10.033](https://doi.org/10.1016/j.physletb.2013.10.033), arXiv:[1303.5900](https://arxiv.org/abs/1303.5900) [hep-ex]
- S. Chatrchyan et al., **Search for a Higgs Boson Decaying into a Z and a Photon in pp Collisions at  $\sqrt{s} = 7$  and 8 TeV**, *Phys. Lett. B.* 726 (2013) 587–609, doi:[10.1016/j.physletb.2013.09.057](https://doi.org/10.1016/j.physletb.2013.09.057), arXiv:[1307.5515](https://arxiv.org/abs/1307.5515) [hep-ex]
- S. Chatrchyan et al., **Search for Contact Interactions Using the Inclusive Jet  $p_T$  Spectrum in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 87 (2013) 052017, doi:[10.1103/PhysRevD.87.052017](https://doi.org/10.1103/PhysRevD.87.052017), arXiv:[1301.5023](https://arxiv.org/abs/1301.5023) [hep-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson Produced in Association with a Top-Quark Pair in pp Collisions at the LHC**, *JHEP.* 05 (2013) 145, doi:[10.1007/JHEP05\(2013\)145](https://doi.org/10.1007/JHEP05(2013)145), arXiv:[1303.0763](https://arxiv.org/abs/1303.0763) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Ratio of the Inclusive 3-Jet Cross Section to the Inclusive 2-Jet Cross Section in pp Collisions at  $\sqrt{s} = 7$  TeV and First Determination of the Strong Coupling Constant in the TeV Range**, *Eur. Phys. J. C.* 73 (2013) 2604, doi:[10.1140/epjc/s10052-013-2604-6](https://doi.org/10.1140/epjc/s10052-013-2604-6), arXiv:[1304.7498](https://arxiv.org/abs/1304.7498) [hep-ex]



- S. Chatrchyan et al., **Measurement of associated production of vector bosons and top quark-antiquark pairs at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 110 (2013) 172002, doi:[10.1103/PhysRevLett.110.172002](https://doi.org/10.1103/PhysRevLett.110.172002), arXiv:[1303.3239](https://arxiv.org/abs/1303.3239) [hep-ex]
- S. Chatrchyan et al., **Search for a Standard-Model-Like Higgs Boson with a Mass in the Range 145 to 1000 GeV at the LHC**, *Eur. Phys. J. C.* 73 (2013) 2469, doi:[10.1140/epjc/s10052-013-2469-8](https://doi.org/10.1140/epjc/s10052-013-2469-8), arXiv:[1304.0213](https://arxiv.org/abs/1304.0213) [hep-ex]
- S. Chatrchyan et al., **The Performance of the CMS Muon Detector in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV at the LHC**, *JINST.* 8 (2013) P11002, doi:[10.1088/1748-0221/8/11/P11002](https://doi.org/10.1088/1748-0221/8/11/P11002), arXiv:[1306.6905](https://arxiv.org/abs/1306.6905) [physics.ins-det]
- S. Chatrchyan et al., **Measurement of Masses in the  $t\bar{t}$  System by Kinematic Endpoints in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2494, doi:[10.1140/epjc/s10052-013-2494-7](https://doi.org/10.1140/epjc/s10052-013-2494-7), arXiv:[1304.5783](https://arxiv.org/abs/1304.5783) [hep-ex]
- S. Chatrchyan et al., **Interpretation of Searches for Supersymmetry with Simplified Models**, *Phys. Rev. D.* 88 (2013) 052017, doi:[10.1103/PhysRevD.88.052017](https://doi.org/10.1103/PhysRevD.88.052017), arXiv:[1301.2175](https://arxiv.org/abs/1301.2175) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Cross Section and Angular Correlations for Associated Production of a Z Boson with b Hadrons in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 12 (2013) 039, doi:[10.1007/JHEP12\(2013\)039](https://doi.org/10.1007/JHEP12(2013)039), arXiv:[1310.1349](https://arxiv.org/abs/1310.1349) [hep-ex]
- S. Chatrchyan et al., **Measurement of the W-Boson Helicity in Top-Quark decays from  $t\bar{t}$  Production in Lepton + Jets Events in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 10 (2013) 167, doi:[10.1007/JHEP10\(2013\)167](https://doi.org/10.1007/JHEP10(2013)167), arXiv:[1308.3879](https://arxiv.org/abs/1308.3879) [hep-ex]
- S. Chatrchyan et al., **Jet and Underlying Event Properties as a Function of Charged-Particle Multiplicity in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 73 (2013) 2674, doi:[10.1140/epjc/s10052-013-2674-5](https://doi.org/10.1140/epjc/s10052-013-2674-5), arXiv:[1310.4554](https://arxiv.org/abs/1310.4554) [hep-ex]
- S. Chatrchyan et al., **Search for a New Bottomonium State Decaying to  $\Upsilon(1S)\pi^+\pi^-$  in pp Collisions at  $\sqrt{s} = 8$  TeV**, *Phys. Lett. B.* 727 (2013) 57–76, doi:[10.1016/j.physletb.2013.10.016](https://doi.org/10.1016/j.physletb.2013.10.016), arXiv:[1309.0250](https://arxiv.org/abs/1309.0250) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  Production Cross Section in the All-Jet Final State in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 05 (2013) 065, doi:[10.1007/JHEP05\(2013\)065](https://doi.org/10.1007/JHEP05(2013)065), arXiv:[1302.0508](https://arxiv.org/abs/1302.0508) [hep-ex]
- S. Chatrchyan et al., **Study of the Underlying Event at Forward Rapidity in pp Collisions at  $\sqrt{s} = 0.9, 2.76$ , and 7 TeV**, *JHEP.* 04 (2013) 072, doi:[10.1007/JHEP04\(2013\)072](https://doi.org/10.1007/JHEP04(2013)072), arXiv:[1302.2394](https://arxiv.org/abs/1302.2394) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Production Cross Section for  $Z\gamma \rightarrow \nu\bar{\nu}\gamma$  in pp Collisions at  $\sqrt{s} = 7$  TeV and Limits on  $ZZ\gamma$  and  $Z\gamma\gamma$  Triple Gauge Boson Couplings**, *JHEP.* 10 (2013) 164, doi:[10.1007/JHEP10\(2013\)164](https://doi.org/10.1007/JHEP10(2013)164), arXiv:[1309.1117](https://arxiv.org/abs/1309.1117) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Differential and Double-Differential Drell-Yan Cross Sections in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 12 (2013) 030, doi:[10.1007/JHEP12\(2013\)030](https://doi.org/10.1007/JHEP12(2013)030), arXiv:[1310.7291](https://arxiv.org/abs/1310.7291) [hep-ex]
- S. Chatrchyan et al., **Measurement of Neutral Strange Particle Production in the Underlying Event in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 88 (2013) 052001, doi:[10.1103/PhysRevD.88.052001](https://doi.org/10.1103/PhysRevD.88.052001), arXiv:[1305.6016](https://arxiv.org/abs/1305.6016) [hep-ex]
- S. Chatrchyan et al., **Searches for Higgs Bosons in pp Collisions at  $\sqrt{s} = 7$  and 8 TeV in the Context of Four-Generation and Fermiophobic Models**, *Phys. Lett. B.* 725 (2013) 36–59, doi:[10.1016/j.physletb.2013.06.043](https://doi.org/10.1016/j.physletb.2013.06.043), arXiv:[1302.1764](https://arxiv.org/abs/1302.1764) [hep-ex]
- T. Chwalek et al., **No File Left Behind - Monitoring Transfer Latencies in PhEDEx**, *J. Phys. Conf. Ser.* 396 (2012) 032089, doi:[10.1088/1742-6596/396/3/032089](https://doi.org/10.1088/1742-6596/396/3/032089)
- S. Chatrchyan et al., **Search for signatures of extra dimensions in the diphoton mass spectrum at the Large Hadron Collider**, *Phys. Rev. Lett.* 108 (2012) 111801, doi:[10.1103/PhysRevLett.108.111801](https://doi.org/10.1103/PhysRevLett.108.111801), arXiv:[1112.0688](https://arxiv.org/abs/1112.0688) [hep-ex]
- S. Chatrchyan et al., **Performance of tau-lepton reconstruction and identification in CMS**, *JINST.* 7 (2012) P01001, doi:[10.1088/1748-0221/7/01/P01001](https://doi.org/10.1088/1748-0221/7/01/P01001), arXiv:[1109.6034](https://arxiv.org/abs/1109.6034) [physics.ins-det]
- S. Chatrchyan et al., **Jet Production Rates in Association with W and Z Bosons in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2012) 010, doi:[10.1007/JHEP01\(2012\)010](https://doi.org/10.1007/JHEP01(2012)010), arXiv:[1110.3226](https://arxiv.org/abs/1110.3226) [hep-ex]
- S. Chatrchyan et al., **Measurement of the charge asymmetry in top-quark pair production in proton-proton collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 709 (2012) 28–49, doi:[10.1016/j.physletb.2012.01.078](https://doi.org/10.1016/j.physletb.2012.01.078), arXiv:[1112.5100](https://arxiv.org/abs/1112.5100) [hep-ex]

- S. Chatrchyan et al.,  **$J/\psi$  and  $\psi_{2S}$  production in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 02 (2012) 011, doi:[10.1007/JHEP02\(2012\)011](https://doi.org/10.1007/JHEP02(2012)011), arXiv:[1111.1557](https://arxiv.org/abs/1111.1557) [hep-ex]
- S. Chatrchyan et al., **Exclusive photon-photon production of muon pairs in proton-proton collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2012) 052, doi:[10.1007/JHEP01\(2012\)052](https://doi.org/10.1007/JHEP01(2012)052), arXiv:[1111.5536](https://arxiv.org/abs/1111.5536) [hep-ex]
- S. Chatrchyan et al., **Forward Energy Flow, Central Charged-Particle Multiplicities, and Pseudorapidity Gaps in W and Z Boson Events from  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 72 (2012) 1839, doi:[10.1140/epjc/s10052-011-1839-3](https://doi.org/10.1140/epjc/s10052-011-1839-3), arXiv:[1110.0181](https://arxiv.org/abs/1110.0181) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Rapidity and Transverse Momentum Distributions of Z Bosons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 85 (2012) 032002, doi:[10.1103/PhysRevD.85.032002](https://doi.org/10.1103/PhysRevD.85.032002), arXiv:[1110.4973](https://arxiv.org/abs/1110.4973) [hep-ex]
- S. Chatrchyan et al., **Inclusive search for squarks and gluinos in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 85 (2012) 012004, doi:[10.1103/PhysRevD.85.012004](https://doi.org/10.1103/PhysRevD.85.012004), arXiv:[1107.1279](https://arxiv.org/abs/1107.1279) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Production Cross Section for Pairs of Isolated Photons in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2012) 133, doi:[10.1007/JHEP01\(2012\)133](https://doi.org/10.1007/JHEP01(2012)133), arXiv:[1110.6461](https://arxiv.org/abs/1110.6461) [hep-ex]
- S. Chatrchyan et al., **Study of High-pT Charged Particle Suppression in PbPb Compared to  $pp$  Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Eur. Phys. J. C.* 72 (2012) 1945, doi:[10.1140/epjc/s10052-012-1945-x](https://doi.org/10.1140/epjc/s10052-012-1945-x), arXiv:[1202.2554](https://arxiv.org/abs/1202.2554) [nucl-ex]
- S. Chatrchyan et al., **Search for Heavy, Top-Like Quark Pair Production in the Dilepton Final State in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 716 (2012) 103–121, doi:[10.1016/j.physletb.2012.07.059](https://doi.org/10.1016/j.physletb.2012.07.059), arXiv:[1203.5410](https://arxiv.org/abs/1203.5410) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Top Quark Pair Production Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV in Dilepton Final States Containing a  $\tau$** , *Phys. Rev. D.* 85 (2012) 112007, doi:[10.1103/PhysRevD.85.112007](https://doi.org/10.1103/PhysRevD.85.112007), arXiv:[1203.6810](https://arxiv.org/abs/1203.6810) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics with Same-Sign Isolated Dilepton Events with Jets and Missing Transverse Energy**, *Phys. Rev. Lett.* 109 (2012) 071803, doi:[10.1103/PhysRevLett.109.071803](https://doi.org/10.1103/PhysRevLett.109.071803), arXiv:[1205.6615](https://arxiv.org/abs/1205.6615) [hep-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson Produced in Association with W and Z Bosons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 11 (2012) 088, doi:[10.1007/JHEP11\(2012\)088](https://doi.org/10.1007/JHEP11(2012)088), arXiv:[1209.3937](https://arxiv.org/abs/1209.3937) [hep-ex]
- S. Chatrchyan et al., **Study of the Dijet Mass Spectrum in  $pp \rightarrow W + \text{Jets}$  Events at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 109 (2012) 251801, doi:[10.1103/PhysRevLett.109.251801](https://doi.org/10.1103/PhysRevLett.109.251801), arXiv:[1208.3477](https://arxiv.org/abs/1208.3477) [hep-ex]
- S. Chatrchyan et al., **Search for Neutral Higgs Bosons Decaying to Tau Pairs in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 713 (2012) 68–90, doi:[10.1016/j.physletb.2012.05.028](https://doi.org/10.1016/j.physletb.2012.05.028), arXiv:[1202.4083](https://arxiv.org/abs/1202.4083) [hep-ex]
- S. Chatrchyan et al., **Suppression of Non-Prompt  $J/\psi$ , Prompt  $J/\psi$ , and  $Y(1S)$  in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *JHEP.* 05 (2012) 063, doi:[10.1007/JHEP05\(2012\)063](https://doi.org/10.1007/JHEP05(2012)063), arXiv:[1201.5069](https://arxiv.org/abs/1201.5069) [nucl-ex]
- S. Chatrchyan et al., **Search for Anomalous  $t\bar{t}$  Production in the Highly-Boosted All-Hadronic Final State**, *JHEP.* 09 (2012) 029, doi:[10.1007/JHEP09\(2012\)029](https://doi.org/10.1007/JHEP09(2012)029), arXiv:[1204.2488](https://arxiv.org/abs/1204.2488) [hep-ex]
- S. Chatrchyan et al., **Observation of Z Decays to Four Leptons with the CMS Detector at the LHC**, *JHEP.* 12 (2012) 034, doi:[10.1007/JHEP12\(2012\)034](https://doi.org/10.1007/JHEP12(2012)034), arXiv:[1210.3844](https://arxiv.org/abs/1210.3844) [hep-ex]
- S. Chatrchyan et al., **Search for Narrow Resonances in Dilepton Mass Spectra in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 714 (2012) 158–179, doi:[10.1016/j.physletb.2012.06.051](https://doi.org/10.1016/j.physletb.2012.06.051), arXiv:[1206.1849](https://arxiv.org/abs/1206.1849) [hep-ex]
- S. Chatrchyan et al., **Search for Exclusive or Semi-Exclusive Photon Pair Production and Observation of Exclusive and Semi-Exclusive Electron Pair Production in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 11 (2012) 080, doi:[10.1007/JHEP11\(2012\)080](https://doi.org/10.1007/JHEP11(2012)080), arXiv:[1209.1666](https://arxiv.org/abs/1209.1666) [hep-ex]
- S. Chatrchyan et al., **Search for Third-Generation Leptoquarks and Scalar Bottom Quarks in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 12 (2012) 055, doi:[10.1007/JHEP12\(2012\)055](https://doi.org/10.1007/JHEP12(2012)055), arXiv:[1210.5627](https://arxiv.org/abs/1210.5627) [hep-ex]
- S. Chatrchyan et al., **A Search for a Doubly-Charged Higgs Boson in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 72 (2012) 2189, doi:[10.1140/epjc/s10052-012-2189-5](https://doi.org/10.1140/epjc/s10052-012-2189-5), arXiv:[1207.2666](https://arxiv.org/abs/1207.2666) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Z/  $\gamma^*$ +b-jet Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 06 (2012) 126, doi:[10.1007/JHEP06\(2012\)126](https://doi.org/10.1007/JHEP06(2012)126), arXiv:[1204.1643](https://arxiv.org/abs/1204.1643) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  Production Cross Section in the Dilepton Channel in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 11 (2012) 067, doi:[10.1007/JHEP11\(2012\)067](https://doi.org/10.1007/JHEP11(2012)067), arXiv:[1208.2671](https://arxiv.org/abs/1208.2671) [hep-ex]

- S. Chatrchyan et al., **Search for a Light Pseudoscalar Higgs Boson in the Dimuon Decay Channel in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 109 (2012) 121801, doi:[10.1103/PhysRevLett.109.121801](https://doi.org/10.1103/PhysRevLett.109.121801), arXiv:[1206.6326](https://arxiv.org/abs/1206.6326) [hep-ex]
- S. Chatrchyan et al., **Study of  $W$  Boson Production in PbPb and  $pp$  Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Lett. B.* 715 (2012) 66–87, doi:[10.1016/j.physletb.2012.07.025](https://doi.org/10.1016/j.physletb.2012.07.025), arXiv:[1205.6334](https://arxiv.org/abs/1205.6334) [nucl-ex]
- S. Chatrchyan et al., **Search for a Light Charged Higgs Boson in Top Quark Decays in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 07 (2012) 143, doi:[10.1007/JHEP07\(2012\)143](https://doi.org/10.1007/JHEP07(2012)143), arXiv:[1205.5736](https://arxiv.org/abs/1205.5736) [hep-ex]
- S. Chatrchyan et al., **Search for a  $W'$  or  $\rho_{TC}$  Decaying into  $WZ$  in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 109 (2012) 141801, doi:[10.1103/PhysRevLett.109.141801](https://doi.org/10.1103/PhysRevLett.109.141801), arXiv:[1206.0433](https://arxiv.org/abs/1206.0433) [hep-ex]
- S. Chatrchyan et al., **Observation of a new  $\Xi_b$  Baryon**, *Phys. Rev. Lett.* 108 (2012) 252002, doi:[10.1103/PhysRevLett.108.252002](https://doi.org/10.1103/PhysRevLett.108.252002), arXiv:[1204.5955](https://arxiv.org/abs/1204.5955) [hep-ex]
- S. Chatrchyan et al., **Search for  $B_s^0 \rightarrow \mu^+ \mu^-$  and  $B^0 \rightarrow \mu^+ \mu^-$  decays**, *JHEP.* 04 (2012) 033, doi:[10.1007/JHEP04\(2012\)033](https://doi.org/10.1007/JHEP04(2012)033), arXiv:[1203.3976](https://arxiv.org/abs/1203.3976) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics in Events with Same-Sign Dileptons and  $b$ -Tagged Jets in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 08 (2012) 110, doi:[10.1007/JHEP08\(2012\)110](https://doi.org/10.1007/JHEP08(2012)110), arXiv:[1205.3933](https://arxiv.org/abs/1205.3933) [hep-ex]
- S. Chatrchyan et al., **Search for Charge-Asymmetric Production of  $W'$  Bosons in  $t\bar{t}$ + Jet Events from  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 717 (2012) 351–370, doi:[10.1016/j.physletb.2012.09.048](https://doi.org/10.1016/j.physletb.2012.09.048), arXiv:[1206.3921](https://arxiv.org/abs/1206.3921) [hep-ex]
- S. Chatrchyan et al., **Search for Microscopic Black Holes in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 04 (2012) 061, doi:[10.1007/JHEP04\(2012\)061](https://doi.org/10.1007/JHEP04(2012)061), arXiv:[1202.6396](https://arxiv.org/abs/1202.6396) [hep-ex]
- S. Chatrchyan et al., **Observation of Sequential Upsilon Suppression in PbPb Collisions**, *Phys. Rev. Lett.* 109 (2012) 222301, doi:[10.1103/PhysRevLett.109.222301](https://doi.org/10.1103/PhysRevLett.109.222301), arXiv:[1208.2826](https://arxiv.org/abs/1208.2826) [nucl-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson Decaying into Two Photons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 710 (2012) 403–425, doi:[10.1016/j.physletb.2012.03.003](https://doi.org/10.1016/j.physletb.2012.03.003), arXiv:[1202.1487](https://arxiv.org/abs/1202.1487) [hep-ex]
- S. Chatrchyan et al., **Search for Electroweak Production of Charginos and Neutralinos using Leptonic Final States in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 11 (2012) 147, doi:[10.1007/JHEP11\(2012\)147](https://doi.org/10.1007/JHEP11(2012)147), arXiv:[1209.6620](https://arxiv.org/abs/1209.6620) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Mass Difference between Top and Antitop Quarks**, *JHEP.* 06 (2012) 109, doi:[10.1007/JHEP06\(2012\)109](https://doi.org/10.1007/JHEP06(2012)109), arXiv:[1204.2807](https://arxiv.org/abs/1204.2807) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics with Long-Lived Particles Decaying to Photons and Missing Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 11 (2012) 172, doi:[10.1007/JHEP11\(2012\)172](https://doi.org/10.1007/JHEP11(2012)172), arXiv:[1207.0627](https://arxiv.org/abs/1207.0627) [hep-ex]
- S. Chatrchyan et al., **Search for Pair Production of First- and Second-Generation Scalar Leptoquarks in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 86 (2012) 052013, doi:[10.1103/PhysRevD.86.052013](https://doi.org/10.1103/PhysRevD.86.052013), arXiv:[1207.5406](https://arxiv.org/abs/1207.5406) [hep-ex]
- S. Chatrchyan et al., **Search for Physics Beyond the Standard Model in Events with a  $Z$  Boson, Jets, and Missing Transverse Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 716 (2012) 260–284, doi:[10.1016/j.physletb.2012.08.026](https://doi.org/10.1016/j.physletb.2012.08.026), arXiv:[1204.3774](https://arxiv.org/abs/1204.3774) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Electron Charge Asymmetry in Inclusive  $W$  Production in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 109 (2012) 111806, doi:[10.1103/PhysRevLett.109.111806](https://doi.org/10.1103/PhysRevLett.109.111806), arXiv:[1206.2598](https://arxiv.org/abs/1206.2598) [hep-ex]
- S. Chatrchyan et al., **Search for Resonant  $t\bar{t}$  Production in Lepton+Jets Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 12 (2012) 015, doi:[10.1007/JHEP12\(2012\)015](https://doi.org/10.1007/JHEP12(2012)015), arXiv:[1209.4397](https://arxiv.org/abs/1209.4397) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Bottom-like Quarks in  $4.9\text{ fb}^{-1}$  of  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 05 (2012) 123, doi:[10.1007/JHEP05\(2012\)123](https://doi.org/10.1007/JHEP05(2012)123), arXiv:[1204.1088](https://arxiv.org/abs/1204.1088) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Hadronic Final States using MT2 in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 10 (2012) 018, doi:[10.1007/JHEP10\(2012\)018](https://doi.org/10.1007/JHEP10(2012)018), arXiv:[1207.1798](https://arxiv.org/abs/1207.1798) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Pseudorapidity and Centrality Dependence of the Transverse Energy Density in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 109 (2012) 152303, doi:[10.1103/PhysRevLett.109.152303](https://doi.org/10.1103/PhysRevLett.109.152303), arXiv:[1205.2488](https://arxiv.org/abs/1205.2488) [nucl-ex]
- S. Chatrchyan et al., **Search for High-Mass Resonances Decaying into  $\tau$ -Lepton Pairs in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 716 (2012) 82–102, doi:[10.1016/j.physletb.2012.07.062](https://doi.org/10.1016/j.physletb.2012.07.062), arXiv:[1206.1725](https://arxiv.org/abs/1206.1725) [hep-ex]

- S. Chatrchyan et al., **Search for Dark Matter and Large Extra Dimensions in  $pp$  Collisions Yielding a Photon and Missing Transverse Energy**, *Phys. Rev. Lett.* 108 (2012) 261803, doi:[10.1103/PhysRevLett.108.261803](https://doi.org/10.1103/PhysRevLett.108.261803), arXiv:[1204.0821](https://arxiv.org/abs/1204.0821) [hep-ex]
- S. Chatrchyan et al., **Search for Pair Produced Fourth-Generation Up-Type Quarks in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV with a Lepton in the Final State**, *Phys. Lett. B.* 718 (2012) 307–328, doi:[10.1016/j.physletb.2012.10.038](https://doi.org/10.1016/j.physletb.2012.10.038), arXiv:[1209.0471](https://arxiv.org/abs/1209.0471) [hep-ex]
- S. Chatrchyan et al., **Search for Leptonic Decays of  $W'$  Bosons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 08 (2012) 023, doi:[10.1007/JHEP08\(2012\)023](https://doi.org/10.1007/JHEP08(2012)023), arXiv:[1204.4764](https://arxiv.org/abs/1204.4764) [hep-ex]
- S. Chatrchyan et al., **A New Boson with a Mass of 125 GeV Observed with the CMS Experiment at the Large Hadron Collider**, *Science.* 338 (2012) 1569–1575, doi:[10.1126/science.1230816](https://doi.org/10.1126/science.1230816)
- S. Chatrchyan et al., **Measurement of Jet Fragmentation into Charged Particles in  $pp$  and PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *JHEP.* 10 (2012) 087, doi:[10.1007/JHEP10\(2012\)087](https://doi.org/10.1007/JHEP10(2012)087), arXiv:[1205.5872](https://arxiv.org/abs/1205.5872) [nucl-ex]
- S. Chatrchyan et al., **Performance of CMS Muon Reconstruction in  $pp$  Collision Events at  $\sqrt{s} = 7$  TeV**, *JINST.* 7 (2012) P10002, doi:[10.1088/1748-0221/7/10/P10002](https://doi.org/10.1088/1748-0221/7/10/P10002), arXiv:[1206.4071](https://arxiv.org/abs/1206.4071) [physics.ins-det]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson in the  $H \rightarrow ZZ \rightarrow \ell^+ \ell^- \tau^+ \tau^-$  Decay Channel in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 03 (2012) 081, doi:[10.1007/JHEP03\(2012\)081](https://doi.org/10.1007/JHEP03(2012)081), arXiv:[1202.3617](https://arxiv.org/abs/1202.3617) [hep-ex]
- S. Chatrchyan et al., **Inclusive and Differential Measurements of the  $t\bar{t}$  Charge Asymmetry in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 717 (2012) 129–150, doi:[10.1016/j.physletb.2012.09.028](https://doi.org/10.1016/j.physletb.2012.09.028), arXiv:[1207.0065](https://arxiv.org/abs/1207.0065) [hep-ex]
- S. Chatrchyan et al., **Measurement of Isolated Photon Production in  $pp$  and PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Lett. B.* 710 (2012) 256–277, doi:[10.1016/j.physletb.2012.02.077](https://doi.org/10.1016/j.physletb.2012.02.077), arXiv:[1201.3093](https://arxiv.org/abs/1201.3093) [nucl-ex]
- S. Chatrchyan et al., **Measurement of the Underlying Event in the Drell-Yan Process in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 72 (2012) 2080, doi:[10.1140/epjc/s10052-012-2080-4](https://doi.org/10.1140/epjc/s10052-012-2080-4), arXiv:[1204.1411](https://arxiv.org/abs/1204.1411) [hep-ex]
- S. Chatrchyan et al., **Shape, Transverse Size, and Charged Hadron Multiplicity of Jets in  $pp$  Collisions at 7 TeV**, *JHEP.* 06 (2012) 160, doi:[10.1007/JHEP06\(2012\)160](https://doi.org/10.1007/JHEP06(2012)160), arXiv:[1204.3170](https://arxiv.org/abs/1204.3170) [hep-ex]
- S. Chatrchyan et al., **Inclusive  $b$ -Jet Production in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 04 (2012) 084, doi:[10.1007/JHEP04\(2012\)084](https://doi.org/10.1007/JHEP04(2012)084), arXiv:[1202.4617](https://arxiv.org/abs/1202.4617) [hep-ex]
- S. Chatrchyan et al., **Observation of a New Boson at a Mass of 125 GeV with the CMS Experiment at the LHC**, *Phys. Lett. B.* 716 (2012) 30–61, doi:[10.1016/j.physletb.2012.08.021](https://doi.org/10.1016/j.physletb.2012.08.021), arXiv:[1207.7235](https://arxiv.org/abs/1207.7235) [hep-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson in the  $H \rightarrow ZZ \rightarrow 2\ell 2\nu$  Channel in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 03 (2012) 040, doi:[10.1007/JHEP03\(2012\)040](https://doi.org/10.1007/JHEP03(2012)040), arXiv:[1202.3478](https://arxiv.org/abs/1202.3478) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Relative Prompt Production Rate of  $\chi_{c2}$  and  $\chi_{c1}$  in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 72 (2012) 2251, doi:[10.1140/epjc/s10052-012-2251-3](https://doi.org/10.1140/epjc/s10052-012-2251-3), arXiv:[1210.0875](https://arxiv.org/abs/1210.0875) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Lepton Partners of Neutrinos in Proton-Proton Collisions in the Context of the Type III Seesaw Mechanism**, *Phys. Lett. B.* 718 (2012) 348–368, doi:[10.1016/j.physletb.2012.10.070](https://doi.org/10.1016/j.physletb.2012.10.070), arXiv:[1210.1797](https://arxiv.org/abs/1210.1797) [hep-ex]
- S. Chatrchyan et al., **Search for Anomalous Production of Multilepton Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 06 (2012) 169, doi:[10.1007/JHEP06\(2012\)169](https://doi.org/10.1007/JHEP06(2012)169), arXiv:[1204.5341](https://arxiv.org/abs/1204.5341) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Inclusive Production Cross Sections for Forward Jets and for Dijet Events with One Forward and One Central Jet in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 06 (2012) 036, doi:[10.1007/JHEP06\(2012\)036](https://doi.org/10.1007/JHEP06(2012)036), arXiv:[1202.0704](https://arxiv.org/abs/1202.0704) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Underlying Event Activity in  $pp$  Collisions at  $\sqrt{s} = 0.9$  and 7 TeV with the Novel Jet-Area/Median Approach**, *JHEP.* 08 (2012) 130, doi:[10.1007/JHEP08\(2012\)130](https://doi.org/10.1007/JHEP08(2012)130), arXiv:[1207.2392](https://arxiv.org/abs/1207.2392) [hep-ex]
- S. Chatrchyan et al., **Search for a Higgs Boson in the Decay Channel  $H \rightarrow ZZ^* \rightarrow q\bar{q}\ell^-\ell^+$  in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 04 (2012) 036, doi:[10.1007/JHEP04\(2012\)036](https://doi.org/10.1007/JHEP04(2012)036), arXiv:[1202.1416](https://arxiv.org/abs/1202.1416) [hep-ex]
- S. Chatrchyan et al., **Search for Quark Compositeness in Dijet Angular Distributions from  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 05 (2012) 055, doi:[10.1007/JHEP05\(2012\)055](https://doi.org/10.1007/JHEP05(2012)055), arXiv:[1202.5535](https://arxiv.org/abs/1202.5535) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Top-Quark Mass in  $t\bar{t}$  Events with Lepton+Jets Final States in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 12 (2012) 105, doi:[10.1007/JHEP12\(2012\)105](https://doi.org/10.1007/JHEP12(2012)105), arXiv:[1209.2319](https://arxiv.org/abs/1209.2319) [hep-ex]



- S. Chatrchyan et al., **Search for Stopped Long-Lived Particles Produced in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 08 (2012) 026, doi:[10.1007/JHEP08\(2012\)026](https://doi.org/10.1007/JHEP08(2012)026), arXiv:[1207.0106](https://arxiv.org/abs/1207.0106) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Top-Quark Mass in  $t\bar{t}$  Events with Dilepton Final States in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 72 (2012) 2202, doi:[10.1140/epjc/s10052-012-2202-z](https://doi.org/10.1140/epjc/s10052-012-2202-z), arXiv:[1209.2393](https://arxiv.org/abs/1209.2393) [hep-ex]
- S. Chatrchyan et al., **Azimuthal Anisotropy of Charged Particles at High Transverse Momenta in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 109 (2012) 022301, doi:[10.1103/PhysRevLett.109.022301](https://doi.org/10.1103/PhysRevLett.109.022301), arXiv:[1204.1850](https://arxiv.org/abs/1204.1850) [nucl-ex]
- S. Chatrchyan et al., **Search for Dark Matter and Large Extra Dimensions in Monojet Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 09 (2012) 094, doi:[10.1007/JHEP09\(2012\)094](https://doi.org/10.1007/JHEP09(2012)094), arXiv:[1206.5663](https://arxiv.org/abs/1206.5663) [hep-ex]
- S. Chatrchyan et al., **Jet Momentum Dependence of Jet Quenching in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Lett. B.* 712 (2012) 176–197, doi:[10.1016/j.physletb.2012.04.058](https://doi.org/10.1016/j.physletb.2012.04.058), arXiv:[1202.5022](https://arxiv.org/abs/1202.5022) [nucl-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson in the Decay Channel  $H$  to  $ZZ$  to 4 Leptons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 108 (2012) 111804, doi:[10.1103/PhysRevLett.108.111804](https://doi.org/10.1103/PhysRevLett.108.111804), arXiv:[1202.1997](https://arxiv.org/abs/1202.1997) [hep-ex]
- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson Decaying to Bottom Quarks in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 710 (2012) 284–306, doi:[10.1016/j.physletb.2012.02.085](https://doi.org/10.1016/j.physletb.2012.02.085), arXiv:[1202.4195](https://arxiv.org/abs/1202.4195) [hep-ex]
- S. Chatrchyan et al., **Search for Large Extra Dimensions in Dimuon and Dielectron Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 711 (2012) 15–34, doi:[10.1016/j.physletb.2012.03.029](https://doi.org/10.1016/j.physletb.2012.03.029), arXiv:[1202.3827](https://arxiv.org/abs/1202.3827) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Long-Lived Charged Particles in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 713 (2012) 408–433, doi:[10.1016/j.physletb.2012.06.023](https://doi.org/10.1016/j.physletb.2012.06.023), arXiv:[1205.0272](https://arxiv.org/abs/1205.0272) [hep-ex]
- S. Chatrchyan et al., **Combined Search for the Quarks of a Sequential Fourth Generation**, *Phys. Rev. D.* 86 (2012) 112003, doi:[10.1103/PhysRevD.86.112003](https://doi.org/10.1103/PhysRevD.86.112003), arXiv:[1209.1062](https://arxiv.org/abs/1209.1062) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $\Lambda_b$  Cross Section and the  $\bar{\Lambda}_b$  to  $\Lambda_b$  Ratio with  $J/\Psi\Lambda$  Decays in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 714 (2012) 136–157, doi:[10.1016/j.physletb.2012.05.063](https://doi.org/10.1016/j.physletb.2012.05.063), arXiv:[1205.0594](https://arxiv.org/abs/1205.0594) [hep-ex]
- S. Chatrchyan et al., **Search for heavy Majorana Neutrinos in  $\mu^\pm\mu^\pm +$  Jets and  $e^\pm e^\pm +$  Jets Events in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 717 (2012) 109–128, doi:[10.1016/j.physletb.2012.09.012](https://doi.org/10.1016/j.physletb.2012.09.012), arXiv:[1207.6079](https://arxiv.org/abs/1207.6079) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Events with b-Quark Jets and Missing Transverse Energy in  $pp$  Collisions at 7 TeV**, *Phys. Rev. D.* 86 (2012) 072010, doi:[10.1103/PhysRevD.86.072010](https://doi.org/10.1103/PhysRevD.86.072010), arXiv:[1208.4859](https://arxiv.org/abs/1208.4859) [hep-ex]
- S. Chatrchyan et al., **Ratios of Dijet Production Cross Sections as a Function of the Absolute Difference in Rapidity between Jets in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 72 (2012) 2216, doi:[10.1140/epjc/s10052-012-2216-6](https://doi.org/10.1140/epjc/s10052-012-2216-6), arXiv:[1204.0696](https://arxiv.org/abs/1204.0696) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Single-Top-Quark  $t$ -Channel Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 12 (2012) 035, doi:[10.1007/JHEP12\(2012\)035](https://doi.org/10.1007/JHEP12(2012)035), arXiv:[1209.4533](https://arxiv.org/abs/1209.4533) [hep-ex]
- S. Chatrchyan et al., **Search for a Fermiophobic Higgs Boson in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 09 (2012) 111, doi:[10.1007/JHEP09\(2012\)111](https://doi.org/10.1007/JHEP09(2012)111), arXiv:[1207.1130](https://arxiv.org/abs/1207.1130) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Inclusive Cross Section  $\sigma(pp \rightarrow b\bar{b}X \rightarrow \mu\mu X')$  at  $\sqrt{s} = 7$  TeV**, *JHEP.* 06 (2012) 110, doi:[10.1007/JHEP06\(2012\)110](https://doi.org/10.1007/JHEP06(2012)110), arXiv:[1203.3458](https://arxiv.org/abs/1203.3458) [hep-ex]
- S. Chatrchyan et al., **Centrality Dependence of Dihadron Correlations and Azimuthal anisotropy Harmonics in PbPb Collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Eur. Phys. J. C.* 72 (2012) 2012, doi:[10.1140/epjc/s10052-012-2012-3](https://doi.org/10.1140/epjc/s10052-012-2012-3), arXiv:[1201.3158](https://arxiv.org/abs/1201.3158) [nucl-ex]
- S. Chatrchyan et al., **Study of the Inclusive Production of Charged Pions, Kaons, and Protons in  $pp$  Collisions at  $\sqrt{s} = 0.9, 2.76$ , and 7 TeV**, *Eur. Phys. J. C.* 72 (2012) 2164, doi:[10.1140/epjc/s10052-012-2164-1](https://doi.org/10.1140/epjc/s10052-012-2164-1), arXiv:[1207.4724](https://arxiv.org/abs/1207.4724) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics in the Multijet and Missing Transverse Momentum Final State in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 109 (2012) 171803, doi:[10.1103/PhysRevLett.109.171803](https://doi.org/10.1103/PhysRevLett.109.171803), arXiv:[1207.1898](https://arxiv.org/abs/1207.1898) [hep-ex]

- S. Chatrchyan et al., **Search for the Standard Model Higgs Boson Decaying to  $W^+W^-$  in the Fully Leptonic Final State in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 710 (2012) 91–113, doi:[10.1016/j.physletb.2012.02.076](https://doi.org/10.1016/j.physletb.2012.02.076), arXiv:[1202.1489](https://arxiv.org/abs/1202.1489) [hep-ex]
- S. Chatrchyan et al., **Combined Results of Searches for the Standard Model Higgs Boson in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 710 (2012) 26–48, doi:[10.1016/j.physletb.2012.02.064](https://doi.org/10.1016/j.physletb.2012.02.064), arXiv:[1202.1488](https://arxiv.org/abs/1202.1488) [hep-ex]
- S. Chatrchyan et al., **Search for Three-Jet Resonances in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 718 (2012) 329–347, doi:[10.1016/j.physletb.2012.10.048](https://doi.org/10.1016/j.physletb.2012.10.048), arXiv:[1208.2931](https://arxiv.org/abs/1208.2931) [hep-ex]
- S. Chatrchyan et al., **Search for Heavy Neutrinos and  $W_R$  Bosons with Right-Handed Couplings in a Left-Right Symmetric Model in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 109 (2012) 261802, doi:[10.1103/PhysRevLett.109.261802](https://doi.org/10.1103/PhysRevLett.109.261802), arXiv:[1210.2402](https://arxiv.org/abs/1210.2402) [hep-ex]
- E. Fajardo et al., **A New Era for Central Processing and Production in CMS**, *J. Phys. Conf. Ser.* 396 (2012) 042018, doi:[10.1088/1742-6596/396/4/042018](https://doi.org/10.1088/1742-6596/396/4/042018)
- R. Kaselis et al., **CMS Data Transfer Operations After the First Years of LHC Collisions**, *J. Phys. Conf. Ser.* 396 (2012) 042033, doi:[10.1088/1742-6596/396/4/042033](https://doi.org/10.1088/1742-6596/396/4/042033)
- J. Molina-Perez et al., **Monitoring Techniques and Alarm Procedures for CMS Services and Sites in WLCG**, *J. Phys. Conf. Ser.* 396 (2012) 042041, doi:[10.1088/1742-6596/396/4/042041](https://doi.org/10.1088/1742-6596/396/4/042041)
- J. Adelman-McCarthy et al., **CMS distributed computing workflow experience**, *J. Phys. Conf. Ser.* 331 (2011) 072019, doi:[10.1088/1742-6596/331/7/072019](https://doi.org/10.1088/1742-6596/331/7/072019)
- V. Khachatryan et al., **Search for Pair Production of First-Generation Scalar Leptoquarks in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 201802, doi:[10.1103/PhysRevLett.106.201802](https://doi.org/10.1103/PhysRevLett.106.201802), arXiv:[1012.4031](https://arxiv.org/abs/1012.4031) [hep-ex]
- V. Khachatryan et al., **Search for Stopped Gluinos in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 011801, doi:[10.1103/PhysRevLett.106.011801](https://doi.org/10.1103/PhysRevLett.106.011801), arXiv:[1011.5861](https://arxiv.org/abs/1011.5861) [hep-ex]
- V. Khachatryan et al., **Search for a Heavy Gauge Boson  $W'$  in the Final State with an Electron and Large Missing Transverse Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 698 (2011) 21–39, doi:[10.1016/j.physletb.2011.02.048](https://doi.org/10.1016/j.physletb.2011.02.048), arXiv:[1012.5945](https://arxiv.org/abs/1012.5945) [hep-ex]
- V. Khachatryan et al., **Prompt and Non-Prompt  $J/\psi$  Production in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Eur. Phys. J. C.* 71 (2011) 1575, doi:[10.1140/epjc/s10052-011-1575-8](https://doi.org/10.1140/epjc/s10052-011-1575-8), arXiv:[1011.4193](https://arxiv.org/abs/1011.4193) [hep-ex]
- V. Khachatryan et al., **Search for Microscopic Black Hole Signatures at the Large Hadron Collider**, *Phys. Lett. B.* 697 (2011) 434–453, doi:[10.1016/j.physletb.2011.02.032](https://doi.org/10.1016/j.physletb.2011.02.032), arXiv:[1012.3375](https://arxiv.org/abs/1012.3375) [hep-ex]
- V. Khachatryan et al., **Charged Particle Multiplicities in  $pp$  Interactions at  $\sqrt{s} = 0.9, 2.36$ , and 7 TeV**, *JHEP.* 01 (2011) 079, doi:[10.1007/JHEP01\(2011\)079](https://doi.org/10.1007/JHEP01(2011)079), arXiv:[1011.5531](https://arxiv.org/abs/1011.5531) [hep-ex]
- V. Khachatryan et al., **Search for Pair Production of Second-Generation Scalar Leptoquarks in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 201803, doi:[10.1103/PhysRevLett.106.201803](https://doi.org/10.1103/PhysRevLett.106.201803), arXiv:[1012.4033](https://arxiv.org/abs/1012.4033) [hep-ex]
- V. Khachatryan et al., **Measurement of the Isolated Prompt Photon Production Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 082001, doi:[10.1103/PhysRevLett.106.082001](https://doi.org/10.1103/PhysRevLett.106.082001), arXiv:[1012.0799](https://arxiv.org/abs/1012.0799) [hep-ex]
- V. Khachatryan et al., **Measurements of Inclusive  $W$  and  $Z$  Cross Sections in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 01 (2011) 080, doi:[10.1007/JHEP01\(2011\)080](https://doi.org/10.1007/JHEP01(2011)080), arXiv:[1012.2466](https://arxiv.org/abs/1012.2466) [hep-ex]
- V. Khachatryan et al., **First Measurement of the Cross Section for Top-Quark Pair Production in Proton-Proton Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 695 (2011) 424–443, doi:[10.1016/j.physletb.2010.11.058](https://doi.org/10.1016/j.physletb.2010.11.058), arXiv:[1010.5994](https://arxiv.org/abs/1010.5994) [hep-ex]
- V. Khachatryan et al., **Upsilon Production Cross-Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 83 (2011) 112004, doi:[10.1103/PhysRevD.83.112004](https://doi.org/10.1103/PhysRevD.83.112004), arXiv:[1012.5545](https://arxiv.org/abs/1012.5545) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Inclusive  $W$  and  $Z$  Production Cross Sections in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 10 (2011) 132, doi:[10.1007/JHEP10\(2011\)132](https://doi.org/10.1007/JHEP10(2011)132), arXiv:[1107.4789](https://arxiv.org/abs/1107.4789) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Inclusive Jet Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 107 (2011) 132001, doi:[10.1103/PhysRevLett.107.132001](https://doi.org/10.1103/PhysRevLett.107.132001), arXiv:[1106.0208](https://arxiv.org/abs/1106.0208) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  production cross section and the top quark mass in the dilepton channel in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 07 (2011) 049, doi:[10.1007/JHEP07\(2011\)049](https://doi.org/10.1007/JHEP07(2011)049), arXiv:[1105.5661](https://arxiv.org/abs/1105.5661) [hep-ex]

- S. Chatrchyan et al., **Search for supersymmetry in  $pp$  collisions at  $\sqrt{s} = 7$  TeV in events with a single lepton, jets, and missing transverse momentum**, *JHEP*. 08 (2011) 156, doi:[10.1007/JHEP08\(2011\)156](https://doi.org/10.1007/JHEP08(2011)156), arXiv:[1107.1870](https://arxiv.org/abs/1107.1870) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV in Events with Two Photons and Missing Transverse Energy**, *Phys. Rev. Lett.* 106 (2011) 211802, doi:[10.1103/PhysRevLett.106.211802](https://doi.org/10.1103/PhysRevLett.106.211802), arXiv:[1103.0953](https://arxiv.org/abs/1103.0953) [hep-ex]
- S. Chatrchyan et al., **Indications of suppression of excited  $\Upsilon$  states in PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 107 (2011) 052302, doi:[10.1103/PhysRevLett.107.052302](https://doi.org/10.1103/PhysRevLett.107.052302), arXiv:[1105.4894](https://arxiv.org/abs/1105.4894) [nucl-ex]
- S. Chatrchyan et al., **Dependence on pseudorapidity and centrality of charged hadron production in PbPb collisions at a nucleon-nucleon centre-of-mass energy of 2.76 TeV**, *JHEP*. 08 (2011) 141, doi:[10.1007/JHEP08\(2011\)141](https://doi.org/10.1007/JHEP08(2011)141), arXiv:[1107.4800](https://arxiv.org/abs/1107.4800) [nucl-ex]
- V. Khachatryan et al., **Search for Heavy Stable Charged Particles in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 03 (2011) 024, doi:[10.1007/JHEP03\(2011\)024](https://doi.org/10.1007/JHEP03(2011)024), arXiv:[1101.1645](https://arxiv.org/abs/1101.1645) [hep-ex]
- S. Chatrchyan et al., **Measurement of the lepton charge asymmetry in inclusive  $W$  production in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 04 (2011) 050, doi:[10.1007/JHEP04\(2011\)050](https://doi.org/10.1007/JHEP04(2011)050), arXiv:[1103.3470](https://arxiv.org/abs/1103.3470) [hep-ex]
- S. Chatrchyan et al., **Missing transverse energy performance of the CMS detector**, *JINST*. 6 (2011) P09001, doi:[10.1088/1748-0221/6/09/P09001](https://doi.org/10.1088/1748-0221/6/09/P09001), arXiv:[1106.5048](https://arxiv.org/abs/1106.5048) [physics.ins-det]
- S. Chatrchyan et al., **Search for Supersymmetry at the LHC in Events with Jets and Missing Transverse Energy**, *Phys. Rev. Lett.* 107 (2011) 221804, doi:[10.1103/PhysRevLett.107.221804](https://doi.org/10.1103/PhysRevLett.107.221804), arXiv:[1109.2352](https://arxiv.org/abs/1109.2352) [hep-ex]
- S. Chatrchyan et al., **Search for Resonances in the Dijet Mass Spectrum from 7 TeV  $pp$  Collisions at CMS**, *Phys. Lett. B*. 704 (2011) 123–142, doi:[10.1016/j.physletb.2011.09.015](https://doi.org/10.1016/j.physletb.2011.09.015), arXiv:[1107.4771](https://arxiv.org/abs/1107.4771) [hep-ex]
- S. Chatrchyan et al., **Long-range and short-range dihadron angular correlations in central PbPb collisions at a nucleon-nucleon center of mass energy of 2.76 TeV**, *JHEP*. 07 (2011) 076, doi:[10.1007/JHEP07\(2011\)076](https://doi.org/10.1007/JHEP07(2011)076), arXiv:[1105.2438](https://arxiv.org/abs/1105.2438) [nucl-ex]
- S. Chatrchyan et al., **Measurement of the Top-antitop Production Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV using the Kinematic Properties of Events with Leptons and Jets**, *Eur. Phys. J. C*. 71 (2011) 1721, doi:[10.1140/epjc/s10052-011-1721-3](https://doi.org/10.1140/epjc/s10052-011-1721-3), arXiv:[1106.0902](https://arxiv.org/abs/1106.0902) [hep-ex]
- S. Chatrchyan et al., **Measurement of  $W^+W^-$  production and search for the Higgs boson in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 699 (2011) 25–47, doi:[10.1016/j.physletb.2011.03.056](https://doi.org/10.1016/j.physletb.2011.03.056), arXiv:[1102.5429](https://arxiv.org/abs/1102.5429) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics with a Mono-Jet and Missing Transverse Energy in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 107 (2011) 201804, doi:[10.1103/PhysRevLett.107.201804](https://doi.org/10.1103/PhysRevLett.107.201804), arXiv:[1106.4775](https://arxiv.org/abs/1106.4775) [hep-ex]
- S. Chatrchyan et al., **A search for excited leptons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 704 (2011) 143–162, doi:[10.1016/j.physletb.2011.09.021](https://doi.org/10.1016/j.physletb.2011.09.021), arXiv:[1107.1773](https://arxiv.org/abs/1107.1773) [hep-ex]
- S. Chatrchyan et al., **Search for physics beyond the standard model using multilepton signatures in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B*. 704 (2011) 411–433, doi:[10.1016/j.physletb.2011.09.047](https://doi.org/10.1016/j.physletb.2011.09.047), arXiv:[1106.0933](https://arxiv.org/abs/1106.0933) [hep-ex]
- V. Khachatryan et al., **Measurement of Dijet Angular Distributions and Search for Quark Compositeness in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 201804, doi:[10.1103/PhysRevLett.106.201804](https://doi.org/10.1103/PhysRevLett.106.201804), arXiv:[1102.2020](https://arxiv.org/abs/1102.2020) [hep-ex]
- S. Chatrchyan et al., **Search for Same-Sign Top-Quark Pair Production at  $\sqrt{s} = 7$  TeV and Limits on Flavour Changing Neutral Currents in the Top Sector**, *JHEP*. 08 (2011) 005, doi:[10.1007/JHEP08\(2011\)005](https://doi.org/10.1007/JHEP08(2011)005), arXiv:[1106.2142](https://arxiv.org/abs/1106.2142) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Drell-Yan Cross Section in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP*. 10 (2011) 007, doi:[10.1007/JHEP10\(2011\)007](https://doi.org/10.1007/JHEP10(2011)007), arXiv:[1108.0566](https://arxiv.org/abs/1108.0566) [hep-ex]
- V. Khachatryan et al., **Dijet Azimuthal Decorrelations in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 122003, doi:[10.1103/PhysRevLett.106.122003](https://doi.org/10.1103/PhysRevLett.106.122003), arXiv:[1101.5029](https://arxiv.org/abs/1101.5029) [hep-ex]
- S. Chatrchyan et al., **Observation and studies of jet quenching in PbPb collisions at nucleon-nucleon center-of-mass energy = 2.76 TeV**, *Phys. Rev. C*. 84 (2011) 024906, doi:[10.1103/PhysRevC.84.024906](https://doi.org/10.1103/PhysRevC.84.024906), arXiv:[1102.1957](https://arxiv.org/abs/1102.1957) [nucl-ex]
- V. Khachatryan et al., **Strange Particle Production in  $pp$  Collisions at  $\sqrt{s} = 0.9$  and 7 TeV**, *JHEP*. 05 (2011) 064, doi:[10.1007/JHEP05\(2011\)064](https://doi.org/10.1007/JHEP05(2011)064), arXiv:[1102.4282](https://arxiv.org/abs/1102.4282) [hep-ex]

- S. Chatrchyan et al., **Measurement of the Polarization of W Bosons with Large Transverse Momenta in W+Jets Events at the LHC**, *Phys. Rev. Lett.* 107 (2011) 021802, doi:[10.1103/PhysRevLett.107.021802](https://doi.org/10.1103/PhysRevLett.107.021802), arXiv:[1104.3829](https://arxiv.org/abs/1104.3829) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Strange B Meson Production Cross Section with J/Psi  $\phi$  Decays in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. D.* 84 (2011) 052008, doi:[10.1103/PhysRevD.84.052008](https://doi.org/10.1103/PhysRevD.84.052008), arXiv:[1106.4048](https://arxiv.org/abs/1106.4048) [hep-ex]
- S. Chatrchyan et al., **Search for a Vector-like Quark with Charge 2/3 in  $t + Z$  Events from pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 107 (2011) 271802, doi:[10.1103/PhysRevLett.107.271802](https://doi.org/10.1103/PhysRevLett.107.271802), arXiv:[1109.4985](https://arxiv.org/abs/1109.4985) [hep-ex]
- S. Chatrchyan et al., **Search for a  $W'$  boson decaying to a muon and a neutrino in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 701 (2011) 160–179, doi:[10.1016/j.physletb.2011.05.048](https://doi.org/10.1016/j.physletb.2011.05.048), arXiv:[1103.0030](https://arxiv.org/abs/1103.0030) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Inclusive Z Cross Section via Decays to Tau Pairs in pp Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 08 (2011) 117, doi:[10.1007/JHEP08\(2011\)117](https://doi.org/10.1007/JHEP08(2011)117), arXiv:[1104.1617](https://arxiv.org/abs/1104.1617) [hep-ex]
- S. Chatrchyan et al., **Search for a Heavy Bottom-like Quark in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 701 (2011) 204–223, doi:[10.1016/j.physletb.2011.05.074](https://doi.org/10.1016/j.physletb.2011.05.074), arXiv:[1102.4746](https://arxiv.org/abs/1102.4746) [hep-ex]
- S. Chatrchyan et al., **Search for Neutral MSSM Higgs Bosons Decaying to Tau Pairs in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 231801, doi:[10.1103/PhysRevLett.106.231801](https://doi.org/10.1103/PhysRevLett.106.231801), arXiv:[1104.1619](https://arxiv.org/abs/1104.1619) [hep-ex]
- S. Chatrchyan et al., **Measurement of the ratio of the 3-jet to 2-jet cross sections in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 702 (2011) 336–354, doi:[10.1016/j.physletb.2011.07.067](https://doi.org/10.1016/j.physletb.2011.07.067), arXiv:[1106.0647](https://arxiv.org/abs/1106.0647) [hep-ex]
- S. Chatrchyan et al., **Search for new physics with same-sign isolated dilepton events with jets and missing transverse energy at the LHC**, *JHEP.* 06 (2011) 077, doi:[10.1007/JHEP06\(2011\)077](https://doi.org/10.1007/JHEP06(2011)077), arXiv:[1104.3168](https://arxiv.org/abs/1104.3168) [hep-ex]
- S. Chatrchyan et al., **Charged particle transverse momentum spectra in pp collisions at  $\sqrt{s} = 0.9$  and 7 TeV**, *JHEP.* 08 (2011) 086, doi:[10.1007/JHEP08\(2011\)086](https://doi.org/10.1007/JHEP08(2011)086), arXiv:[1104.3547](https://arxiv.org/abs/1104.3547) [hep-ex]
- S. Chatrchyan et al., **Measurement of  $W\gamma$  and  $Z\gamma$  production in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 701 (2011) 535–555, doi:[10.1016/j.physletb.2011.06.034](https://doi.org/10.1016/j.physletb.2011.06.034), arXiv:[1105.2758](https://arxiv.org/abs/1105.2758) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Differential Cross Section for Isolated Prompt Photon Production in pp Collisions at 7 TeV**, *Phys. Rev. D.* 84 (2011) 052011, doi:[10.1103/PhysRevD.84.052011](https://doi.org/10.1103/PhysRevD.84.052011), arXiv:[1108.2044](https://arxiv.org/abs/1108.2044) [hep-ex]
- V. Khachatryan et al., **Measurement of Bose-Einstein Correlations in pp Collisions at  $\sqrt{s} = 0.9$  and 7 TeV**, *JHEP.* 05 (2011) 029, doi:[10.1007/JHEP05\(2011\)029](https://doi.org/10.1007/JHEP05(2011)029), arXiv:[1101.3518](https://arxiv.org/abs/1101.3518) [hep-ex]
- S. Chatrchyan et al., **Measurement of the differential dijet production cross section in proton-proton collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 700 (2011) 187–206, doi:[10.1016/j.physletb.2011.05.027](https://doi.org/10.1016/j.physletb.2011.05.027), arXiv:[1104.1693](https://arxiv.org/abs/1104.1693) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t$ -channel single top quark production cross section in pp collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 107 (2011) 091802, doi:[10.1103/PhysRevLett.107.091802](https://doi.org/10.1103/PhysRevLett.107.091802), arXiv:[1106.3052](https://arxiv.org/abs/1106.3052) [hep-ex]
- V. Khachatryan et al., **Measurement of the  $B^+$  Production Cross Section in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 112001, doi:[10.1103/PhysRevLett.106.112001](https://doi.org/10.1103/PhysRevLett.106.112001), arXiv:[1101.0131](https://arxiv.org/abs/1101.0131) [hep-ex]
- S. Chatrchyan et al., **Search for Three-Jet Resonances in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 107 (2011) 101801, doi:[10.1103/PhysRevLett.107.101801](https://doi.org/10.1103/PhysRevLett.107.101801), arXiv:[1107.3084](https://arxiv.org/abs/1107.3084) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $B^0$  production cross section in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 106 (2011) 252001, doi:[10.1103/PhysRevLett.106.252001](https://doi.org/10.1103/PhysRevLett.106.252001), arXiv:[1104.2892](https://arxiv.org/abs/1104.2892) [hep-ex]
- S. Chatrchyan et al., **Measurement of the Underlying Event Activity at the LHC with  $\sqrt{s} = 7$  TeV and Comparison with  $\sqrt{s} = 0.9$  TeV**, *JHEP.* 09 (2011) 109, doi:[10.1007/JHEP09\(2011\)109](https://doi.org/10.1007/JHEP09(2011)109), arXiv:[1107.0330](https://arxiv.org/abs/1107.0330) [hep-ex]
- S. Chatrchyan et al., **Determination of Jet Energy Calibration and Transverse Momentum Resolution in CMS**, *JINST.* 6 (2011) P11002, doi:[10.1088/1748-0221/6/11/P11002](https://doi.org/10.1088/1748-0221/6/11/P11002), arXiv:[1107.4277](https://arxiv.org/abs/1107.4277) [physics.ins-det]
- S. Chatrchyan et al., **Search for B(s) and B to dimuon decays in pp collisions at 7 TeV**, *Phys. Rev. Lett.* 107 (2011) 191802, doi:[10.1103/PhysRevLett.107.191802](https://doi.org/10.1103/PhysRevLett.107.191802), arXiv:[1107.5834](https://arxiv.org/abs/1107.5834) [hep-ex]
- S. Chatrchyan et al., **Search for Physics Beyond the Standard Model in Opposite-Sign Dilepton Events at  $\sqrt{s} = 7$  TeV**, *JHEP.* 06 (2011) 026, doi:[10.1007/JHEP06\(2011\)026](https://doi.org/10.1007/JHEP06(2011)026), arXiv:[1103.1348](https://arxiv.org/abs/1103.1348) [hep-ex]
- V. Khachatryan et al., **First Measurement of Hadronic Event Shapes in pp Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 699 (2011) 48–67, doi:[10.1016/j.physletb.2011.03.060](https://doi.org/10.1016/j.physletb.2011.03.060), arXiv:[1102.0068](https://arxiv.org/abs/1102.0068) [hep-ex]



- S. Chatrchyan et al., **Measurement of the weak mixing angle with the Drell-Yan process in proton-proton collisions at the LHC**, *Phys. Rev. D.* 84 (2011) 112002, doi:[10.1103/PhysRevD.84.112002](https://doi.org/10.1103/PhysRevD.84.112002), arXiv:[1110.2682](https://arxiv.org/abs/1110.2682) [hep-ex]
- S. Chatrchyan et al., **Search for Large Extra Dimensions in the Diphoton Final State at the Large Hadron Collider**, *JHEP.* 05 (2011) 085, doi:[10.1007/JHEP05\(2011\)085](https://doi.org/10.1007/JHEP05(2011)085), arXiv:[1103.4279](https://arxiv.org/abs/1103.4279) [hep-ex]
- S. Chatrchyan et al., **Measurement of the  $t\bar{t}$  Production Cross Section in  $pp$  Collisions at 7 TeV in Lepton + Jets Events Using  $b$ -quark Jet Identification**, *Phys. Rev. D.* 84 (2011) 092004, doi:[10.1103/PhysRevD.84.092004](https://doi.org/10.1103/PhysRevD.84.092004), arXiv:[1108.3773](https://arxiv.org/abs/1108.3773) [hep-ex]
- V. Khachatryan et al., **Search for Supersymmetry in  $pp$  Collisions at 7 TeV in Events with Jets and Missing Transverse Energy**, *Phys. Lett. B.* 698 (2011) 196–218, doi:[10.1016/j.physletb.2011.03.021](https://doi.org/10.1016/j.physletb.2011.03.021), arXiv:[1101.1628](https://arxiv.org/abs/1101.1628) [hep-ex]
- V. Khachatryan et al., **Inclusive  $b$ -Hadron Production Cross Section with Muons in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 03 (2011) 090, doi:[10.1007/JHEP03\(2011\)090](https://doi.org/10.1007/JHEP03(2011)090), arXiv:[1101.3512](https://arxiv.org/abs/1101.3512) [hep-ex]
- S. Chatrchyan et al., **Measurement of energy flow at large pseudorapidities in  $pp$  collisions at  $\sqrt{s} = 0.9$  and 7 TeV**, *JHEP.* 11 (2011) 148, doi:[10.1007/JHEP11\(2011\)148](https://doi.org/10.1007/JHEP11(2011)148), arXiv:[1110.0211](https://arxiv.org/abs/1110.0211) [hep-ex]
- S. Chatrchyan et al., **Search for Supersymmetry in Events with  $b$  Jets and Missing Transverse Momentum at the LHC**, *JHEP.* 07 (2011) 113, doi:[10.1007/JHEP07\(2011\)113](https://doi.org/10.1007/JHEP07(2011)113), arXiv:[1106.3272](https://arxiv.org/abs/1106.3272) [hep-ex]
- S. Chatrchyan et al., **Search for Light Resonances Decaying into Pairs of Muons as a Signal of New Physics**, *JHEP.* 07 (2011) 098, doi:[10.1007/JHEP07\(2011\)098](https://doi.org/10.1007/JHEP07(2011)098), arXiv:[1106.2375](https://arxiv.org/abs/1106.2375) [hep-ex]
- S. Chatrchyan et al., **Search for Resonances in the Dilepton Mass Distribution in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 05 (2011) 093, doi:[10.1007/JHEP05\(2011\)093](https://doi.org/10.1007/JHEP05(2011)093), arXiv:[1103.0981](https://arxiv.org/abs/1103.0981) [hep-ex]
- S. Chatrchyan et al., **Search for New Physics with Jets and Missing Transverse Momentum in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 08 (2011) 155, doi:[10.1007/JHEP08\(2011\)155](https://doi.org/10.1007/JHEP08(2011)155), arXiv:[1106.4503](https://arxiv.org/abs/1106.4503) [hep-ex]
- V. Khachatryan et al., **Measurement of  $B\bar{B}$  Angular Correlations based on Secondary Vertex Reconstruction at  $\sqrt{s} = 7$  TeV**, *JHEP.* 03 (2011) 136, doi:[10.1007/JHEP03\(2011\)136](https://doi.org/10.1007/JHEP03(2011)136), arXiv:[1102.3194](https://arxiv.org/abs/1102.3194) [hep-ex]
- S. Chatrchyan et al., **Search for supersymmetry in events with a lepton, a photon, and large missing transverse energy in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *JHEP.* 06 (2011) 093, doi:[10.1007/JHEP06\(2011\)093](https://doi.org/10.1007/JHEP06(2011)093), arXiv:[1105.3152](https://arxiv.org/abs/1105.3152) [hep-ex]
- S. Chatrchyan et al., **Search for First Generation Scalar Leptoquarks in the  $e \nu jj$  channel in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Lett. B.* 703 (2011) 246–266, doi:[10.1016/j.physletb.2011.07.089](https://doi.org/10.1016/j.physletb.2011.07.089), arXiv:[1105.5237](https://arxiv.org/abs/1105.5237) [hep-ex]
- S. Chatrchyan et al., **Study of  $Z$  boson production in PbPb collisions at  $\sqrt{s_{NN}} = 2.76$  TeV**, *Phys. Rev. Lett.* 106 (2011) 212301, doi:[10.1103/PhysRevLett.106.212301](https://doi.org/10.1103/PhysRevLett.106.212301), arXiv:[1102.5435](https://arxiv.org/abs/1102.5435) [nucl-ex]
- M. Albert et al., **Experience Building and Operating the CMS Tier-1 Computing Centres**, *J. Phys. Conf. Ser.* 219 (2010) 072035, doi:[10.1088/1742-6596/219/7/072035](https://doi.org/10.1088/1742-6596/219/7/072035)
- S. Chatrchyan et al., **Performance of the CMS Cathode Strip Chambers with Cosmic Rays**, *JINST.* 5 (2010) T03018, doi:[10.1088/1748-0221/5/03/T03018](https://doi.org/10.1088/1748-0221/5/03/T03018), arXiv:[0911.4992](https://arxiv.org/abs/0911.4992) [physics.ins-det]
- S. Chatrchyan et al., **Commissioning and Performance of the CMS Pixel Tracker with Cosmic Ray Muons**, *JINST.* 5 (2010) T03007, doi:[10.1088/1748-0221/5/03/T03007](https://doi.org/10.1088/1748-0221/5/03/T03007), arXiv:[0911.5434](https://arxiv.org/abs/0911.5434) [physics.ins-det]
- S. Chatrchyan et al., **Performance and Operation of the CMS Electromagnetic Calorimeter**, *JINST.* 5 (2010) T03010, doi:[10.1088/1748-0221/5/03/T03010](https://doi.org/10.1088/1748-0221/5/03/T03010), arXiv:[0910.3423](https://arxiv.org/abs/0910.3423) [physics.ins-det]
- S. Chatrchyan et al., **Alignment of the CMS Silicon Tracker during Commissioning with Cosmic Rays**, *JINST.* 5 (2010) T03009, doi:[10.1088/1748-0221/5/03/T03009](https://doi.org/10.1088/1748-0221/5/03/T03009), arXiv:[0910.2505](https://arxiv.org/abs/0910.2505) [physics.ins-det]
- S. Chatrchyan et al., **Performance of CMS Muon Reconstruction in Cosmic-Ray Events**, *JINST.* 5 (2010) T03022, doi:[10.1088/1748-0221/5/03/T03022](https://doi.org/10.1088/1748-0221/5/03/T03022), arXiv:[0911.4994](https://arxiv.org/abs/0911.4994) [physics.ins-det]
- S. Chatrchyan et al., **Aligning the CMS Muon Chambers with the Muon Alignment System during an Extended Cosmic Ray Run**, *JINST.* 5 (2010) T03019, doi:[10.1088/1748-0221/5/03/T03019](https://doi.org/10.1088/1748-0221/5/03/T03019), arXiv:[0911.4770](https://arxiv.org/abs/0911.4770) [physics.ins-det]
- S. Chatrchyan et al., **Performance of the CMS Hadron Calorimeter with Cosmic Ray Muons and LHC Beam Data**, *JINST.* 5 (2010) T03012, doi:[10.1088/1748-0221/5/03/T03012](https://doi.org/10.1088/1748-0221/5/03/T03012), arXiv:[0911.4991](https://arxiv.org/abs/0911.4991) [physics.ins-det]
- S. Chatrchyan et al., **Commissioning of the CMS High-Level Trigger with Cosmic Rays**, *JINST.* 5 (2010) T03005, doi:[10.1088/1748-0221/5/03/T03005](https://doi.org/10.1088/1748-0221/5/03/T03005), arXiv:[0911.4889](https://arxiv.org/abs/0911.4889) [physics.ins-det]

- S. Chatrchyan et al., **Performance of the CMS Drift-Tube Local Trigger with Cosmic Rays**, *JINST.* 5 (2010) T03003, doi:[10.1088/1748-0221/5/03/T03003](https://doi.org/10.1088/1748-0221/5/03/T03003), arXiv:[0911.4893](https://arxiv.org/abs/0911.4893) [physics.ins-det]
- S. Chatrchyan et al., **Commissioning of the CMS Experiment and the Cosmic Run at Four Tesla**, *JINST.* 5 (2010) T03001, doi:[10.1088/1748-0221/5/03/T03001](https://doi.org/10.1088/1748-0221/5/03/T03001), arXiv:[0911.4845](https://arxiv.org/abs/0911.4845) [physics.ins-det]
- S. Chatrchyan et al., **Performance of the CMS Drift Tube Chambers with Cosmic Rays**, *JINST.* 5 (2010) T03015, doi:[10.1088/1748-0221/5/03/T03015](https://doi.org/10.1088/1748-0221/5/03/T03015), arXiv:[0911.4855](https://arxiv.org/abs/0911.4855) [physics.ins-det]
- S. Chatrchyan et al., **Alignment of the CMS Muon System with Cosmic-Ray and Beam-Halo Muons**, *JINST.* 5 (2010) T03020, doi:[10.1088/1748-0221/5/03/T03020](https://doi.org/10.1088/1748-0221/5/03/T03020), arXiv:[0911.4022](https://arxiv.org/abs/0911.4022) [physics.ins-det]
- S. Chatrchyan et al., **Precise Mapping of the Magnetic Field in the CMS Barrel Yoke using Cosmic Rays**, *JINST.* 5 (2010) T03021, doi:[10.1088/1748-0221/5/03/T03021](https://doi.org/10.1088/1748-0221/5/03/T03021), arXiv:[0910.5530](https://arxiv.org/abs/0910.5530) [physics.ins-det]
- S. Chatrchyan et al., **Identification and Filtering of Uncharacteristic Noise in the CMS Hadron Calorimeter**, *JINST.* 5 (2010) T03014, doi:[10.1088/1748-0221/5/03/T03014](https://doi.org/10.1088/1748-0221/5/03/T03014), arXiv:[0911.4881](https://arxiv.org/abs/0911.4881) [physics.ins-det]
- S. Chatrchyan et al., **Commissioning and Performance of the CMS Silicon Strip Tracker with Cosmic Ray Muons**, *JINST.* 5 (2010) T03008, doi:[10.1088/1748-0221/5/03/T03008](https://doi.org/10.1088/1748-0221/5/03/T03008), arXiv:[0911.4996](https://arxiv.org/abs/0911.4996) [physics.ins-det]
- S. Chatrchyan et al., **Performance of CMS Hadron Calorimeter Timing and Synchronization using Test Beam, Cosmic Ray, and LHC Beam Data**, *JINST.* 5 (2010) T03013, doi:[10.1088/1748-0221/5/03/T03013](https://doi.org/10.1088/1748-0221/5/03/T03013), arXiv:[0911.4877](https://arxiv.org/abs/0911.4877) [physics.ins-det]
- S. Chatrchyan et al., **Time Reconstruction and Performance of the CMS Electromagnetic Calorimeter**, *JINST.* 5 (2010) T03011, doi:[10.1088/1748-0221/5/03/T03011](https://doi.org/10.1088/1748-0221/5/03/T03011), arXiv:[0911.4044](https://arxiv.org/abs/0911.4044) [physics.ins-det]
- S. Chatrchyan et al., **Performance Study of the CMS Barrel Resistive Plate Chambers with Cosmic Rays**, *JINST.* 5 (2010) T03017, doi:[10.1088/1748-0221/5/03/T03017](https://doi.org/10.1088/1748-0221/5/03/T03017), arXiv:[0911.4045](https://arxiv.org/abs/0911.4045) [physics.ins-det]
- S. Chatrchyan et al., **Fine Synchronization of the CMS Muon Drift-Tube Local Trigger using Cosmic Rays**, *JINST.* 5 (2010) T03004, doi:[10.1088/1748-0221/5/03/T03004](https://doi.org/10.1088/1748-0221/5/03/T03004), arXiv:[0911.4904](https://arxiv.org/abs/0911.4904) [physics.ins-det]
- S. Chatrchyan et al., **Calibration of the CMS Drift Tube Chambers and Measurement of the Drift Velocity with Cosmic Rays**, *JINST.* 5 (2010) T03016, doi:[10.1088/1748-0221/5/03/T03016](https://doi.org/10.1088/1748-0221/5/03/T03016), arXiv:[0911.4895](https://arxiv.org/abs/0911.4895) [physics.ins-det]
- S. Chatrchyan et al., **Measurement of the Muon Stopping Power in Lead Tungstate**, *JINST.* 5 (2010) P03007, doi:[10.1088/1748-0221/5/03/P03007](https://doi.org/10.1088/1748-0221/5/03/P03007), arXiv:[0911.5397](https://arxiv.org/abs/0911.5397) [physics.ins-det]
- S. Chatrchyan et al., **Performance of the CMS Level-1 Trigger during Commissioning with Cosmic Ray Muons**, *JINST.* 5 (2010) T03002, doi:[10.1088/1748-0221/5/03/T03002](https://doi.org/10.1088/1748-0221/5/03/T03002), arXiv:[0911.5422](https://arxiv.org/abs/0911.5422) [physics.ins-det]
- S. Chatrchyan et al., **CMS Data Processing Workflows during an Extended Cosmic Ray Run**, *JINST.* 5 (2010) T03006, doi:[10.1088/1748-0221/5/03/T03006](https://doi.org/10.1088/1748-0221/5/03/T03006), arXiv:[0911.4842](https://arxiv.org/abs/0911.4842) [physics.ins-det]
- V. Khachatryan et al., **Search for Quark Compositeness with the Dijet Centrality Ratio in  $pp$  Collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 105 (2010) 262001, doi:[10.1103/PhysRevLett.105.262001](https://doi.org/10.1103/PhysRevLett.105.262001), arXiv:[1010.4439](https://arxiv.org/abs/1010.4439) [hep-ex]
- V. Khachatryan et al., **Observation of Long-Range Near-Side Angular Correlations in Proton-Proton Collisions at the LHC**, *JHEP.* 09 (2010) 091, doi:[10.1007/JHEP09\(2010\)091](https://doi.org/10.1007/JHEP09(2010)091), arXiv:[1009.4122](https://arxiv.org/abs/1009.4122) [hep-ex]
- V. Khachatryan et al., **First Measurement of Bose-Einstein Correlations in Proton-Proton Collisions at  $\sqrt{s} = 0.9$  and 2.36 TeV at the LHC**, *Phys. Rev. Lett.* 105 (2010) 032001, doi:[10.1103/PhysRevLett.105.032001](https://doi.org/10.1103/PhysRevLett.105.032001), arXiv:[1005.3294](https://arxiv.org/abs/1005.3294) [hep-ex]
- V. Khachatryan et al., **Search for Dijet Resonances in 7 TeV  $pp$  Collisions at CMS**, *Phys. Rev. Lett.* 105 (2010) 211801, doi:[10.1103/PhysRevLett.105.211801](https://doi.org/10.1103/PhysRevLett.105.211801), arXiv:[1010.0203](https://arxiv.org/abs/1010.0203) [hep-ex]
- V. Khachatryan et al., **First Measurement of the Underlying Event Activity at the LHC with  $\sqrt{s} = 0.9$  TeV**, *Eur. Phys. J. C.* 70 (2010) 555–572, doi:[10.1140/epjc/s10052-010-1453-9](https://doi.org/10.1140/epjc/s10052-010-1453-9), arXiv:[1006.2083](https://arxiv.org/abs/1006.2083) [hep-ex]
- V. Khachatryan et al., **Transverse-momentum and pseudorapidity distributions of charged hadrons in  $pp$  collisions at  $\sqrt{s} = 7$  TeV**, *Phys. Rev. Lett.* 105 (2010) 022002, doi:[10.1103/PhysRevLett.105.022002](https://doi.org/10.1103/PhysRevLett.105.022002), arXiv:[1005.3299](https://arxiv.org/abs/1005.3299) [hep-ex]
- V. Khachatryan et al., **CMS Tracking Performance Results from Early LHC Operation**, *Eur. Phys. J. C.* 70 (2010) 1165–1192, doi:[10.1140/epjc/s10052-010-1491-3](https://doi.org/10.1140/epjc/s10052-010-1491-3), arXiv:[1007.1988](https://arxiv.org/abs/1007.1988) [physics.ins-det]

- V. Khachatryan et al., **Transverse Momentum and Pseudorapidity Distributions of Charged Hadrons in pp Collisions at  $\sqrt{s} = 0.9$  and 2.36 TeV**, *JHEP*. 02 (2010) 041, doi:[10.1007/JHEP02\(2010\)041](https://doi.org/10.1007/JHEP02(2010)041), arXiv:[1002.0621](https://arxiv.org/abs/1002.0621) [hep-ex]
- V. Khachatryan et al., **Measurement of the Charge Ratio of Atmospheric Muons with the CMS Detector**, *Phys. Lett. B*. 692 (2010) 83–104, doi:[10.1016/j.physletb.2010.07.033](https://doi.org/10.1016/j.physletb.2010.07.033), arXiv:[1005.5332](https://arxiv.org/abs/1005.5332) [hep-ex]
- D. Bradley et al., **Use of glide-ins in CMS for production and analysis**, *J. Phys. Conf. Ser.* 219 (2010) 072013, doi:[10.1088/1742-6596/219/7/072013](https://doi.org/10.1088/1742-6596/219/7/072013)
- O. Gutsche, **Validation of Software Releases for CMS**, *J. Phys. Conf. Ser.* 219 (2010) 042040, doi:[10.1088/1742-6596/219/4/042040](https://doi.org/10.1088/1742-6596/219/4/042040)
- W. Adam et al., **Alignment of the CMS Silicon Strip Tracker during stand-alone Commissioning**, *JINST*. 4 (2009) T07001, doi:[10.1088/1748-0221/4/07/T07001](https://doi.org/10.1088/1748-0221/4/07/T07001), arXiv:[0904.1220](https://arxiv.org/abs/0904.1220) [physics.ins-det]
- W. Adam et al., **Performance studies of the CMS Strip Tracker before installation**, *JINST*. 4 (2009) P06009, doi:[10.1088/1748-0221/4/06/P06009](https://doi.org/10.1088/1748-0221/4/06/P06009), arXiv:[0901.4316](https://arxiv.org/abs/0901.4316) [physics.ins-det]
- W. Adam et al., **Stand-alone Cosmic Muon Reconstruction Before Installation of the CMS Silicon Strip Tracker**, *JINST*. 4 (2009) P05004, doi:[10.1088/1748-0221/4/05/P05004](https://doi.org/10.1088/1748-0221/4/05/P05004), arXiv:[0902.1860](https://arxiv.org/abs/0902.1860) [physics.ins-det]
- S. Chekanov et al., **Measurement of beauty production from dimuon events at HERA**, *JHEP*. 02 (2009) 032, doi:[10.1088/1126-6708/2009/02/032](https://doi.org/10.1088/1126-6708/2009/02/032), arXiv:[0811.0894](https://arxiv.org/abs/0811.0894) [hep-ex]
- W. Adam et al., **The CMS tracker operation and performance at the Magnet Test and Cosmic Challenge**, *JINST*. 3 (2008) P07006, doi:[10.1088/1748-0221/3/07/P07006](https://doi.org/10.1088/1748-0221/3/07/P07006)
- S. Chatrchyan et al., **The CMS Experiment at the CERN LHC**, *JINST*. 3 (2008) S08004, doi:[10.1088/1748-0221/3/08/S08004](https://doi.org/10.1088/1748-0221/3/08/S08004)
- D. Evans et al., **Large scale job management and experience in recent data challenges within the LHC CMS experiment**, *PoS. ACAT08* (2008) 032, doi:[10.22323/1.070.0032](https://doi.org/10.22323/1.070.0032)
- O. Gutsche et al., **WLCG scale testing during CMS data challenges**, *J. Phys. Conf. Ser.* 119 (2008) 062033, doi:[10.1088/1742-6596/119/6/062033](https://doi.org/10.1088/1742-6596/119/6/062033)
- D. Spiga et al., **CRAB: The CMS distributed analysis tool development and design**, *Nucl. Phys. B Proc. Suppl.* 177-178 (2008) 267–268, doi:[10.1016/j.nuclphysbps.2007.11.124](https://doi.org/10.1016/j.nuclphysbps.2007.11.124)
- G.L. Bayatian et al., **CMS physics technical design report: Addendum on high density QCD with heavy ions**, *J. Phys. G*. 34 (2007) 2307–2455, doi:[10.1088/0954-3899/34/11/008](https://doi.org/10.1088/0954-3899/34/11/008)
- G.L. Bayatian et al., **CMS technical design report, volume II: Physics performance**, *J. Phys. G*. 34 (2007) 995–1579, doi:[10.1088/0954-3899/34/6/S01](https://doi.org/10.1088/0954-3899/34/6/S01)
- D. Spiga et al., **The CMS Remote Analysis Builder (CRAB)**, *Lect. Notes Comput. Sci.* 4873 (2007) 580–586, doi:[10.1007/978-3-540-77220-0\\_52](https://doi.org/10.1007/978-3-540-77220-0_52)
- F. Farina et al., **Status and evolution of CRAB**, *PoS. ACAT* (2007) 020, doi:[10.22323/1.050.0020](https://doi.org/10.22323/1.050.0020)
- S. Chekanov et al., **Measurement of neutral current cross sections at high Bjorken-x with the ZEUS detector at HERA**, *Eur. Phys. J. C*. 49 (2007) 523–544, doi:[10.1140/epjc/s10052-006-0164-8](https://doi.org/10.1140/epjc/s10052-006-0164-8), arXiv:[hep-ex/0608014](https://arxiv.org/abs/hep-ex/0608014) [hep-ex]
- S. Chekanov et al., **Measurement of azimuthal asymmetries in neutral current deep inelastic scattering at HERA**, *Eur. Phys. J. C*. 51 (2007) 289–299, doi:[10.1140/epjc/s10052-007-0310-y](https://doi.org/10.1140/epjc/s10052-007-0310-y), arXiv:[hep-ex/0608053](https://arxiv.org/abs/hep-ex/0608053) [hep-ex]
- S. Chekanov et al., **Measurement of prompt photons with associated jets in photoproduction at HERA**, *Eur. Phys. J. C*. 49 (2007) 511–522, doi:[10.1140/epjc/s10052-006-0134-1](https://doi.org/10.1140/epjc/s10052-006-0134-1), arXiv:[hep-ex/0608028](https://arxiv.org/abs/hep-ex/0608028) [hep-ex]
- S. Chekanov et al., **Event shapes in deep inelastic scattering at HERA**, *Nucl. Phys. B*. 767 (2007) 1–28, doi:[10.1016/j.nuclphysb.2006.05.016](https://doi.org/10.1016/j.nuclphysb.2006.05.016), arXiv:[hep-ex/0604032](https://arxiv.org/abs/hep-ex/0604032) [hep-ex]
- S. Chekanov et al., **Inclusive-jet and dijet cross-sections in deep inelastic scattering at HERA**, *Nucl. Phys. B*. 765 (2007) 1–30, doi:[10.1016/j.nuclphysb.2006.09.018](https://doi.org/10.1016/j.nuclphysb.2006.09.018), arXiv:[hep-ex/0608048](https://arxiv.org/abs/hep-ex/0608048) [hep-ex]
- G.L. Bayatian et al., **CMS Physics: Technical Design Report Volume 1: Detector Performance and Software**, (2006)
- S. Chekanov et al., **Forward jet production in deep inelastic ep scattering and low-x parton dynamics at HERA**, *Phys. Lett. B*. 632 (2006) 13–26, doi:[10.1016/j.physletb.2005.09.066](https://doi.org/10.1016/j.physletb.2005.09.066), arXiv:[hep-ex/0502029](https://arxiv.org/abs/hep-ex/0502029) [hep-ex]

- S. Chekanov et al., **Measurement of high- $Q^2$  deep inelastic scattering cross sections with a longitudinally polarised positron beam at HERA**, *Phys. Lett. B.* 637 (2006) 210–222, doi:[10.1016/j.physletb.2006.04.047](https://doi.org/10.1016/j.physletb.2006.04.047), arXiv:[hep-ex/0602026](https://arxiv.org/abs/hep-ex/0602026) [hep-ex]
- O. Gutsche, **Measurement of Beauty Quark Cross Sections in Photoproduction with the ZEUS Experiment at the Electron Proton Collider HERA**, PhD thesis, Hamburg U., 2005, doi:[10.3204/DESY-THESIS-2005-010](https://doi.org/10.3204/DESY-THESIS-2005-010)
- S. Chekanov et al., **Study of the pion trajectory in the photoproduction of leading neutrons at HERA**, *Phys. Lett. B.* 610 (2005) 199–211, doi:[10.1016/j.physletb.2005.01.101](https://doi.org/10.1016/j.physletb.2005.01.101), arXiv:[hep-ex/0404002](https://arxiv.org/abs/hep-ex/0404002) [hep-ex]
- S. Chekanov et al., **Exclusive electroproduction of phi mesons at HERA**, *Nucl. Phys. B.* 718 (2005) 3–31, doi:[10.1016/j.nuclphysb.2005.04.009](https://doi.org/10.1016/j.nuclphysb.2005.04.009), arXiv:[hep-ex/0504010](https://arxiv.org/abs/hep-ex/0504010) [hep-ex]
- S. Chekanov et al., **Measurement of inelastic  $J/\psi$  production in deep inelastic scattering at HERA**, *Eur. Phys. J. C.* 44 (2005) 13–25, doi:[10.1140/epjc/s2005-02346-2](https://doi.org/10.1140/epjc/s2005-02346-2), arXiv:[hep-ex/0505008](https://arxiv.org/abs/hep-ex/0505008) [hep-ex]
- S. Chekanov et al., **An NLO QCD analysis of inclusive cross-section and jet-production data from the zeus experiment**, *Eur. Phys. J. C.* 42 (2005) 1–16, doi:[10.1140/epjc/s2005-02293-x](https://doi.org/10.1140/epjc/s2005-02293-x), arXiv:[hep-ph/0503274](https://arxiv.org/abs/hep-ph/0503274) [hep-ex]
- S. Chekanov et al., **Search for lepton-flavor violation at HERA**, *Eur. Phys. J. C.* 44 (2005) 463–479, doi:[10.1140/epjc/s2005-02399-1](https://doi.org/10.1140/epjc/s2005-02399-1), arXiv:[hep-ex/0501070](https://arxiv.org/abs/hep-ex/0501070) [hep-ex]
- S. Chekanov et al., **Measurement of charm fragmentation ratios and fractions in photoproduction at HERA**, *Eur. Phys. J. C.* 44 (2005) 351–366, doi:[10.1140/epjc/s2005-02397-3](https://doi.org/10.1140/epjc/s2005-02397-3), arXiv:[hep-ex/0508019](https://arxiv.org/abs/hep-ex/0508019) [hep-ex]
- S. Chekanov et al., **Inclusive jet cross sections and dijet correlations in  $D^{*+}$  photoproduction at HERA**, *Nucl. Phys. B.* 729 (2005) 492–525, doi:[10.1016/j.nuclphysb.2005.09.021](https://doi.org/10.1016/j.nuclphysb.2005.09.021), arXiv:[hep-ex/0507089](https://arxiv.org/abs/hep-ex/0507089) [hep-ex]
- S. Chekanov et al., **Search for pentaquarks decaying to  $\Xi$ -pi in deep inelastic scattering at HERA**, *Phys. Lett. B.* 610 (2005) 212–224, doi:[10.1016/j.physletb.2005.02.016](https://doi.org/10.1016/j.physletb.2005.02.016), arXiv:[hep-ex/0501069](https://arxiv.org/abs/hep-ex/0501069) [hep-ex]
- S. Chekanov et al., **Multijet production in neutral current deep inelastic scattering at HERA and determination of  $\alpha(s)$** , *Eur. Phys. J. C.* 44 (2005) 183–193, doi:[10.1140/epjc/s2005-02347-1](https://doi.org/10.1140/epjc/s2005-02347-1), arXiv:[hep-ex/0502007](https://arxiv.org/abs/hep-ex/0502007) [hep-ex]
- S. Chekanov et al., **Study of deep inelastic inclusive and diffractive scattering with the ZEUS forward plug calorimeter**, *Nucl. Phys. B.* 713 (2005) 3–80, doi:[10.1016/j.nuclphysb.2005.02.001](https://doi.org/10.1016/j.nuclphysb.2005.02.001), arXiv:[hep-ex/0501060](https://arxiv.org/abs/hep-ex/0501060) [hep-ex]
- S. Chekanov et al., **Bose-Einstein correlations in one and two-dimensions in deep inelastic scattering**, *Phys. Lett. B.* 583 (2004) 231–246, doi:[10.1016/j.physletb.2003.12.068](https://doi.org/10.1016/j.physletb.2003.12.068), arXiv:[hep-ex/0311030](https://arxiv.org/abs/hep-ex/0311030) [hep-ex]
- S. Chekanov et al., **Search for contact interactions, large extra dimensions and finite quark radius in e p collisions at HERA**, *Phys. Lett. B.* 591 (2004) 23–41, doi:[10.1016/j.physletb.2004.03.081](https://doi.org/10.1016/j.physletb.2004.03.081), arXiv:[hep-ex/0401009](https://arxiv.org/abs/hep-ex/0401009) [hep-ex]
- S. Chekanov et al., **Isolated tau leptons in events with large missing transverse momentum at HERA**, *Phys. Lett. B.* 583 (2004) 41–58, doi:[10.1016/j.physletb.2003.12.054](https://doi.org/10.1016/j.physletb.2003.12.054), arXiv:[hep-ex/0311028](https://arxiv.org/abs/hep-ex/0311028) [hep-ex]
- S. Chekanov et al., **Search for QCD instanton induced events in deep inelastic ep scattering at HERA**, *Eur. Phys. J. C.* 34 (2004) 255–265, doi:[10.1140/epjc/s2004-01735-3](https://doi.org/10.1140/epjc/s2004-01735-3), arXiv:[hep-ex/0312048](https://arxiv.org/abs/hep-ex/0312048) [hep-ex]
- S. Chekanov et al., **High  $Q^2$  neutral current cross-sections in  $e^+ p$  deep inelastic scattering at  $s^{1/2} = 318$ -GeV**, *Phys. Rev. D.* 70 (2004) 052001, doi:[10.1103/PhysRevD.70.052001](https://doi.org/10.1103/PhysRevD.70.052001), arXiv:[hep-ex/0401003](https://arxiv.org/abs/hep-ex/0401003) [hep-ex]
- S. Chekanov et al., **Beauty photoproduction measured using decays into muons in dijet events in e p collisions at  $s^{1/2} = 318$ -GeV**, *Phys. Rev. D.* 70 (2004) 012008, doi:[10.1103/PhysRevD.70.012008](https://doi.org/10.1103/PhysRevD.70.012008), arXiv:[hep-ex/0312057](https://arxiv.org/abs/hep-ex/0312057) [hep-ex]
- S. Chekanov et al., **Measurement of  $D^{*+}$  production in deep inelastic  $e^+ p$  scattering at HERA**, *Phys. Rev. D.* 69 (2004) 012004, doi:[10.1103/PhysRevD.69.012004](https://doi.org/10.1103/PhysRevD.69.012004), arXiv:[hep-ex/0308068](https://arxiv.org/abs/hep-ex/0308068) [hep-ex]
- S. Chekanov et al., **Observation of  $K_0^*(s)$   $K_0^*(s)$  resonances in deep inelastic scattering at HERA**, *Phys. Lett. B.* 578 (2004) 33–44, doi:[10.1016/j.physletb.2003.10.049](https://doi.org/10.1016/j.physletb.2003.10.049), arXiv:[hep-ex/0308006](https://arxiv.org/abs/hep-ex/0308006) [hep-ex]
- S. Chekanov et al., **Observation of isolated high  $E(T)$  photons in deep inelastic scattering**, *Phys. Lett. B.* 595 (2004) 86–100, doi:[10.1016/j.physletb.2004.05.033](https://doi.org/10.1016/j.physletb.2004.05.033), arXiv:[hep-ex/0402019](https://arxiv.org/abs/hep-ex/0402019) [hep-ex]
- S. Chekanov et al., **Substructure dependence of jet cross sections at HERA and determination of  $\alpha(s)$** , *Nucl. Phys. B.* 700 (2004) 3–50, doi:[10.1016/j.nuclphysb.2004.08.049](https://doi.org/10.1016/j.nuclphysb.2004.08.049), arXiv:[hep-ex/0405065](https://arxiv.org/abs/hep-ex/0405065) [hep-ex]
- S. Chekanov et al., **Evidence for a narrow baryonic state decaying to  $K_0^*(S)$  p and  $K_0^*(S)$  anti-p in deep inelastic scattering at HERA**, *Phys. Lett. B.* 591 (2004) 7–22, doi:[10.1016/j.physletb.2004.04.024](https://doi.org/10.1016/j.physletb.2004.04.024), arXiv:[hep-ex/0403051](https://arxiv.org/abs/hep-ex/0403051) [hep-ex]



- S. Chekanov et al., **Search for a narrow charmed baryonic state decaying to  $D^{*+} p$  in ep collisions at HERA**, *Eur. Phys. J. C.* 38 (2004) 29–41, doi:[10.1140/epjc/s2004-02042-9](https://doi.org/10.1140/epjc/s2004-02042-9), arXiv:[hep-ex/0409033](https://arxiv.org/abs/hep-ex/0409033) [hep-ex]
- S. Chekanov et al., **Dissociation of virtual photons in events with a leading proton at HERA**, *Eur. Phys. J. C.* 38 (2004) 43–67, doi:[10.1140/epjc/s2004-02047-4](https://doi.org/10.1140/epjc/s2004-02047-4), arXiv:[hep-ex/0408009](https://arxiv.org/abs/hep-ex/0408009) [hep-ex]
- S. Chekanov et al., **Photoproduction of  $D^{*+}$  mesons associated with a leading neutron**, *Phys. Lett. B.* 590 (2004) 143–160, doi:[10.1016/j.physletb.2004.03.076](https://doi.org/10.1016/j.physletb.2004.03.076), arXiv:[hep-ex/0401017](https://arxiv.org/abs/hep-ex/0401017) [hep-ex]
- S. Chekanov et al., **The Dependence of dijet production on photon virtuality in ep collisions at HERA**, *Eur. Phys. J. C.* 35 (2004) 487–500, doi:[10.1140/epjc/s2004-01885-2](https://doi.org/10.1140/epjc/s2004-01885-2), arXiv:[hep-ex/0404033](https://arxiv.org/abs/hep-ex/0404033) [hep-ex]
- S. Chekanov et al., **Measurement of beauty production in deep inelastic scattering at HERA**, *Phys. Lett. B.* 599 (2004) 173–189, doi:[10.1016/j.physletb.2004.08.048](https://doi.org/10.1016/j.physletb.2004.08.048), arXiv:[hep-ex/0405069](https://arxiv.org/abs/hep-ex/0405069) [hep-ex]
- S. Chekanov et al., **Exclusive electroproduction of  $J/\psi$  mesons at HERA**, *Nucl. Phys. B.* 695 (2004) 3–37, doi:[10.1016/j.nuclphysb.2004.06.034](https://doi.org/10.1016/j.nuclphysb.2004.06.034), arXiv:[hep-ex/0404008](https://arxiv.org/abs/hep-ex/0404008) [hep-ex]
- O. Kind et al., **A ROOT based client server event display for the ZEUS experiment**, *eConf.* C0303241 (2003) MOLT002. <http://arxiv.org/abs/hep-ex/0305095>, arXiv:[hep-ex/0305095](https://arxiv.org/abs/hep-ex/0305095) [hep-ex]
- S. Chekanov et al., **Study of the azimuthal asymmetry of jets in neutral current deep inelastic scattering at HERA**, *Phys. Lett. B.* 551 (2003) 226–240, doi:[10.1016/S0370-2693\(02\)03072-1](https://doi.org/10.1016/S0370-2693(02)03072-1), arXiv:[hep-ex/0210064](https://arxiv.org/abs/hep-ex/0210064) [hep-ex]
- S. Chekanov et al., **Measurement of high  $Q^2$  e- p neutral current cross-sections at HERA and the extraction of  $xF(3)$** , *Eur. Phys. J. C.* 28 (2003) 175–201, doi:[10.1140/epjc/s2003-01163-y](https://doi.org/10.1140/epjc/s2003-01163-y), arXiv:[hep-ex/0208040](https://arxiv.org/abs/hep-ex/0208040) [hep-ex]
- S. Chekanov et al., **Observation of the strange sea in the proton via inclusive phi meson production in neutral current deep inelastic scattering at HERA**, *Phys. Lett. B.* 553 (2003) 141–158, doi:[10.1016/S0370-2693\(02\)03206-9](https://doi.org/10.1016/S0370-2693(02)03206-9), arXiv:[hep-ex/0211025](https://arxiv.org/abs/hep-ex/0211025) [hep-ex]
- S. Chekanov et al., **Measurements of inelastic  $J/\psi$  and  $\psi'$  photoproduction at HERA**, *Eur. Phys. J. C.* 27 (2003) 173–188, doi:[10.1140/epjc/s2002-01130-2](https://doi.org/10.1140/epjc/s2002-01130-2), arXiv:[hep-ex/0211011](https://arxiv.org/abs/hep-ex/0211011) [hep-ex]
- S. Chekanov et al., **Measurement of subjet multiplicities in neutral current deep inelastic scattering at HERA and determination of  $\alpha(s)$** , *Phys. Lett. B.* 558 (2003) 41–58, doi:[10.1016/S0370-2693\(03\)00216-8](https://doi.org/10.1016/S0370-2693(03)00216-8), arXiv:[hep-ex/0212030](https://arxiv.org/abs/hep-ex/0212030) [hep-ex]
- S. Chekanov et al., **Measurement of event shapes in deep inelastic scattering at HERA**, *Eur. Phys. J. C.* 27 (2003) 531–545, doi:[10.1140/epjc/s2003-01148-x](https://doi.org/10.1140/epjc/s2003-01148-x), arXiv:[hep-ex/0211040](https://arxiv.org/abs/hep-ex/0211040) [hep-ex]
- S. Chekanov et al., **Measurement of proton dissociative diffractive photoproduction of vector mesons at large momentum transfer at HERA**, *Eur. Phys. J. C.* 26 (2003) 389–409, doi:[10.1140/epjc/s2002-01079-0](https://doi.org/10.1140/epjc/s2002-01079-0), arXiv:[hep-ex/0205081](https://arxiv.org/abs/hep-ex/0205081) [hep-ex]
- S. Chekanov et al., **A ZEUS next-to-leading-order QCD analysis of data on deep inelastic scattering**, *Phys. Rev. D.* 67 (2003) 012007, doi:[10.1103/PhysRevD.67.012007](https://doi.org/10.1103/PhysRevD.67.012007), arXiv:[hep-ex/0208023](https://arxiv.org/abs/hep-ex/0208023) [hep-ex]
- S. Chekanov et al., **Scaling violations and determination of  $\alpha(s)$  from jet production in gamma p interactions at HERA**, *Phys. Lett. B.* 560 (2003) 7–23, doi:[10.1016/S0370-2693\(03\)00380-0](https://doi.org/10.1016/S0370-2693(03)00380-0), arXiv:[hep-ex/0212064](https://arxiv.org/abs/hep-ex/0212064) [hep-ex]
- S. Chekanov et al., **Leading proton production in  $e^+ p$  collisions at HERA**, *Nucl. Phys. B.* 658 (2003) 3–46, doi:[10.1016/S0550-3213\(03\)00152-4](https://doi.org/10.1016/S0550-3213(03)00152-4), arXiv:[hep-ex/0210029](https://arxiv.org/abs/hep-ex/0210029) [hep-ex]
- S. Chekanov et al., **Dijet angular distributions in photoproduction of charm at HERA**, *Phys. Lett. B.* 565 (2003) 87–101, doi:[10.1016/S0370-2693\(03\)00752-4](https://doi.org/10.1016/S0370-2693(03)00752-4), arXiv:[hep-ex/0302025](https://arxiv.org/abs/hep-ex/0302025) [hep-ex]
- S. Chekanov et al., **Measurement of high  $Q^2$  charged current cross-sections in  $e^+ p$  deep inelastic scattering at HERA**, *Eur. Phys. J. C.* 32 (2003) 1–16, doi:[10.1140/epjc/s2003-01363-5](https://doi.org/10.1140/epjc/s2003-01363-5), arXiv:[hep-ex/0307043](https://arxiv.org/abs/hep-ex/0307043) [hep-ex]
- S. Chekanov et al., **Jet production in charged current deep inelastic  $e^+ p$  scattering at HERA**, *Eur. Phys. J. C.* 31 (2003) 149–164, doi:[10.1140/epjc/s2003-01358-2](https://doi.org/10.1140/epjc/s2003-01358-2), arXiv:[hep-ex/0306018](https://arxiv.org/abs/hep-ex/0306018) [hep-ex]
- S. Chekanov et al., **Measurement of deeply virtual Compton scattering at HERA**, *Phys. Lett. B.* 573 (2003) 46–62, doi:[10.1016/j.physletb.2003.08.048](https://doi.org/10.1016/j.physletb.2003.08.048), arXiv:[hep-ex/0305028](https://arxiv.org/abs/hep-ex/0305028) [hep-ex]
- S. Chekanov et al., **A Search for resonance decays to lepton + jet at HERA and limits on leptoquarks**, *Phys. Rev. D.* 68 (2003) 052004, doi:[10.1103/PhysRevD.68.052004](https://doi.org/10.1103/PhysRevD.68.052004), arXiv:[hep-ex/0304008](https://arxiv.org/abs/hep-ex/0304008) [hep-ex]

- S. Chekanov et al., **Search for single top production in ep collisions at HERA**, *Phys. Lett. B.* 559 (2003) 153–170, doi:[10.1016/S0370-2693\(03\)00333-2](https://doi.org/10.1016/S0370-2693(03)00333-2), arXiv:[hep-ex/0302010](https://arxiv.org/abs/hep-ex/0302010) [hep-ex]
- S. Chekanov et al., **Measurement of the open charm contribution to the diffractive proton structure function**, *Nucl. Phys. B.* 672 (2003) 3–35, doi:[10.1016/j.nuclphysb.2003.09.001](https://doi.org/10.1016/j.nuclphysb.2003.09.001), arXiv:[hep-ex/0307068](https://arxiv.org/abs/hep-ex/0307068) [hep-ex]
- S. Chekanov et al., **Measurement of the  $Q^{*2}$  and energy dependence of diffractive interactions at HERA**, *Eur. Phys. J. C.* 25 (2002) 169–187, doi:[10.1007/s10052-002-1003-1](https://doi.org/10.1007/s10052-002-1003-1), arXiv:[hep-ex/0203039](https://arxiv.org/abs/hep-ex/0203039) [hep-ex]
- S. Chekanov et al., **Leading neutron production in e+ p collisions at HERA**, *Nucl. Phys. B.* 637 (2002) 3–56, doi:[10.1016/S0550-3213\(02\)00439-X](https://doi.org/10.1016/S0550-3213(02)00439-X), arXiv:[hep-ex/0205076](https://arxiv.org/abs/hep-ex/0205076) [hep-ex]
- S. Chekanov et al., **Measurement of high  $Q^2$  charged current cross-sections in e<sup>-</sup>p deep inelastic scattering at HERA**, *Phys. Lett. B.* 539 (2002) 197–217, doi:[10.1016/S0370-2693\(02\)02093-2](https://doi.org/10.1016/S0370-2693(02)02093-2), arXiv:[hep-ex/0205091](https://arxiv.org/abs/hep-ex/0205091) [hep-ex]
- S. Chekanov et al., **Inclusive jet cross-sections in the Breit frame in neutral current deep inelastic scattering at HERA and determination of  $\alpha(s)$** , *Phys. Lett. B.* 547 (2002) 164–180, doi:[10.1016/S0370-2693\(02\)02763-6](https://doi.org/10.1016/S0370-2693(02)02763-6), arXiv:[hep-ex/0208037](https://arxiv.org/abs/hep-ex/0208037) [hep-ex]
- S. Chekanov et al., **Measurement of diffractive production of  $D^{*+}$ -(2010) mesons in deep inelastic scattering at HERA**, *Phys. Lett. B.* 545 (2002) 244–260, doi:[10.1016/S0370-2693\(02\)02595-9](https://doi.org/10.1016/S0370-2693(02)02595-9), arXiv:[hep-ex/0206020](https://arxiv.org/abs/hep-ex/0206020) [hep-ex]
- O. Gutsche, **Development of the trigger algorithm for the MONOLITH experiment**, (2001), DESY report: [DESY-THESIS-2001-020](#)