

# Synopsis Document

ARAVIND H. VIJAY

October 15, 2019

# Contents

# Bibliography

- Aaboud, M. et al. (2018). “Search for top squarks decaying to tau sleptons in  $pp$  collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector.” In: *Phys. Rev. D* 98 (3), p. 032008. DOI: [10.1103/PhysRevD.98.032008](https://doi.org/10.1103/PhysRevD.98.032008). URL: <https://link.aps.org/doi/10.1103/PhysRevD.98.032008>.
- Aaboud, Morad et al. (2016). “Search for charged Higgs bosons produced in association with a top quark and decaying via  $H^\pm \rightarrow \tau\nu$  using  $pp$  collision data recorded at  $\sqrt{s} = 13$  TeV by the ATLAS detector.” In: *Phys. Lett. B* 759, pp. 555–574. DOI: [10.1016/j.physletb.2016.06.017](https://doi.org/10.1016/j.physletb.2016.06.017). arXiv: [1603.09203](https://arxiv.org/abs/1603.09203) [hep-ex].
- (2018a). “Measurement of the  $W$ -boson mass in  $pp$  collisions at  $\sqrt{s} = 7$  TeV with the ATLAS detector.” In: *Eur. Phys. J. C* 78.2. [Erratum: *Eur. Phys. J. C* 78,no.11,898(2018)], p. 110. DOI: [10.1140/epjc/s10052-018-6354-3](https://doi.org/10.1140/epjc/s10052-018-6354-3), [10.1140/epjc/s10052-017-5475-4](https://doi.org/10.1140/epjc/s10052-017-5475-4). arXiv: [1701.07240](https://arxiv.org/abs/1701.07240) [hep-ex].
- (2018b). “Measurements of  $b$ -jet tagging efficiency with the ATLAS detector using  $t\bar{t}$  events at  $\sqrt{s} = 13$  TeV.” In: *JHEP* 08, p. 089. DOI: [10.1007/JHEP08\(2018\)089](https://doi.org/10.1007/JHEP08(2018)089). arXiv: [1805.01845](https://arxiv.org/abs/1805.01845) [hep-ex].
- (2018c). “Performance of top-quark and  $W$ -boson tagging with ATLAS in Run 2 of the LHC.” In: arXiv: [1808.07858](https://arxiv.org/abs/1808.07858) [hep-ex].
- (2018d). “Search for supersymmetry in final states with charm jets and missing transverse momentum in 13 TeV  $pp$  collisions with the ATLAS detector.” In: *JHEP* 09, p. 050. DOI: [10.1007/JHEP09\(2018\)050](https://doi.org/10.1007/JHEP09(2018)050). arXiv: [1805.01649](https://arxiv.org/abs/1805.01649) [hep-ex].
- (2018e). “Search for top-squark pair production in final states with one lepton, jets, and missing transverse momentum using 36 fb $^{-1}$  of  $\sqrt{s} = 13$  TeV  $pp$  collision data with the ATLAS detector.” In: *JHEP* 06, p. 108. DOI: [10.1007/JHEP06\(2018\)108](https://doi.org/10.1007/JHEP06(2018)108). arXiv: [1711.11520](https://arxiv.org/abs/1711.11520) [hep-ex].
- (2018f). “Search for  $W' \rightarrow tb$  decays in the hadronic final state using  $pp$  collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector.” In: *Phys. Lett. B* 781, pp. 327–348. DOI: [10.1016/j.physletb.2018.03.036](https://doi.org/10.1016/j.physletb.2018.03.036). arXiv: [1801.07893](https://arxiv.org/abs/1801.07893) [hep-ex].
- Aad, Georges et al. (2012a). “Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC.” In: *Phys. Lett. B* 716, pp. 1–29. DOI: [10.1016/j.physletb.2012.08.020](https://doi.org/10.1016/j.physletb.2012.08.020). arXiv: [1207.7214](https://arxiv.org/abs/1207.7214) [hep-ex]. URL: <https://arxiv.org/abs/1207.7214>.
- (2012b). “Observation of spin correlation in  $t\bar{t}$  events from  $pp$  collisions at  $\sqrt{s} = 7$  TeV using the ATLAS detector.” In: *Phys. Rev. Lett.* 108, p. 212001. DOI: [10.1103/PhysRevLett.108.212001](https://doi.org/10.1103/PhysRevLett.108.212001). arXiv: [1203.4081](https://arxiv.org/abs/1203.4081) [hep-ex].
- (2013). “Search for a light charged Higgs boson in the decay channel  $H^\pm \rightarrow c\bar{s}$  in  $t\bar{t}$  events using  $pp$  collisions at  $\sqrt{s} = 7$  TeV with the ATLAS detector.” In: *Eur. Phys. J. C* 73.6, p. 2465. DOI: [10.1140/epjc/s10052-013-2465-z](https://doi.org/10.1140/epjc/s10052-013-2465-z). arXiv: [1302.3694](https://arxiv.org/abs/1302.3694) [hep-ex].

- (2015a). “Measurement of Spin Correlation in Top-Antitop Quark Events and Search for Top Squark Pair Production in pp Collisions at  $\sqrt{s} = 8$  TeV Using the ATLAS Detector.” In: *Phys. Rev. Lett.* 114.14, p. 142001. DOI: [10.1103/PhysRevLett.114.142001](#). arXiv: [1412.4742 \[hep-ex\]](#).
- (2015b). “Search for charged Higgs bosons decaying via  $H^\pm \rightarrow \tau^\pm \nu$  in fully hadronic final states using pp collision data at  $\sqrt{s} = 8$  TeV with the ATLAS detector.” In: *JHEP* 03, p. 088. DOI: [10.1007/JHEP03\(2015\)088](#). arXiv: [1412.6663 \[hep-ex\]](#).
- (2016a). “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.” In: *JHEP* 08, p. 045. DOI: [10.1007/JHEP08\(2016\)045](#). arXiv: [1606.02266 \[hep-ex\]](#).
- (2016b). “Search for charged Higgs bosons in the  $H^\pm \rightarrow tb$  decay channel in pp collisions at  $\sqrt{s} = 8$  TeV using the ATLAS detector.” In: *JHEP* 03, p. 127. DOI: [10.1007/JHEP03\(2016\)127](#). arXiv: [1512.03704 \[hep-ex\]](#).
- (2016c). “Search for new phenomena in events with at least three photons collected in pp collisions at  $\sqrt{s} = 8$  TeV with the ATLAS detector.” In: *Eur. Phys. J. C* 76.4, p. 210. DOI: [10.1140/epjc/s10052-016-4034-8](#). arXiv: [1509.05051 \[hep-ex\]](#).
- (2017). “Topological cell clustering in the ATLAS calorimeters and its performance in LHC Run 1.” In: *Eur. Phys. J. C* 77, p. 490. DOI: [10.1140/epjc/s10052-017-5004-5](#). arXiv: [1603.02934 \[hep-ex\]](#).
- Aaltonen, T. et al. (2009). “Search for charged Higgs bosons in decays of top quarks in p anti-p collisions at  $\sqrt{s} = 1.96$  TeV.” In: *Phys. Rev. Lett.* 103, p. 101803. DOI: [10.1103/PhysRevLett.103.101803](#). arXiv: [0907.1269 \[hep-ex\]](#).
- (2011). “Measurement of  $t\bar{t}$  Spin Correlation in  $p\bar{p}$  Collisions Using the CDF II Detector at the Tevatron.” In: *Phys. Rev. D* 83, p. 031104. DOI: [10.1103/PhysRevD.83.031104](#). arXiv: [1012.3093 \[hep-ex\]](#).
- Abadi, Martín et al. (2016). “TensorFlow: Large-Scale Machine Learning on Heterogeneous Distributed Systems.” In: *CoRR* abs/1603.04467. arXiv: [1603.04467](#). URL: <http://arxiv.org/abs/1603.04467>.
- Abazov, V. M. et al. (2007). “Evidence for production of single top quarks and first direct measurement of  $|V_{tb}|$ .” In: *Phys. Rev. Lett.* 98, p. 181802. DOI: [10.1103/PhysRevLett.98.181802](#). arXiv: [hep-ex/0612052 \[hep-ex\]](#).
- Abazov, Victor Mukhamedovich et al. (2012). “Evidence for spin correlation in  $t\bar{t}$  production.” In: *Phys. Rev. Lett.* 108, p. 032004. DOI: [10.1103/PhysRevLett.108.032004](#). arXiv: [1110.4194 \[hep-ex\]](#).
- Abbateo, D. et al. (2000). “A Combination of preliminary electroweak measurements and constraints on the standard model.” In:
- (2001). “A Combination of preliminary electroweak measurements and constraints on the standard model.” In: arXiv: [hep-ex/0112021 \[hep-ex\]](#).
- Abbiendi, G. et al. (2013). “Search for Charged Higgs bosons: Combined Results Using LEP Data.” In: *Eur. Phys. J. C* 73, p. 2463. DOI: [10.1140/epjc/s10052-013-2463-1](#). arXiv: [1301.6065 \[hep-ex\]](#).
- Abdallah, J. et al. (2004). “Measurement of the forward backward asymmetries of  $e^+ e^- \rightarrow Z \rightarrow b$  anti-b and  $e^+ e^- \rightarrow Z \rightarrow c$  anti-c using prompt leptons.” In: *Eur. Phys. J. C* 34, pp. 109–125. DOI: [10.1140/epjc/s2004-01708-6](#). arXiv: [hep-ex/0403041 \[hep-ex\]](#).
- Agashe, Kaustubh, Yanou Cui, and Roberto Franceschini (2013). “Natural Islands for a 125 GeV Higgs in the scale-invariant NMSSM.” In: *JHEP* 02, p. 031. DOI: [10.1007/JHEP02\(2013\)031](#). arXiv: [1209.2115 \[hep-ph\]](#).

- Agashe, Kaustubh, Gilad Perez, and Amarjit Soni (2005). “Flavor structure of warped extra dimension models.” In: *Phys. Rev. D* 71, p. 016002. DOI: [10.1103/PhysRevD.71.016002](https://doi.org/10.1103/PhysRevD.71.016002). arXiv: [hep-ph/0408134](https://arxiv.org/abs/hep-ph/0408134) [hep-ph].
- Aggleton, Robin et al. (2017). “Review of LHC experimental results on low mass bosons in multi Higgs models.” In: *JHEP* 02, p. 035. DOI: [10.1007/JHEP02\(2017\)035](https://doi.org/10.1007/JHEP02(2017)035). arXiv: [1609.06089](https://arxiv.org/abs/1609.06089) [hep-ph].
- Aguilar-Saavedra, J. A., J. Carvalho, et al. (2007). “Probing anomalous Wtb couplings in top pair decays.” In: *Eur. Phys. J. C* 50, pp. 519–533. DOI: [10.1140/epjc/s10052-007-0289-4](https://doi.org/10.1140/epjc/s10052-007-0289-4). arXiv: [hep-ph/0605190](https://arxiv.org/abs/hep-ph/0605190) [hep-ph].
- Aguilar-Saavedra, J. A., Jack H. Collins, and Rashmish K. Mishra (2017). “A generic anti-QCD jet tagger.” In: *JHEP* 11, p. 163. DOI: [10.1007/JHEP11\(2017\)163](https://doi.org/10.1007/JHEP11(2017)163). arXiv: [1709.01087](https://arxiv.org/abs/1709.01087) [hep-ph].
- Akeroyd, A. G. et al. (2017). “Prospects for charged Higgs searches at the LHC.” In: *Eur. Phys. J. C* 77.5, p. 276. DOI: [10.1140/epjc/s10052-017-4829-2](https://doi.org/10.1140/epjc/s10052-017-4829-2). arXiv: [1607.01320](https://arxiv.org/abs/1607.01320) [hep-ph].
- Albornoz Vasquez, Daniel et al. (2012). “The 125 GeV Higgs in the NMSSM in light of LHC results and astrophysics constraints.” In: *Phys. Rev. D* 86, p. 035023. DOI: [10.1103/PhysRevD.86.035023](https://doi.org/10.1103/PhysRevD.86.035023). arXiv: [1203.3446](https://arxiv.org/abs/1203.3446) [hep-ph].
- Aliferis, Georgios, Georgios Kofinas, and Vasilios Zarikas (2015). “Efficient electroweak baryogenesis by black holes.” In: *Phys. Rev. D* 91.4, p. 045002. DOI: [10.1103/PhysRevD.91.045002](https://doi.org/10.1103/PhysRevD.91.045002). arXiv: [1406.6215](https://arxiv.org/abs/1406.6215) [hep-ph].
- Alloul, Adam et al. (2014). “FeynRules 2.0 - A complete toolbox for tree-level phenomenology.” In: *Comput. Phys. Commun.* 185, pp. 2250–2300. DOI: [10.1016/j.cpc.2014.04.012](https://doi.org/10.1016/j.cpc.2014.04.012). arXiv: [1310.1921](https://arxiv.org/abs/1310.1921) [hep-ph].
- Almarashi, M. M. and S. Moretti (2011). “Low Mass Higgs signals at the LHC in the Next-to-Minimal Supersymmetric Standard Model.” In: *Eur. Phys. J. C* 71, p. 1618. DOI: [10.1140/epjc/s10052-011-1618-1](https://doi.org/10.1140/epjc/s10052-011-1618-1). arXiv: [1011.6547](https://arxiv.org/abs/1011.6547) [hep-ph].
- Almarashi, Mosleh and Stefano Moretti (2011). “Very Light CP-odd Higgs bosons of the NMSSM at the LHC in 4b-quark final states.” In: *Phys. Rev. D* 84, p. 015014. DOI: [10.1103/PhysRevD.84.015014](https://doi.org/10.1103/PhysRevD.84.015014). arXiv: [1105.4191](https://arxiv.org/abs/1105.4191) [hep-ph].
- Almeida, Leandro G. et al. (2015). “Playing Tag with ANN: Boosted Top Identification with Pattern Recognition.” In: *JHEP* 07, p. 086. DOI: [10.1007/JHEP07\(2015\)086](https://doi.org/10.1007/JHEP07(2015)086). arXiv: [1501.05968](https://arxiv.org/abs/1501.05968) [hep-ph].
- Alzheimer, A. et al. (2014). “Boosted objects and jet substructure at the LHC. Report of BOOST2012, held at IFIC Valencia, 23rd-27th of July 2012.” In: *Eur. Phys. J. C* 74.3, p. 2792. DOI: [10.1140/epjc/s10052-014-2792-8](https://doi.org/10.1140/epjc/s10052-014-2792-8). arXiv: [1311.2708](https://arxiv.org/abs/1311.2708) [hep-ex].
- Alves, Daniele (2012). “Simplified Models for LHC New Physics Searches.” In: *J. Phys. G* 39. Ed. by Nima Arkani-Hamed et al., p. 105005. DOI: [10.1088/0954-3899/39/10/105005](https://doi.org/10.1088/0954-3899/39/10/105005). arXiv: [1105.2838](https://arxiv.org/abs/1105.2838) [hep-ph].
- Alwall, Johan, Philip Schuster, and Natalia Toro (2009). “Simplified Models for a First Characterization of New Physics at the LHC.” In: *Phys. Rev. D* 79, p. 075020. DOI: [10.1103/PhysRevD.79.075020](https://doi.org/10.1103/PhysRevD.79.075020). arXiv: [0810.3921](https://arxiv.org/abs/0810.3921) [hep-ph].
- Alwall, J. et al. (2014). “The automated computation of tree-level and next-to-leading order differential cross sections, and their matching to parton shower simulations.” In: *JHEP* 07, p. 079. DOI: [10.1007/JHEP07\(2014\)079](https://doi.org/10.1007/JHEP07(2014)079). arXiv: [1405.0301](https://arxiv.org/abs/1405.0301) [hep-ph].
- Anders, Christoph et al. (2014). “Benchmarking an even better top tagger algorithm.” In: *Phys. Rev. D* 89.7, p. 074047. DOI: [10.1103/PhysRevD.89.074047](https://doi.org/10.1103/PhysRevD.89.074047). arXiv: [1312.1504](https://arxiv.org/abs/1312.1504) [hep-ph].

- Andreassen, Anders et al. (2019). “JUNIPR: a Framework for Unsupervised Machine Learning in Particle Physics.” In: *Eur. Phys. J. C* 79.2, p. 102. DOI: [10.1140/epjc/s10052-019-6607-9](https://doi.org/10.1140/epjc/s10052-019-6607-9). arXiv: [1804.09720](https://arxiv.org/abs/1804.09720) [hep-ph].
- Angus, Garry W., Benoit Famaey, and HongSheng Zhao (2006). “Can MOND take a bullet? Analytical comparisons of three versions of MOND beyond spherical symmetry.” In: *Mon. Not. Roy. Astron. Soc.* 371, p. 138. DOI: [10.1111/j.1365-2966.2006.10668.x](https://doi.org/10.1111/j.1365-2966.2006.10668.x). arXiv: [astro-ph/0606216](https://arxiv.org/abs/astro-ph/0606216) [astro-ph].
- Aoki, Mayumi et al. (2011). “Light Charged Higgs bosons at the LHC in 2HDMs.” In: *Phys. Rev. D* 84, p. 055028. DOI: [10.1103/PhysRevD.84.055028](https://doi.org/10.1103/PhysRevD.84.055028). arXiv: [1104.3178](https://arxiv.org/abs/1104.3178) [hep-ph].
- Aoyama, Tatsumi, Masashi Hayakawa, et al. (2012). “Tenth-Order QED Contribution to the Electron  $g-2$  and an Improved Value of the Fine Structure Constant.” In: *Phys. Rev. Lett.* 109, p. 111807. DOI: [10.1103/PhysRevLett.109.111807](https://doi.org/10.1103/PhysRevLett.109.111807). arXiv: [1205.5368](https://arxiv.org/abs/1205.5368) [hep-ph].
- Aoyama, Tatsumi, M. Hayakawa, et al. (2015). “Tenth-Order Electron Anomalous Magnetic Moment — Contribution of Diagrams without Closed Lepton Loops.” In: *Phys. Rev. D* 91.3. [Erratum: *Phys. Rev. D* 96, no. 1, 019901 (2017)], p. 033006. DOI: [10.1103/PhysRevD.91.033006](https://doi.org/10.1103/PhysRevD.91.033006), [10.1103/PhysRevD.96.019901](https://doi.org/10.1103/PhysRevD.96.019901). arXiv: [1412.8284](https://arxiv.org/abs/1412.8284) [hep-ph].
- Aquino, Priscila M., Gustavo Burdman, and Oscar J. P. Eboli (2007). “A Signal for a theory of flavor at the LHC.” In: *Phys. Rev. Lett.* 98, p. 131601. DOI: [10.1103/PhysRevLett.98.131601](https://doi.org/10.1103/PhysRevLett.98.131601). arXiv: [hep-ph/0612055](https://arxiv.org/abs/hep-ph/0612055) [hep-ph].
- Arbey, A., M. Battaglia, et al. (2012). “Implications of a 125 GeV Higgs for supersymmetric models.” In: *Phys. Lett. B* 708, pp. 162–169. DOI: [10.1016/j.physletb.2012.01.053](https://doi.org/10.1016/j.physletb.2012.01.053). arXiv: [1112.3028](https://arxiv.org/abs/1112.3028) [hep-ph].
- Arbey, A., M. Boudaud, et al. (2017). “Robustness of dark matter constraints and interplay with collider searches for New Physics.” In: *JHEP* 11, p. 132. DOI: [10.1007/JHEP11\(2017\)132](https://doi.org/10.1007/JHEP11(2017)132). arXiv: [1707.00426](https://arxiv.org/abs/1707.00426) [hep-ph].
- Arbey, A., F. Mahmoudi, et al. (2017). “Status of the Charged Higgs Boson in Two Higgs Doublet Models.” In: arXiv: [1706.07414](https://arxiv.org/abs/1706.07414) [hep-ph].
- Arhrib, Abdesslam, Rachid Benbrik, Rikard Enberg, et al. (2017). “Identifying a light charged Higgs boson at the LHC Run II.” In: *Phys. Lett. B* 774, pp. 591–598. DOI: [10.1016/j.physletb.2017.10.006](https://doi.org/10.1016/j.physletb.2017.10.006). arXiv: [1706.01964](https://arxiv.org/abs/1706.01964) [hep-ph].
- Arhrib, Abdesslam, Rachid Benbrik, and Stefano Moretti (2017). “Bosonic Decays of Charged Higgs Bosons in a 2HDM Type-I.” In: *Eur. Phys. J. C* 77.9, p. 621. DOI: [10.1140/epjc/s10052-017-5197-7](https://doi.org/10.1140/epjc/s10052-017-5197-7). arXiv: [1607.02402](https://arxiv.org/abs/1607.02402) [hep-ph].
- Arhrib, Abdesslam, Kingman Cheung, et al. (2007). “Associated production of a light pseudoscalar Higgs boson with a chargino pair in the NMSSM.” In: *JHEP* 03, p. 073. DOI: [10.1088/1126-6708/2007/03/073](https://doi.org/10.1088/1126-6708/2007/03/073). arXiv: [hep-ph/0606114](https://arxiv.org/abs/hep-ph/0606114) [hep-ph].
- Arnison, G. et al. (1984). “Experimental Observation of Events with Large Missing Transverse Energy Accompanied by a Jet Or a Photon(s) in  $p$  anti- $p$  Collisions at  $s^{1/2}=540$ -GeV.” In: *Phys. Lett.* 139B, p. 115. DOI: [10.1016/0370-2693\(84\)90046-7](https://doi.org/10.1016/0370-2693(84)90046-7).
- Arunprasath, V., Rohini M. Godbole, and Ritesh K. Singh (2017). “Polarization of a top quark produced in the decay of a gluino or a stop in an arbitrary frame.” In: *Phys. Rev. D* 95.7, p. 076012. DOI: [10.1103/PhysRevD.95.076012](https://doi.org/10.1103/PhysRevD.95.076012). arXiv: [1612.03803](https://arxiv.org/abs/1612.03803) [hep-ph].

- Assamagan, K. A., M. Guchait, and S. Moretti (2004). “Charged Higgs bosons in the transition region  $M(H^{+-}) \rightarrow m(t)$  at the LHC.” In: *Physics at TeV colliders. Proceedings, Workshop, Les Houches, France, May 26-June 3, 2003*. arXiv: [hep-ph/0402057 \[hep-ph\]](#).
- Badziak, Marcin, Marek Olechowski, and Stefan Pokorski (2013a). “125 GeV Higgs and enhanced diphoton signal of a light singlet-like scalar in NMSSM.” In: *PoS EPS-HEP2013*, p. 257. arXiv: [1310.4518 \[hep-ph\]](#).
- (2013b). “New Regions in the NMSSM with a 125 GeV Higgs.” In: *JHEP* 06, p. 043. DOI: [10.1007/JHEP06\(2013\)043](#). arXiv: [1304.5437 \[hep-ph\]](#).
- Bagnaia, P. et al. (1983). “Evidence for  $Z^0 \rightarrow e^+ e^-$  at the CERN anti-p p Collider.” In: *Phys. Lett.* 129B. [7.69(1983)], pp. 130–140. DOI: [10.1016/0370-2693\(83\)90744-X](#).
- Baldi, Pierre et al. (2016). “Jet Substructure Classification in High-Energy Physics with Deep Neural Networks.” In: *Phys. Rev. D* 93.9, p. 094034. DOI: [10.1103/PhysRevD.93.094034](#). arXiv: [1603.09349 \[hep-ex\]](#).
- Ball, Richard D. et al. (2010). “A first unbiased global NLO determination of parton distributions and their uncertainties.” In: *Nucl. Phys.* B838, pp. 136–206. DOI: [10.1016/j.nuclphysb.2010.05.008](#). arXiv: [1002.4407 \[hep-ph\]](#).
- Banfi, Andrea, Gavin P. Salam, and Giulia Zanderighi (2005). “Principles of general final-state resummation and automated implementation.” In: *JHEP* 03, p. 073. DOI: [10.1088/1126-6708/2005/03/073](#). arXiv: [hep-ph/0407286 \[hep-ph\]](#).
- Banner, M. et al. (1983). “Observation of Single Isolated Electrons of High Transverse Momentum in Events with Missing Transverse Energy at the CERN anti-p p Collider.” In: *Phys. Lett.* 122B. [7.45(1983)], pp. 476–485. DOI: [10.1016/0370-2693\(83\)91605-2](#).
- Barate, R. et al. (2003). “Search for the standard model Higgs boson at LEP.” In: *Phys. Lett.* B565, pp. 61–75. DOI: [10.1016/S0370-2693\(03\)00614-2](#). arXiv: [hep-ex/0306033 \[hep-ex\]](#).
- Barbieri, Riccardo et al. (2013). “Exploring the Higgs sector of a most natural NMSSM.” In: *Phys. Rev. D* 87.11, p. 115018. DOI: [10.1103/PhysRevD.87.115018](#). arXiv: [1304.3670 \[hep-ph\]](#).
- Barger, Vernon D., J. Ohnemus, and R. J. N. Phillips (1989). “Spin Correlation Effects in the Hadroproduction and Decay of Very Heavy Top Quark Pairs.” In: *Int. J. Mod. Phys.* A4, p. 617. DOI: [10.1142/S0217751X89000297](#).
- Barger, Vernon D., R. J. N. Phillips, and D. P. Roy (1994). “Heavy charged Higgs signals at the LHC.” In: *Phys. Lett.* B324, pp. 236–240. DOI: [10.1016/0370-2693\(94\)90413-8](#). arXiv: [hep-ph/9311372 \[hep-ph\]](#).
- Barnard, James et al. (2017). “Parton Shower Uncertainties in Jet Substructure Analyses with Deep Neural Networks.” In: *Phys. Rev. D* 95.1, p. 014018. DOI: [10.1103/PhysRevD.95.014018](#). arXiv: [1609.00607 \[hep-ph\]](#).
- Barrientos Bendezu, A. A. and Bernd A. Kniehl (2000). “ $H^+ H^-$  pair production at the Large Hadron Collider.” In: *Nucl. Phys.* B568, pp. 305–318. DOI: [10.1016/S0550-3213\(99\)00732-4](#). arXiv: [hep-ph/9908385 \[hep-ph\]](#).
- Basso, Lorenzo et al. (2013). “The CP-violating type-II 2HDM and Charged Higgs boson benchmarks.” In: *PoS Corfu2012*, p. 029. arXiv: [1305.3219 \[hep-ph\]](#).
- Basso, L. et al. (2012). “Probing the charged Higgs boson at the LHC in the CP-violating type-II 2HDM.” In: *JHEP* 11, p. 011. DOI: [10.1007/JHEP11\(2012\)011](#). arXiv: [1205.6569 \[hep-ph\]](#).



- Bauer, M. et al. (2010). “Flavor Physics in the Randall-Sundrum Model: II. Tree-Level Weak-Interaction Processes.” In: *JHEP* 09, p. 017. DOI: [10.1007/JHEP09\(2010\)017](https://doi.org/10.1007/JHEP09(2010)017). arXiv: [0912.1625 \[hep-ph\]](https://arxiv.org/abs/0912.1625).
- Baumgart, Matthew and Brock Tweedie (2013). “A New Twist on Top Quark Spin Correlations.” In: *JHEP* 03, p. 117. DOI: [10.1007/JHEP03\(2013\)117](https://doi.org/10.1007/JHEP03(2013)117). arXiv: [1212.4888 \[hep-ph\]](https://arxiv.org/abs/1212.4888).
- Bechtle, Philip et al. (2014). “HiggsBounds—4: Improved Tests of Extended Higgs Sectors against Exclusion Bounds from LEP, the Tevatron and the LHC.” In: *Eur. Phys. J. C* 74.3, p. 2693. DOI: [10.1140/epjc/s10052-013-2693-2](https://doi.org/10.1140/epjc/s10052-013-2693-2). arXiv: [1311.0055 \[hep-ph\]](https://arxiv.org/abs/1311.0055).
- Bednyakov, A. V. et al. (2017). “On the  $b$ -quark running mass in QCD and the SM.” In: *Nucl. Phys.* B916, pp. 463–483. DOI: [10.1016/j.nuclphysb.2017.01.004](https://doi.org/10.1016/j.nuclphysb.2017.01.004). arXiv: [1612.00660 \[hep-ph\]](https://arxiv.org/abs/1612.00660).
- Belanger, G. et al. (2013). “Top Polarization in Stop Production at the LHC.” In: *JHEP* 05, p. 167. DOI: [10.1007/JHEP05\(2013\)167](https://doi.org/10.1007/JHEP05(2013)167). arXiv: [1212.3526 \[hep-ph\]](https://arxiv.org/abs/1212.3526).
- Belyaev, Alexander et al. (2010). “LHC discovery potential of the lightest NMSSM Higgs in the  $h1 \rightarrow a1$   $a1 \rightarrow 4$  muons channel.” In: *Phys. Rev.* D81, p. 075021. DOI: [10.1103/PhysRevD.81.075021](https://doi.org/10.1103/PhysRevD.81.075021). arXiv: [1002.1956 \[hep-ph\]](https://arxiv.org/abs/1002.1956).
- Beneke, M. et al. (2000). “Top quark physics.” In: *1999 CERN Workshop on standard model physics (and more) at the LHC, CERN, Geneva, Switzerland, 25-26 May: Proceedings*, pp. 419–529. arXiv: [hep-ph/0003033 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0003033). URL: <http://weplib.cern.ch/abstract?CERN-TH-2000-100>.
- Berger, Edmond L. et al. (2005). “Associated production of a top quark and a charged Higgs boson.” In: *Phys. Rev.* D71, p. 115012. DOI: [10.1103/PhysRevD.71.115012](https://doi.org/10.1103/PhysRevD.71.115012). arXiv: [hep-ph/0312286 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0312286).
- Bernon, Jérémy et al. (2015). “Scrutinizing the alignment limit in two-Higgs-doublet models:  $m_h=125$  GeV.” In: *Phys. Rev.* D92.7, p. 075004. DOI: [10.1103/PhysRevD.92.075004](https://doi.org/10.1103/PhysRevD.92.075004). arXiv: [1507.00933 \[hep-ph\]](https://arxiv.org/abs/1507.00933).
- (2016). “Scrutinizing the alignment limit in two-Higgs-doublet models. II.  $m_H=125$  GeV.” In: *Phys. Rev.* D93.3, p. 035027. DOI: [10.1103/PhysRevD.93.035027](https://doi.org/10.1103/PhysRevD.93.035027). arXiv: [1511.03682 \[hep-ph\]](https://arxiv.org/abs/1511.03682).
- Bernreuther, W., P. González, and C. Mellein (2014). “Decays of polarized top quarks to lepton, neutrino and jets at NLO QCD.” In: *Eur. Phys. J. C* 74.3, p. 2815. DOI: [10.1140/epjc/s10052-014-2815-5](https://doi.org/10.1140/epjc/s10052-014-2815-5). arXiv: [1401.5930 \[hep-ph\]](https://arxiv.org/abs/1401.5930).
- Bertolini, Daniele et al. (2014). “Pileup Per Particle Identification.” In: *JHEP* 10, p. 059. DOI: [10.1007/JHEP10\(2014\)059](https://doi.org/10.1007/JHEP10(2014)059). arXiv: [1407.6013 \[hep-ph\]](https://arxiv.org/abs/1407.6013).
- Bhatia, Disha, Ushoshi Maitra, and Saurabh Niyogi (2017). “Discovery prospects of Light Higgs at LHC in Type-I 2HDM.” In: arXiv: [1704.07850 \[hep-ph\]](https://arxiv.org/abs/1704.07850).
- Bhattacharjee, Biplob, Sourav K. Mandal, and Mihoko Nojiri (2013). “Top Polarization and Stop Mixing from Boosted Jet Substructure.” In: *JHEP* 03, p. 105. DOI: [10.1007/JHEP03\(2013\)105](https://doi.org/10.1007/JHEP03(2013)105). arXiv: [1211.7261 \[hep-ph\]](https://arxiv.org/abs/1211.7261).
- Bhupal Dev, P. S. and Apostolos Pilaftsis (2014). “Maximally Symmetric Two Higgs Doublet Model with Natural Standard Model Alignment.” In: *JHEP* 12. [Erratum: *JHEP*11,147(2015)], p. 024. DOI: [10.1007/JHEP11\(2015\)147,10.1007/JHEP12\(2014\)024](https://doi.org/10.1007/JHEP11(2015)147,10.1007/JHEP12(2014)024). arXiv: [1408.3405 \[hep-ph\]](https://arxiv.org/abs/1408.3405).
- Bisset, Mike, Monoranjan Guchait, and Stefano Moretti (2001). “Signatures of MSSM charged Higgs bosons via chargino neutralino decay channels at the LHC.” In: *Eur. Phys. J. C* 19, pp. 143–154. DOI: [10.1007/s100520100550](https://doi.org/10.1007/s100520100550). arXiv: [hep-ph/0010253 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0010253).



- Blanchet, Luc and Bala R. Iyer (2005). “Hadamard regularization of the third post-Newtonian gravitational wave generation of two point masses.” In: *Phys. Rev. D* 71, p. 024004. DOI: [10.1103/PhysRevD.71.024004](https://doi.org/10.1103/PhysRevD.71.024004). arXiv: [gr-qc/0409094](https://arxiv.org/abs/gr-qc/0409094) [gr-qc].
- Blazey, Gerald C. et al. (2000). “Run II jet physics.” In: *QCD and weak boson physics in Run II. Proceedings, Batavia, USA, March 4-6, June 3-4, November 4-6, 1999*, pp. 47–77. arXiv: [hep-ex/0005012](https://arxiv.org/abs/hep-ex/0005012) [hep-ex]. URL: [http://lss.fnal.gov/cgi-bin/find\\_paper.pl?conf-00-092](http://lss.fnal.gov/cgi-bin/find_paper.pl?conf-00-092).
- Bomark, N-E., S. Moretti, and L. Roszkowski (2016). “Detection prospects of light NMSSM Higgs pseudoscalar via cascades of heavier scalars from vector boson fusion and Higgs-strahlung.” In: *J. Phys. G* 43.10, p. 105003. DOI: [10.1088/0954-3899/43/10/105003](https://doi.org/10.1088/0954-3899/43/10/105003). arXiv: [1503.04228](https://arxiv.org/abs/1503.04228) [hep-ph].
- Boos, E. et al. (2003). “Polarization in sfermion decays: Determining tan beta and trilinear couplings.” In: *Eur. Phys. J. C* 30, pp. 395–407. DOI: [10.1140/epjc/s2003-01288-y](https://doi.org/10.1140/epjc/s2003-01288-y). arXiv: [hep-ph/0303110](https://arxiv.org/abs/hep-ph/0303110) [hep-ph].
- Boosted Higgs ( $\rightarrow b\bar{b}$ ) Boson Identification with the ATLAS Detector at  $\sqrt{s} = 13$  TeV* (2016). Tech. rep. ATLAS-CONF-2016-039. Geneva: CERN. URL: <https://cds.cern.ch/record/2206038>.
- Borzumati, Francesca, Jean-Loic Kneur, and Nir Polonsky (1999). “Higgs-Strahlung and R-parity violating slepton-Strahlung at hadron colliders.” In: *Phys. Rev. D* 60, p. 115011. DOI: [10.1103/PhysRevD.60.115011](https://doi.org/10.1103/PhysRevD.60.115011). arXiv: [hep-ph/9905443](https://arxiv.org/abs/hep-ph/9905443) [hep-ph].
- Branco, G. C. et al. (2012). “Theory and phenomenology of two-Higgs-doublet models.” In: *Phys. Rept.* 516, pp. 1–102. DOI: [10.1016/j.physrep.2012.02.002](https://doi.org/10.1016/j.physrep.2012.02.002). arXiv: [1106.0034](https://arxiv.org/abs/1106.0034) [hep-ph].
- Brandenburg, Arnd, Z. G. Si, and P. Uwer (2002). “QCD corrected spin analyzing power of jets in decays of polarized top quarks.” In: *Phys. Lett. B* 539, pp. 235–241. DOI: [10.1016/S0370-2693\(02\)02098-1](https://doi.org/10.1016/S0370-2693(02)02098-1). arXiv: [hep-ph/0205023](https://arxiv.org/abs/hep-ph/0205023) [hep-ph].
- Broggio, Alessandro et al. (2016). “Associated production of a top pair and a Higgs boson beyond NLO.” In: *JHEP* 03, p. 124. DOI: [10.1007/JHEP03\(2016\)124](https://doi.org/10.1007/JHEP03(2016)124). arXiv: [1510.01914](https://arxiv.org/abs/1510.01914) [hep-ph].
- Brun, Rene and Fons Rademakers (1997). “ROOT — An object oriented data analysis framework.” In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 389.1. New Computing Techniques in Physics Research V, pp. 81–86. ISSN: 0168-9002. DOI: [http://dx.doi.org/10.1016/S0168-9002\(97\)00048-X](https://doi.org/10.1016/S0168-9002(97)00048-X). URL: <http://www.sciencedirect.com/science/article/pii/S016890029700048X>.
- Buckley, Andy et al. (2013). “Rivet user manual.” In: *Comput. Phys. Commun.* 184, pp. 2803–2819. DOI: [10.1016/j.cpc.2013.05.021](https://doi.org/10.1016/j.cpc.2013.05.021). arXiv: [1003.0694](https://arxiv.org/abs/1003.0694) [hep-ph].
- Burdman, Gustavo (2004). “Flavor violation in warped extra dimensions and CP asymmetries in B decays.” In: *Phys. Lett. B* 590, pp. 86–94. DOI: [10.1016/j.physletb.2004.03.055](https://doi.org/10.1016/j.physletb.2004.03.055). arXiv: [hep-ph/0310144](https://arxiv.org/abs/hep-ph/0310144) [hep-ph].
- Butter, A. et al. (2019). “The Machine Learning Landscape of Top Taggers.” In: ed. by G. Kasieczka and T. Plehn. arXiv: [1902.09914](https://arxiv.org/abs/1902.09914) [hep-ph].
- Butter, Anja et al. (2018). “Deep-learned Top Tagging with a Lorentz Layer.” In: *SciPost Phys.* 5.3, p. 028. DOI: [10.21468/SciPostPhys.5.3.028](https://doi.org/10.21468/SciPostPhys.5.3.028). arXiv: [1707.08966](https://arxiv.org/abs/1707.08966) [hep-ph].
- Butterworth, J. M., B. E. Cox, and Jeffrey R. Forshaw (2002). “WW scattering at the CERN LHC.” In: *Phys. Rev. D* 65, p. 096014. DOI: [10.1103/PhysRevD.65.096014](https://doi.org/10.1103/PhysRevD.65.096014). arXiv: [hep-ph/0201098](https://arxiv.org/abs/hep-ph/0201098) [hep-ph].

- Butterworth, Jonathan M. et al. (2008). “Jet substructure as a new Higgs search channel at the LHC.” In: *Phys. Rev. Lett.* 100, p. 242001. DOI: [10.1103/PhysRevLett.100.242001](#). arXiv: [0802.2470 \[hep-ph\]](#).
- Cabibbo, Nicola (1963). “Unitary Symmetry and Leptonic Decays.” In: *Phys. Rev. Lett.* 10. [648(1963)], pp. 531–533. DOI: [10.1103/PhysRevLett.10.531](#).
- Cacciapaglia, Giacomo et al. (2016). “Search for a lighter Higgs boson in Two Higgs Doublet Models.” In: *JHEP* 12, p. 068. DOI: [10.1007/JHEP12\(2016\)068](#). arXiv: [1607.08653 \[hep-ph\]](#).
- Cacciari, Matteo, Gavin P. Salam, and Gregory Soyez (2008a). “The Anti- $k_t$  jet clustering algorithm.” In: *JHEP* 04, p. 063. DOI: [10.1088/1126-6708/2008/04/063](#). arXiv: [0802.1189 \[hep-ph\]](#).
- (2008b). “The anti- $k_t$  jet clustering algorithm.” In: *Journal of High Energy Physics* 2008.04, p. 063. URL: <http://stacks.iop.org/1126-6708/2008/i=04/a=063>.
- (2012a). “FastJet User Manual.” In: *Eur. Phys. J. C* 72, p. 1896. DOI: [10.1140/epjc/s10052-012-1896-2](#). arXiv: [1111.6097 \[hep-ph\]](#).
- (2012b). “FastJet user manual.” In: *The European Physical Journal C* 72.3, p. 1896. ISSN: 1434-6052. DOI: [10.1140/epjc/s10052-012-1896-2](#). URL: <https://doi.org/10.1140/epjc/s10052-012-1896-2>.
- (2015). “SoftKiller, a particle-level pileup removal method.” In: *Eur. Phys. J. C* 75.2, p. 59. DOI: [10.1140/epjc/s10052-015-3267-2](#). arXiv: [1407.0408 \[hep-ph\]](#).
- Cao, Jun-Jie et al. (2012). “A SM-like Higgs near 125 GeV in low energy SUSY: a comparative study for MSSM and NMSSM.” In: *JHEP* 03, p. 086. DOI: [10.1007/JHEP03\(2012\)086](#). arXiv: [1202.5821 \[hep-ph\]](#).
- Cao, Junjie et al. (2013). “A light Higgs scalar in the NMSSM confronted with the latest LHC Higgs data.” In: *JHEP* 11, p. 018. DOI: [10.1007/JHEP11\(2013\)018](#). arXiv: [1309.4939 \[hep-ph\]](#).
- Cao, Qing-Hong et al. (2017). “A General Analysis of Wtb anomalous Couplings.” In: *Chin. Phys. C* 41.6, p. 063101. DOI: [10.1088/1674-1137/41/6/063101](#). arXiv: [1504.03785 \[hep-ph\]](#).
- Carena, Marcela, Howard E. Haber, et al. (2015). “Complementarity between Nonstandard Higgs Boson Searches and Precision Higgs Boson Measurements in the MSSM.” In: *Phys. Rev. D* 91.3, p. 035003. DOI: [10.1103/PhysRevD.91.035003](#). arXiv: [1410.4969 \[hep-ph\]](#).
- Carena, Marcela, Ian Low, et al. (2014). “Impersonating the Standard Model Higgs Boson: Alignment without Decoupling.” In: *JHEP* 04, p. 015. DOI: [10.1007/JHEP04\(2014\)015](#). arXiv: [1310.2248 \[hep-ph\]](#).
- Casagrande, S. et al. (2008). “Flavor Physics in the Randall-Sundrum Model: I. Theoretical Setup and Electroweak Precision Tests.” In: *JHEP* 10, p. 094. DOI: [10.1088/1126-6708/2008/10/094](#). arXiv: [0807.4937 \[hep-ph\]](#).
- Catani, S., Yuri L. Dokshitzer, M. Olsson, et al. (1991). “New clustering algorithm for multi - jet cross-sections in  $e^+ e^-$  annihilation.” In: *Phys. Lett. B* 269, pp. 432–438. DOI: [10.1016/0370-2693\(91\)90196-W](#).
- Catani, S., Yuri L. Dokshitzer, M. H. Seymour, et al. (1993). “Longitudinally invariant  $K_t$  clustering algorithms for hadron hadron collisions.” In: *Nucl. Phys. B* 406, pp. 187–224. DOI: [10.1016/0550-3213\(93\)90166-M](#).
- Catani, S., G. Turnock, and B. R. Webber (1991). “Heavy jet mass distribution in  $e^+ e^-$  annihilation.” In: *Phys. Lett. B* 272, pp. 368–372. DOI: [10.1016/0370-2693\(91\)91845-M](#).

- Cerri, Olmo et al. (2018). “Variational Autoencoders for New Physics Mining at the Large Hadron Collider.” In: arXiv: [1811.10276 \[hep-ex\]](#).
- Chakraborty, Amit, Abhishek M. Iyer, and Tuhin S. Roy (2018). “A Framework for Finding Anomalous Objects at the LHC.” In: *Nucl. Phys.* B932, pp. 439–470. DOI: [10.1016/j.nuclphysb.2018.05.019](#). arXiv: [1707.07084 \[hep-ph\]](#).
- Chakraborty, Dhiman, Jacobo Konigsberg, and David L. Rainwater (2003). “Review of top quark physics.” In: *Ann. Rev. Nucl. Part. Sci.* 53, pp. 301–351. DOI: [10.1146/annurev.nucl.53.041002.110601](#). arXiv: [hep-ph/0303092 \[hep-ph\]](#).
- Chang, Spencer, Patrick J. Fox, and Neal Weiner (2007). “Visible Cascade Higgs Decays to Four Photons at Hadron Colliders.” In: *Phys. Rev. Lett.* 98, p. 111802. DOI: [10.1103/PhysRevLett.98.111802](#). arXiv: [hep-ph/0608310 \[hep-ph\]](#).
- Chatrchyan, Serguei et al. (2012a). “Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC.” In: *Phys.Lett.* B716, pp. 30–61. DOI: [10.1016/j.physletb.2012.08.021](#). arXiv: [1207.7235 \[hep-ex\]](#). URL: <https://arxiv.org/abs/1207.7235>.
- (2012b). “Search for a light charged Higgs boson in top quark decays in  $pp$  collisions at  $\sqrt{s} = 7$  TeV.” In: *JHEP* 07, p. 143. DOI: [10.1007/JHEP07\(2012\)143](#). arXiv: [1205.5736 \[hep-ex\]](#).
- (2012c). “Search for a light pseudoscalar Higgs boson in the dimuon decay channel in  $pp$  collisions at  $\sqrt{s} = 7$  TeV.” In: *Phys. Rev. Lett.* 109, p. 121801. DOI: [10.1103/PhysRevLett.109.121801](#). arXiv: [1206.6326 \[hep-ex\]](#).
- (2013). “Search for top-squark pair production in the single-lepton final state in  $pp$  collisions at  $\sqrt{s} = 8$  TeV.” In: *Eur. Phys. J.* C73.12, p. 2677. DOI: [10.1140/epjc/s10052-013-2677-2](#). arXiv: [1308.1586 \[hep-ex\]](#).
- (2014). “Search for top squark and higgsino production using diphoton Higgs boson decays.” In: *Phys. Rev. Lett.* 112, p. 161802. DOI: [10.1103/PhysRevLett.112.161802](#). arXiv: [1312.3310 \[hep-ex\]](#).
- Chen, Tianqi et al. (2015). “MXNet: A Flexible and Efficient Machine Learning Library for Heterogeneous Distributed Systems.” In: *arXiv e-prints*, arXiv:1512.01274, arXiv:1512.01274. arXiv: [1512.01274 \[cs.DC\]](#).
- Chetyrkin, K. G. and F. V. Tkachov (1981). “Integration by Parts: The Algorithm to Calculate beta Functions in 4 Loops.” In: *Nucl. Phys.* B192, pp. 159–204. DOI: [10.1016/0550-3213\(81\)90199-1](#).
- Chivukula, R. Sekhar, Elizabeth H. Simmons, and Natascia Vignaroli (2013). “A Flavorful Top-Coloron Model.” In: *Phys. Rev.* D87.7, p. 075002. DOI: [10.1103/PhysRevD.87.075002](#). arXiv: [1302.1069 \[hep-ph\]](#).
- Choi, Suyong, Seung J. Lee, and Maxim Perelstein (2019). “Infrared Safety of a Neural-Net Top Tagging Algorithm.” In: *JHEP* 02, p. 132. DOI: [10.1007/JHEP02\(2019\)132](#). arXiv: [1806.01263 \[hep-ph\]](#).
- Christensen, Neil D. et al. (2013). “Low-Mass Higgs Bosons in the NMSSM and Their LHC Implications.” In: *JHEP* 08, p. 019. DOI: [10.1007/JHEP08\(2013\)019](#). arXiv: [1303.2113 \[hep-ph\]](#).
- Clowe, Douglas, Marusa Bradac, et al. (2006). “A direct empirical proof of the existence of dark matter.” In: *Astrophys. J.* 648, pp. L109–L113. DOI: [10.1086/508162](#). arXiv: [astro-ph/0608407 \[astro-ph\]](#).
- Clowe, Douglas, Anthony Gonzalez, and Maxim Markevitch (2004). “Weak lensing mass reconstruction of the interacting cluster 1E0657-558: Direct evidence for the existence of dark matter.” In: *Astrophys. J.* 604, pp. 596–603. DOI: [10.1086/381970](#). arXiv: [astro-ph/0312273 \[astro-ph\]](#).

- Cogan, Josh et al. (2015). “Jet-Images: Computer Vision Inspired Techniques for Jet Tagging.” In: *JHEP* 02, p. 118. DOI: [10.1007/JHEP02\(2015\)118](https://doi.org/10.1007/JHEP02(2015)118). arXiv: [1407.5675](https://arxiv.org/abs/1407.5675) [hep-ph].
- Cohen, Timothy, Marat Freytsis, and Bryan Ostdiek (2018). “(Machine) Learning to Do More with Less.” In: *JHEP* 02, p. 034. DOI: [10.1007/JHEP02\(2018\)034](https://doi.org/10.1007/JHEP02(2018)034). arXiv: [1706.09451](https://arxiv.org/abs/1706.09451) [hep-ph].
- Coleman, Sidney R. and J. Mandula (1967). “All Possible Symmetries of the S Matrix.” In: *Phys. Rev.* 159, pp. 1251–1256. DOI: [10.1103/PhysRev.159.1251](https://doi.org/10.1103/PhysRev.159.1251).
- Collaboration, CMS (2014a). “Boosted Top Jet Tagging at CMS.” In:
- (2014b). “Exclusion limits on gluino and top-squark pair production in natural SUSY scenarios with inclusive razor and exclusive single-lepton searches at 8 TeV.” In:
  - (2018). “Search for charged Higgs bosons with the  $H^\pm \rightarrow \tau^\pm \nu_\tau$  decay channel in proton-proton collisions at  $\sqrt{s} = 13$  TeV.” In:
  - (2019a). “Search for a charged Higgs boson decaying into top and bottom quarks in proton-proton collisions at 13 TeV in events with electrons or muons.” In:
  - (2019b). “Search for charged Higgs bosons decaying into top and a bottom quark in the fully hadronic final state at 13 TeV.” In:
- collaboration, The ATLAS (2018). “Search for diboson resonances in hadronic final states in  $79.8 \text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector.” In:
- Collins, Jack H., Kiel Howe, and Benjamin Nachman (2018). “Anomaly Detection for Resonant New Physics with Machine Learning.” In: *Phys. Rev. Lett.* 121.24, p. 241803. DOI: [10.1103/PhysRevLett.121.241803](https://doi.org/10.1103/PhysRevLett.121.241803). arXiv: [1805.02664](https://arxiv.org/abs/1805.02664) [hep-ph].
- (2019). “Extending the search for new resonances with machine learning.” In: *Phys. Rev.* D99.1, p. 014038. DOI: [10.1103/PhysRevD.99.014038](https://doi.org/10.1103/PhysRevD.99.014038). arXiv: [1902.02634](https://arxiv.org/abs/1902.02634) [hep-ph].
- “Combining heavy flavor electroweak measurements at LEP” (1996). In: *Nucl. Instrum. Meth.* A378, pp. 101–115.
- Conway, J. S. et al. (2016). “Identification of High-Momentum Top Quarks, Higgs Bosons, and W and Z Bosons Using Boosted Event Shapes.” In: *Phys. Rev.* D94.9, p. 094027. DOI: [10.1103/PhysRevD.94.094027](https://doi.org/10.1103/PhysRevD.94.094027). arXiv: [1606.06859](https://arxiv.org/abs/1606.06859) [hep-ex].
- Corbelli, Edvige and Paolo Salucci (2000). “The Extended Rotation Curve and the Dark Matter Halo of M33.” In: *Mon. Not. Roy. Astron. Soc.* 311, pp. 441–447. DOI: [10.1046/j.1365-8711.2000.03075.x](https://doi.org/10.1046/j.1365-8711.2000.03075.x). arXiv: [astro-ph/9909252](https://arxiv.org/abs/astro-ph/9909252) [astro-ph].
- Cornwall, John M. and Richard E. Norton (1973). “Spontaneous Symmetry Breaking Without Scalar Mesons.” In: *Phys. Rev. D* 8 (10), pp. 3338–3346. DOI: [10.1103/PhysRevD.8.3338](https://doi.org/10.1103/PhysRevD.8.3338). URL: <https://link.aps.org/doi/10.1103/PhysRevD.8.3338>.
- Cortiana, Giorgio (2016). “Top-quark mass measurements: review and perspectives.” In: *Rev. Phys.* 1, pp. 60–76. DOI: [10.1016/j.revip.2016.04.001](https://doi.org/10.1016/j.revip.2016.04.001). arXiv: [1510.04483](https://arxiv.org/abs/1510.04483) [hep-ex].
- Dasgupta, Mrinal, Alessandro Fregoso, Simone Marzani, and Alexander Powling (2013). “Jet substructure with analytical methods.” In: *Eur. Phys. J. C* 73.11, p. 2623. DOI: [10.1140/epjc/s10052-013-2623-3](https://doi.org/10.1140/epjc/s10052-013-2623-3). arXiv: [1307.0013](https://arxiv.org/abs/1307.0013) [hep-ph].
- Dasgupta, Mrinal, Alessandro Fregoso, Simone Marzani, and Gavin P. Salam (2013). “Towards an understanding of jet substructure.” In: *JHEP* 09, p. 029. DOI: [10.1007/JHEP09\(2013\)029](https://doi.org/10.1007/JHEP09(2013)029). arXiv: [1307.0007](https://arxiv.org/abs/1307.0007) [hep-ph].



- Dasgupta, Mrinal, Marco Guzzi, et al. (2018). “Top tagging : an analytical perspective.” In: *JHEP* 09, p. 170. DOI: [10.1007/JHEP09\(2018\)170](https://doi.org/10.1007/JHEP09(2018)170). arXiv: [1807.04767 \[hep-ph\]](https://arxiv.org/abs/1807.04767).
- Datta, Aseshkrishna, Abdelhak Djouadi, Monoranjan Guchait, and Yann Mambrini (2001). “Charged Higgs boson production from supersymmetric particle cascade decays at the CERN LHC.” In: *Phys. Rev. D* 65 (1), p. 015007. DOI: [10.1103/PhysRevD.65.015007](https://doi.org/10.1103/PhysRevD.65.015007). URL: <https://link.aps.org/doi/10.1103/PhysRevD.65.015007>.
- (2002). “Charged Higgs production from SUSY particle cascade decays at the CERN LHC.” In: *Phys. Rev. D* 65, p. 015007. DOI: [10.1103/PhysRevD.65.015007](https://doi.org/10.1103/PhysRevD.65.015007). arXiv: [hep-ph/0107271 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0107271).
- Datta, Aseshkrishna, Abdelhak Djouadi, Monoranjan Guchait, and Filip Moortgat (2004). “Detection of mssm higgs bosons from supersymmetric particle cascade decays at the LHC.” In: *Nucl. Phys. B* 681, pp. 31–64. DOI: [10.1016/j.nuclphysb.2003.12.012](https://doi.org/10.1016/j.nuclphysb.2003.12.012). arXiv: [hep-ph/0303095 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0303095).
- Datta, Kaustuv and Andrew Larkoski (2017). “How Much Information is in a Jet?” In: *JHEP* 06, p. 073. DOI: [10.1007/JHEP06\(2017\)073](https://doi.org/10.1007/JHEP06(2017)073). arXiv: [1704.08249 \[hep-ph\]](https://arxiv.org/abs/1704.08249).
- Davis, Raymond, Don S. Harmer, and Kenneth C. Hoffman (1968). “Search for Neutrinos from the Sun.” In: *Phys. Rev. Lett.* 20 (21), pp. 1205–1209. DOI: [10.1103/PhysRevLett.20.1205](https://doi.org/10.1103/PhysRevLett.20.1205). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.20.1205>.
- Dawson, S., C. Jackson, et al. (2003). “Associated Higgs production with top quarks at the large hadron collider: NLO QCD corrections.” In: *Phys. Rev. D* 68, p. 034022. DOI: [10.1103/PhysRevD.68.034022](https://doi.org/10.1103/PhysRevD.68.034022). arXiv: [hep-ph/0305087 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0305087).
- Dawson, S., L. H. Orr, et al. (2003). “Associated top quark Higgs boson production at the LHC.” In: *Phys. Rev. D* 67, p. 071503. DOI: [10.1103/PhysRevD.67.071503](https://doi.org/10.1103/PhysRevD.67.071503). arXiv: [hep-ph/0211438 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0211438).
- Degrande, Celine et al. (2015). “Heavy charged Higgs boson production at the LHC.” In: *JHEP* 10, p. 145. DOI: [10.1007/JHEP10\(2015\)145](https://doi.org/10.1007/JHEP10(2015)145). arXiv: [1507.02549 \[hep-ph\]](https://arxiv.org/abs/1507.02549).
- Demartin, Federico et al. (2015). “Higgs production in association with a single top quark at the LHC.” In: *Eur. Phys. J. C* 75.6, p. 267. DOI: [10.1140/epjc/s10052-015-3475-9](https://doi.org/10.1140/epjc/s10052-015-3475-9). arXiv: [1504.00611 \[hep-ph\]](https://arxiv.org/abs/1504.00611).
- Dermisek, Radovan and John F. Gunion (2007). “The NMSSM Solution to the Fine-Tuning Problem, Precision Electroweak Constraints and the Largest LEP Higgs Event Excess.” In: *Phys. Rev. D* 76, p. 095006. DOI: [10.1103/PhysRevD.76.095006](https://doi.org/10.1103/PhysRevD.76.095006). arXiv: [0705.4387 \[hep-ph\]](https://arxiv.org/abs/0705.4387).
- Dery, Lucio Mwinmaarong et al. (2017). “Weakly Supervised Classification in High Energy Physics.” In: *JHEP* 05, p. 145. DOI: [10.1007/JHEP05\(2017\)145](https://doi.org/10.1007/JHEP05(2017)145). arXiv: [1702.00414 \[hep-ph\]](https://arxiv.org/abs/1702.00414).
- Diaz-Cruz, J. L. et al. (2008). “Charged Higgs boson phenomenology in Supersymmetric models with Higgs triplets.” In: *Phys. Rev. D* 77, p. 035007. DOI: [10.1103/PhysRevD.77.035007](https://doi.org/10.1103/PhysRevD.77.035007). arXiv: [0710.4169 \[hep-ph\]](https://arxiv.org/abs/0710.4169).
- Dittmaier, Stefan et al. (2011). “Charged-Higgs-boson production at the LHC: NLO supersymmetric QCD corrections.” In: *Phys. Rev. D* 83, p. 055005. DOI: [10.1103/PhysRevD.83.055005](https://doi.org/10.1103/PhysRevD.83.055005). arXiv: [0906.2648 \[hep-ph\]](https://arxiv.org/abs/0906.2648).
- Djouadi, A. et al. (2008). “Benchmark scenarios for the NMSSM.” In: *JHEP* 07, p. 002. DOI: [10.1088/1126-6708/2008/07/002](https://doi.org/10.1088/1126-6708/2008/07/002). arXiv: [0801.4321 \[hep-ph\]](https://arxiv.org/abs/0801.4321).
- Djouadi, A., W. Hollik, and C. Junger (1997). “QCD corrections to scalar quark decays.” In: *Phys. Rev. D* 55, pp. 6975–6985. DOI: [10.1103/PhysRevD.55.6975](https://doi.org/10.1103/PhysRevD.55.6975). arXiv: [hep-ph/9609419 \[hep-ph\]](https://arxiv.org/abs/hep-ph/9609419).

- Djouadi, A., J. Kalinowski, and M. Spira (1998). “HDECAY: A Program for Higgs boson decays in the standard model and its supersymmetric extension.” In: *Comput. Phys. Commun.* 108, pp. 56–74. DOI: [10.1016/S0010-4655\(97\)00123-9](https://doi.org/10.1016/S0010-4655(97)00123-9). arXiv: [hep-ph/9704448](https://arxiv.org/abs/hep-ph/9704448) [hep-ph].
- Djouadi, Abdelhak (2008). “The Anatomy of electro-weak symmetry breaking. II. The Higgs bosons in the minimal supersymmetric model.” In: *Phys. Rept.* 459, pp. 1–241. DOI: [10.1016/j.physrep.2007.10.005](https://doi.org/10.1016/j.physrep.2007.10.005). arXiv: [hep-ph/0503173](https://arxiv.org/abs/hep-ph/0503173) [hep-ph].
- Djouadi, Abdelhak et al. (2018). “HDECAY: Twenty++ Years After.” In: arXiv: [1801.09506](https://arxiv.org/abs/1801.09506) [hep-ph].
- Dobbs, Matt and Jorgen Beck Hansen (2001). “The HepMC C++ Monte Carlo event record for High Energy Physics.” In: *Comput. Phys. Commun.* 134, pp. 41–46. DOI: [10.1016/S0010-4655\(00\)00189-2](https://doi.org/10.1016/S0010-4655(00)00189-2).
- Dobrescu, Bogdan A., Greg L. Landsberg, and Konstantin T. Matchev (2001). “Higgs boson decays to CP odd scalars at the Tevatron and beyond.” In: *Phys. Rev. D* 63, p. 075003. DOI: [10.1103/PhysRevD.63.075003](https://doi.org/10.1103/PhysRevD.63.075003). arXiv: [hep-ph/0005308](https://arxiv.org/abs/hep-ph/0005308) [hep-ph].
- Dokshitzer, Yuri L. et al. (1997). “Better jet clustering algorithms.” In: *JHEP* 08, p. 001. DOI: [10.1088/1126-6708/1997/08/001](https://doi.org/10.1088/1126-6708/1997/08/001). arXiv: [hep-ph/9707323](https://arxiv.org/abs/hep-ph/9707323) [hep-ph].
- Domingo, Florian and Georg Weiglein (2016). “NMSSM interpretations of the observed Higgs signal.” In: *JHEP* 04, p. 095. DOI: [10.1007/JHEP04\(2016\)095](https://doi.org/10.1007/JHEP04(2016)095). arXiv: [1509.07283](https://arxiv.org/abs/1509.07283) [hep-ph].
- Drechsel, Peter et al. (2017). “Precise Predictions for the Higgs-Boson Masses in the NMSSM.” In: *Eur. Phys. J. C* 77.1, p. 42. DOI: [10.1140/epjc/s10052-017-4595-1](https://doi.org/10.1140/epjc/s10052-017-4595-1). arXiv: [1601.08100](https://arxiv.org/abs/1601.08100) [hep-ph].
- Drees, M., R. Godbole, and P. Roy (2004). *Theory and phenomenology of sparticles: An account of four-dimensional N=1 supersymmetry in high energy physics*.
- DREES, MANUEL (1989). “SUPERSYMMETRIC MODELS WITH EXTENDED HIGGS SECTOR.” In: *International Journal of Modern Physics A* 04.14, pp. 3635–3651. DOI: [10.1142/S0217751X89001448](https://doi.org/10.1142/S0217751X89001448). eprint: <http://www.worldscientific.com/doi/pdf/10.1142/S0217751X89001448>. URL: <http://www.worldscientific.com/doi/abs/10.1142/S0217751X89001448>.
- Drees, Manuel (1989). “Supersymmetric Models with Extended Higgs Sector.” In: *Int.J.Mod.Phys. A* 4, p. 3635. DOI: [10.1142/S0217751X89001448](https://doi.org/10.1142/S0217751X89001448).
- Drees, Manuel, Rohini Godbole, and Probir Roy (2004). *Theory and phenomenology of Sparticles: an account of four-dimensional N=1 supersymmetry in high-energy physics*. Singapore: World Scientific. URL: <https://cds.cern.ch/record/873465>.
- Drees, Manuel, Monoranjan Guchait, and D. P. Roy (1999). “Signature of charged to neutral Higgs boson decay at the LHC in SUSY models.” In: *Phys. Lett. B* 471, pp. 39–44. DOI: [10.1016/S0370-2693\(99\)01329-5](https://doi.org/10.1016/S0370-2693(99)01329-5). arXiv: [hep-ph/9909266](https://arxiv.org/abs/hep-ph/9909266) [hep-ph].
- Drueke, Elizabeth et al. (2015). “Single Top Production as a Probe of Heavy Resonances.” In: *Phys. Rev. D* 91.5, p. 054020. DOI: [10.1103/PhysRevD.91.054020](https://doi.org/10.1103/PhysRevD.91.054020). arXiv: [1409.7607](https://arxiv.org/abs/1409.7607) [hep-ph].
- Duffy, Daniel and Zack Sullivan (2012). “Model independent reach for W-prime bosons at the LHC.” In: *Phys. Rev. D* 86, p. 075018. DOI: [10.1103/PhysRevD.86.075018](https://doi.org/10.1103/PhysRevD.86.075018). arXiv: [1208.4858](https://arxiv.org/abs/1208.4858) [hep-ph].
- Dugan, Michael J., Howard Georgi, and David B. Kaplan (1985). “Anatomy of a Composite Higgs Model.” In: *Nucl. Phys. B* 254, pp. 299–326. DOI: [10.1016/0550-3213\(85\)90221-4](https://doi.org/10.1016/0550-3213(85)90221-4).
- Eberhardt, Otto, Ulrich Nierste, and Martin Wiebusch (2013). “Status of the two-Higgs-doublet model of type II.” In: *JHEP* 07, p. 118. DOI: [10.1007/JHEP07\(2013\)118](https://doi.org/10.1007/JHEP07(2013)118). arXiv: [1305.1649](https://arxiv.org/abs/1305.1649) [hep-ph].



- Ellis, John R. et al. (1989). “Higgs Bosons in a Nonminimal Supersymmetric Model.” In: *Phys.Rev.* D39, p. 844. DOI: [10.1103/PhysRevD.39.844](#).
- Ellis, R. Keith et al. (2012). “One-loop calculations in quantum field theory: from Feynman diagrams to unitarity cuts.” In: *Phys. Rept.* 518, pp. 141–250. DOI: [10.1016/j.physrep.2012.01.008](#). arXiv: [1105.4319 \[hep-ph\]](#).
- Ellis, Stephen D., Andrew Hornig, David Krohn, et al. (2015). “On Statistical Aspects of Qjets.” In: *JHEP* 01, p. 022. DOI: [10.1007/JHEP01\(2015\)022](#). arXiv: [1409.6785 \[hep-ph\]](#).
- Ellis, Stephen D., Andrew Hornig, Tuhin S. Roy, et al. (2012). “Qjets: A Non-Deterministic Approach to Tree-Based Jet Substructure.” In: *Phys. Rev. Lett.* 108, p. 182003. DOI: [10.1103/PhysRevLett.108.182003](#). arXiv: [1201.1914 \[hep-ph\]](#).
- Ellis, Stephen D. and Davison E. Soper (1993). “Successive combination jet algorithm for hadron collisions.” In: *Phys. Rev.* D48, pp. 3160–3166. DOI: [10.1103/PhysRevD.48.3160](#). arXiv: [hep-ph/9305266 \[hep-ph\]](#).
- Ellis, Stephen D., Christopher K. Vermilion, and Jonathan R. Walsh (2010). “Recombination Algorithms and Jet Substructure: Pruning as a Tool for Heavy Particle Searches.” In: *Phys. Rev.* D81, p. 094023. DOI: [10.1103/PhysRevD.81.094023](#). arXiv: [0912.0033 \[hep-ph\]](#).
- Ellwanger, Ulrich (2011). “Higgs Bosons in the Next-to-Minimal Supersymmetric Standard Model at the LHC.” In: *Eur. Phys. J.* C71, p. 1782. DOI: [10.1140/epjc/s10052-011-1782-3](#). arXiv: [1108.0157 \[hep-ph\]](#).
- (2012). “A Higgs boson near 125 GeV with enhanced di-photon signal in the NMSSM.” In: *JHEP* 03, p. 044. DOI: [10.1007/JHEP03\(2012\)044](#). arXiv: [1112.3548 \[hep-ph\]](#).
- Ellwanger, Ulrich, John F. Gunion, and Cyril Hugonie (2005). “NMHDECAY: A Fortran code for the Higgs masses, couplings and decay widths in the NMSSM.” In: *JHEP* 02, p. 066. DOI: [10.1088/1126-6708/2005/02/066](#). arXiv: [hep-ph/0406215 \[hep-ph\]](#).
- Ellwanger, Ulrich and Cyril Hugonie (2018). “The higgsino–singlino sector of the NMSSM: combined constraints from dark matter and the LHC.” In: *Eur. Phys. J.* C78.9, p. 735. DOI: [10.1140/epjc/s10052-018-6204-3](#). arXiv: [1806.09478 \[hep-ph\]](#).
- Ellwanger, Ulrich, Cyril Hugonie, and Ana M. Teixeira (2010). “The Next-to-Minimal Supersymmetric Standard Model.” In: *Phys. Rept.* 496, pp. 1–77. DOI: [10.1016/j.physrep.2010.07.001](#). arXiv: [0910.1785 \[hep-ph\]](#).
- Ellwanger, Ulrich, Michel Rausch de Traubenberg, and Carlos A. Savoy (1993). “Particle spectrum in supersymmetric models with a gauge singlet.” In: *Phys.Lett.* B315, pp. 331–337. DOI: [10.1016/0370-2693\(93\)91621-S](#). arXiv: [hep-ph/9307322 \[hep-ph\]](#).
- Ellwanger, Ulrich and Matias Rodriguez-Vazquez (2016). “Discovery Prospects of a Light Scalar in the NMSSM.” In: *JHEP* 02, p. 096. DOI: [10.1007/JHEP02\(2016\)096](#). arXiv: [1512.04281 \[hep-ph\]](#).
- Enberg, Rikard et al. (2015). “Charged Higgs boson in the  $W^\pm$  Higgs channel at the Large Hadron Collider.” In: *Nucl. Phys.* B893, pp. 420–442. DOI: [10.1016/j.nuclphysb.2015.02.001](#). arXiv: [1412.5814 \[hep-ph\]](#).
- Englert, F. and R. Brout (1964). “Broken Symmetry and the Mass of Gauge Vector Mesons.” In: *Phys. Rev. Lett.* 13. [157(1964)], pp. 321–323. DOI: [10.1103/PhysRevLett.13.321](#).
- Erdmann, M. et al. (2018). “Lorentz Boost Networks: Autonomous Physics-Inspired Feature Engineering.” In: arXiv: [1812.09722 \[hep-ex\]](#).

- Eriksson, David, Johan Rathsmann, and Oscar Stal (2010). “2HDMC: Two-Higgs-Doublet Model Calculator Physics and Manual.” In: *Comput. Phys. Commun.* 181, pp. 189–205. DOI: [10.1016/j.cpc.2009.09.011](https://doi.org/10.1016/j.cpc.2009.09.011). arXiv: [0902.0851](https://arxiv.org/abs/0902.0851) [hep-ph].
- Expected performance of the ATLAS b-tagging algorithms in Run-2* (2015). Tech. rep. ATL-PHYS-PUB-2015-022. Geneva: CERN. URL: <http://cds.cern.ch/record/2037697>.
- Farina, Marco, Yuichiro Nakai, and David Shih (2018). “Searching for New Physics with Deep Autoencoders.” In: arXiv: [1808.08992](https://arxiv.org/abs/1808.08992) [hep-ph].
- Favereau, J. de et al. (2014). “DELPHES 3, A modular framework for fast simulation of a generic collider experiment.” In: *JHEP* 02, p. 057. DOI: [10.1007/JHEP02\(2014\)057](https://doi.org/10.1007/JHEP02(2014)057). arXiv: [1307.6346](https://arxiv.org/abs/1307.6346) [hep-ex].
- Fayet, Pierre (1975). “Supergauge Invariant Extension of the Higgs Mechanism and a Model for the electron and Its Neutrino.” In: *Nucl. Phys.* B90, pp. 104–124. DOI: [10.1016/0550-3213\(75\)90636-7](https://doi.org/10.1016/0550-3213(75)90636-7).
- Fayet, Pierre and J. Iliopoulos (1974). “Spontaneously Broken Supergauge Symmetries and Goldstone Spinors.” In: *Phys. Lett.* 51B, pp. 461–464. DOI: [10.1016/0370-2693\(74\)90310-4](https://doi.org/10.1016/0370-2693(74)90310-4).
- Feynman, R. P. (1948). “Space-time approach to nonrelativistic quantum mechanics.” In: *Rev. Mod. Phys.* 20, pp. 367–387. DOI: [10.1103/RevModPhys.20.367](https://doi.org/10.1103/RevModPhys.20.367).
- (1949). “Space - time approach to quantum electrodynamics.” In: *Phys. Rev.* 76. [,99(1949)], pp. 769–789. DOI: [10.1103/PhysRev.76.769](https://doi.org/10.1103/PhysRev.76.769).
- (1950). “Mathematical formulation of the quantum theory of electromagnetic interaction.” In: *Phys. Rev.* 80. [,198(1950)], pp. 440–457. DOI: [10.1103/PhysRev.80.440](https://doi.org/10.1103/PhysRev.80.440).
- Flechl, Martin et al. (2015). “Improved cross-section predictions for heavy charged Higgs boson production at the LHC.” In: *Phys. Rev. D* 91.7, p. 075015. DOI: [10.1103/PhysRevD.91.075015](https://doi.org/10.1103/PhysRevD.91.075015). arXiv: [1409.5615](https://arxiv.org/abs/1409.5615) [hep-ph].
- Florian, D. de et al. (2016). “Handbook of LHC Higgs Cross Sections: 4. Deciphering the Nature of the Higgs Sector.” In: arXiv: [1610.07922](https://arxiv.org/abs/1610.07922) [hep-ph].
- Franke, F. and H. Fraas (1997). “Neutralinos and Higgs bosons in the next-to-minimal supersymmetric standard model.” In: *Int.J.Mod.Phys.* A12, pp. 479–534. DOI: [10.1142/S0217751X97000529](https://doi.org/10.1142/S0217751X97000529). arXiv: [hep-ph/9512366](https://arxiv.org/abs/hep-ph/9512366) [hep-ph].
- Friedman, Jerome H. (2001). “Greedy function approximation: A gradient boosting machine.” In: *Ann. Statist.* 29.5, pp. 1189–1232. DOI: [10.1214/aos/1013203451](https://doi.org/10.1214/aos/1013203451). URL: <https://doi.org/10.1214/aos/1013203451>.
- Frixione, S., V. Hirschi, D. Pagani, H. S. Shao, et al. (2014). “Weak corrections to Higgs hadroproduction in association with a top-quark pair.” In: *JHEP* 09, p. 065. DOI: [10.1007/JHEP09\(2014\)065](https://doi.org/10.1007/JHEP09(2014)065). arXiv: [1407.0823](https://arxiv.org/abs/1407.0823) [hep-ph].
- Frixione, S., V. Hirschi, D. Pagani, H. -S. Shao, et al. (2015). “Electroweak and QCD corrections to top-pair hadroproduction in association with heavy bosons.” In: *JHEP* 06, p. 184. DOI: [10.1007/JHEP06\(2015\)184](https://doi.org/10.1007/JHEP06(2015)184). arXiv: [1504.03446](https://arxiv.org/abs/1504.03446) [hep-ph].
- Fuks, Benjamin and Richard Ruiz (2017). “A comprehensive framework for studying  $W'$  and  $Z'$  bosons at hadron colliders with automated jet veto resummation.” In: *JHEP* 05, p. 032. DOI: [10.1007/JHEP05\(2017\)032](https://doi.org/10.1007/JHEP05(2017)032). arXiv: [1701.05263](https://arxiv.org/abs/1701.05263) [hep-ph].
- Gallicchio, Jason and Matthew D. Schwartz (2010). “Seeing in Color: Jet Superstructure.” In: *Phys. Rev. Lett.* 105, p. 022001. DOI: [10.1103/PhysRevLett.105.022001](https://doi.org/10.1103/PhysRevLett.105.022001). arXiv: [1001.5027](https://arxiv.org/abs/1001.5027) [hep-ph].

- Geng, Chao-Qiang, Da Huang, and Kimiko Yamashita (2018). “LHC Searches for Top-philic Kaluza-Klein Graviton.” In: *JHEP* 10, p. 046. DOI: [10.1007/JHEP10\(2018\)046](https://doi.org/10.1007/JHEP10(2018)046). arXiv: [1807.09643](https://arxiv.org/abs/1807.09643) [hep-ph].
- Gherghetta, Tony (2011). “A Holographic View of Beyond the Standard Model Physics.” In: *Physics of the large and the small, TASI 09, proceedings of the Theoretical Advanced Study Institute in Elementary Particle Physics, Boulder, Colorado, USA, 1-26 June 2009*, pp. 165–232. DOI: [10.1142/9789814327183\\_0004](https://doi.org/10.1142/9789814327183_0004). arXiv: [1008.2570](https://arxiv.org/abs/1008.2570) [hep-ph].
- Gherghetta, Tony and Alex Pomarol (2000). “Bulk fields and supersymmetry in a slice of AdS.” In: *Nucl. Phys.* B586, pp. 141–162. DOI: [10.1016/S0550-3213\(00\)00392-8](https://doi.org/10.1016/S0550-3213(00)00392-8). arXiv: [hep-ph/0003129](https://arxiv.org/abs/hep-ph/0003129) [hep-ph].
- Gildener, Eldad (1976). “Gauge-symmetry hierarchies.” In: *Phys. Rev. D* 14 (6), pp. 1667–1672. DOI: [10.1103/PhysRevD.14.1667](https://doi.org/10.1103/PhysRevD.14.1667). URL: <https://link.aps.org/doi/10.1103/PhysRevD.14.1667>.
- Giudice, G. F. and A. Masiero (1988). “A Natural Solution to the mu Problem in Supergravity Theories.” In: *Phys. Lett.* B206, pp. 480–484. DOI: [10.1016/0370-2693\(88\)91613-9](https://doi.org/10.1016/0370-2693(88)91613-9).
- Giudice, Gian F. (2013). “Naturalness after LHC8.” In: *PoS EPS-HEP2013*, p. 163. DOI: [10.22323/1.180.0163](https://doi.org/10.22323/1.180.0163). arXiv: [1307.7879](https://arxiv.org/abs/1307.7879) [hep-ph].
- Glashow, S. L., J. Iliopoulos, and L. Maiani (1970). “Weak Interactions with Lepton-Hadron Symmetry.” In: *Phys. Rev. D* 2 (7), pp. 1285–1292. DOI: [10.1103/PhysRevD.2.1285](https://doi.org/10.1103/PhysRevD.2.1285). URL: <https://link.aps.org/doi/10.1103/PhysRevD.2.1285>.
- Glashow, Sheldon L. (1959). “The renormalizability of vector meson interactions.” In: *Nucl. Phys.* 10, pp. 107–117. DOI: [10.1016/0029-5582\(59\)90196-8](https://doi.org/10.1016/0029-5582(59)90196-8).
- Godbole, Rohini M., Michael E. Peskin, et al. (2019). “Why the angular distribution of the top decay lepton is unchanged by anomalous  $tbW$  couplings.” In: *Phys. Lett.* B790, pp. 322–325. DOI: [10.1016/j.physletb.2019.01.022](https://doi.org/10.1016/j.physletb.2019.01.022). arXiv: [1809.06285](https://arxiv.org/abs/1809.06285) [hep-ph].
- Godbole, Rohini M., Kumar Rao, et al. (2010). “On measurement of top polarization as a probe of  $t\bar{t}$  production mechanisms at the LHC.” In: *JHEP* 11, p. 144. DOI: [10.1007/JHEP11\(2010\)144](https://doi.org/10.1007/JHEP11(2010)144). arXiv: [1010.1458](https://arxiv.org/abs/1010.1458) [hep-ph].
- Godbole, Rohini M., Saurabh D. Rindani, and Ritesh K. Singh (2006). “Lepton distribution as a probe of new physics in production and decay of the  $t$  quark and its polarization.” In: *JHEP* 12, p. 021. DOI: [10.1088/1126-6708/2006/12/021](https://doi.org/10.1088/1126-6708/2006/12/021). arXiv: [hep-ph/0605100](https://arxiv.org/abs/hep-ph/0605100) [hep-ph].
- (2007). “Lepton distribution in top decay: A probe of new physics and top- polarization.” In: *Pramana* 69, pp. 915–919. DOI: [10.1007/s12043-007-0204-4](https://doi.org/10.1007/s12043-007-0204-4).
- Godbole, Rohini et al. (2019). “Boosted top quark polarization.” In: *Phys. Rev. D* 100 (5), p. 056010. DOI: [10.1103/PhysRevD.100.056010](https://doi.org/10.1103/PhysRevD.100.056010). arXiv: [1902.08096](https://arxiv.org/abs/1902.08096) [hep-ph]. URL: <https://link.aps.org/doi/10.1103/PhysRevD.100.056010>.
- Gelfand, Yu. A. and E. P. Likhtman (1971). “Extension of the Algebra of Poincare Group Generators and Violation of p Invariance.” In: *JETP Lett.* 13. [Pisma Zh. Eksp. Teor. Fiz.13,452(1971)], pp. 323–326.
- Gross, David J. and Frank Wilczek (1973a). “Asymptotically Free Gauge Theories. I.” In: *Phys. Rev. D* 8 (10), pp. 3633–3652. DOI: [10.1103/PhysRevD.8.3633](https://doi.org/10.1103/PhysRevD.8.3633). URL: <https://link.aps.org/doi/10.1103/PhysRevD.8.3633>.
- (1973b). “Ultraviolet Behavior of Non-Abelian Gauge Theories.” In: *Phys. Rev. Lett.* 30 (26), pp. 1343–1346. DOI: [10.1103/PhysRevLett.30.1343](https://doi.org/10.1103/PhysRevLett.30.1343). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.30.1343>.

- Grossman, Yuval and Matthias Neubert (2000). “Neutrino masses and mixings in nonfactorizable geometry.” In: *Phys. Lett.* B474, pp. 361–371. DOI: [10.1016/S0370-2693\(00\)00054-X](https://doi.org/10.1016/S0370-2693(00)00054-X). arXiv: [hep-ph/9912408](https://arxiv.org/abs/hep-ph/9912408) [hep-ph].
- Group, LEP Electroweak Working (2010). “Precision Electroweak Measurements and Constraints on the Standard Model.” In: arXiv: [1012.2367](https://arxiv.org/abs/1012.2367) [hep-ex].
- Grzadkowski, Bohdan and Zenro Hioki (2002). “Angular distribution of leptons in general  $t\bar{t}$  production and decay.” In: *Phys. Lett.* B529, pp. 82–86. DOI: [10.1016/S0370-2693\(02\)01250-9](https://doi.org/10.1016/S0370-2693(02)01250-9). arXiv: [hep-ph/0112361](https://arxiv.org/abs/hep-ph/0112361) [hep-ph].
- (2003). “Decoupling of anomalous top decay vertices in angular distribution of secondary particles.” In: *Phys. Lett.* B557, pp. 55–59. DOI: [10.1016/S0370-2693\(03\)00187-4](https://doi.org/10.1016/S0370-2693(03)00187-4). arXiv: [hep-ph/0208079](https://arxiv.org/abs/hep-ph/0208079) [hep-ph].
- Guchait, M., Soham Bhattacharya, and Aravind H Vijay (2019). In: *In Prepration*.
- Guchait, Monoranjan, Ritva Kinnunen, and D. P. Roy (2007). “Signature of heavy Charged Higgs Boson at LHC in the 1 and 3 prong Hadronic Tau Decay channels.” In: *Eur. Phys. J.* C52, pp. 665–672. DOI: [10.1140/epjc/s10052-007-0396-2](https://doi.org/10.1140/epjc/s10052-007-0396-2). arXiv: [hep-ph/0608324](https://arxiv.org/abs/hep-ph/0608324) [hep-ph].
- Guchait, Monoranjan and Jacky Kumar (2016). “Light Higgs Bosons in NMSSM at the LHC.” In: *Int. J. Mod. Phys.* A31.12, p. 1650069. DOI: [10.1142/S0217751X1650069X](https://doi.org/10.1142/S0217751X1650069X). arXiv: [1509.02452](https://arxiv.org/abs/1509.02452) [hep-ph].
- (2017). “Diphoton Signal of light pseudoscalar in NMSSM at the LHC.” In: *Phys. Rev.* D95.3, p. 035036. DOI: [10.1103/PhysRevD.95.035036](https://doi.org/10.1103/PhysRevD.95.035036). arXiv: [1608.05693](https://arxiv.org/abs/1608.05693) [hep-ph].
- Guchait, Monoranjan and D. P. Roy (2009). “Using Tau Polarisation for Charged Higgs Boson and SUSY Searches at the LHC.” In: *Physics at the Large Hadron Collider*. [205(2008)], pp. 205–212. DOI: [10.1007/978-81-8489-295-6\\_13](https://doi.org/10.1007/978-81-8489-295-6_13). arXiv: [0808.0438](https://arxiv.org/abs/0808.0438) [hep-ph]. URL: <https://inspirehep.net/record/792239/files/arXiv:0808.0438.pdf>.
- Guchait, Monoranjan and Aravind H. Vijay (2018). “Probing Heavy Charged Higgs Boson at the LHC.” In: *Phys. Rev.* D98.11, p. 115028. DOI: [10.1103/PhysRevD.98.115028](https://doi.org/10.1103/PhysRevD.98.115028). arXiv: [1806.01317](https://arxiv.org/abs/1806.01317) [hep-ph].
- Guchait, Monoranjan, Aravind H. Vijay, and Jacky Kumar (2017). “Detection prospects of light pseudoscalar Higgs boson at the LHC.” In: *JHEP* 08, p. 122. DOI: [10.1007/JHEP08\(2017\)122](https://doi.org/10.1007/JHEP08(2017)122). arXiv: [1705.06275](https://arxiv.org/abs/1705.06275) [hep-ph].
- Guedes, Renato, Stefano Moretti, and Rui Santos (2012). “Charged Higgs bosons in single top production at the LHC.” In: *JHEP* 10, p. 119. DOI: [10.1007/JHEP10\(2012\)119](https://doi.org/10.1007/JHEP10(2012)119). arXiv: [1207.4071](https://arxiv.org/abs/1207.4071) [hep-ph].
- Gunion, J. F. (1994). “Detecting the  $t\bar{b}$  decays of a charged Higgs boson at a hadron supercollider.” In: *Phys. Lett.* B322, pp. 125–130. DOI: [10.1016/0370-2693\(94\)90500-2](https://doi.org/10.1016/0370-2693(94)90500-2). arXiv: [hep-ph/9312201](https://arxiv.org/abs/hep-ph/9312201) [hep-ph].
- Gunion, John F. and Howard E. Haber (2003). “The CP conserving two Higgs doublet model: The Approach to the decoupling limit.” In: *Phys. Rev.* D67, p. 075019. DOI: [10.1103/PhysRevD.67.075019](https://doi.org/10.1103/PhysRevD.67.075019). arXiv: [hep-ph/0207010](https://arxiv.org/abs/hep-ph/0207010) [hep-ph].
- Gunion, John F et al. (1989). *The Higgs hunter’s guide*. Vol. 80. Upton, NY: Brookhaven Nat. Lab. URL: <https://cds.cern.ch/record/425736>.
- Haber, Howard E. and Deva O’Neil (2006). “Basis-independent methods for the two-Higgs-doublet model. II. The Significance of  $\tan\beta$ .” In: *Phys. Rev.* D74. [Erratum: *Phys. Rev.* D74,no.5,059905(2006)], p. 015018. DOI: [10.1103/PhysRevD.74.015018](https://doi.org/10.1103/PhysRevD.74.015018), [10.1103/PhysRevD.74.059905](https://doi.org/10.1103/PhysRevD.74.059905). arXiv: [hep-ph/0602242](https://arxiv.org/abs/hep-ph/0602242) [hep-ph].



- Hagiwara, Kaoru, Junichi Kanzaki, et al. (2008). “HELAS and MadGraph/MadEvent with spin-2 particles.” In: *Eur. Phys. J.* C56, pp. 435–447. DOI: [10.1140/epjc/s10052-008-0663-x](https://doi.org/10.1140/epjc/s10052-008-0663-x). arXiv: [0805.2554](https://arxiv.org/abs/0805.2554) [hep-ph].
- Hagiwara, Kaoru, Hiroshi Yokoya, and Ya-Juan Zheng (2018). “Probing the CP properties of top Yukawa coupling at an  $e^+e^-$  collider.” In: *JHEP* 02, p. 180. DOI: [10.1007/JHEP02\(2018\)180](https://doi.org/10.1007/JHEP02(2018)180). arXiv: [1712.09953](https://arxiv.org/abs/1712.09953) [hep-ph].
- Hahnloser Richard H. R. et al. (2000). “Digital selection and analogue amplification coexist in a cortex-inspired silicon circuit.” In: *Nature* 405, p. 947. DOI: <https://doi.org/10.1038/3501607210.1038/35016072>. URL: <https://www.nature.com/articles/35016072%5C#supplementary-information>.
- Hajer, Jan et al. (2018). “Novelty Detection Meets Collider Physics.” In: arXiv: [1807.10261](https://arxiv.org/abs/1807.10261) [hep-ph].
- Hall, Lawrence J., David Pinner, and Joshua T. Ruderman (2012). “A Natural SUSY Higgs Near 126 GeV.” In: *JHEP* 04, p. 131. DOI: [10.1007/JHEP04\(2012\)131](https://doi.org/10.1007/JHEP04(2012)131). arXiv: [1112.2703](https://arxiv.org/abs/1112.2703) [hep-ph].
- Harlander, Robert, Michael Kramer, and Markus Schumacher (2011). “Bottom-quark associated Higgs-boson production: reconciling the four- and five-flavour scheme approach.” In: arXiv: [1112.3478](https://arxiv.org/abs/1112.3478) [hep-ph].
- Hayashi, Eric and Simon D. M. White (2006). “How Rare is the Bullet Cluster?” In: *Mon. Not. Roy. Astron. Soc.* 370, pp. L38–L41. DOI: [10.1111/j.1745-3933.2006.00184.x](https://doi.org/10.1111/j.1745-3933.2006.00184.x). arXiv: [astro-ph/0604443](https://arxiv.org/abs/astro-ph/0604443) [astro-ph].
- Heimel, Theo et al. (2018). “QCD or What?” In: arXiv: [1808.08979](https://arxiv.org/abs/1808.08979) [hep-ph].
- Heinemeyer, S., O. Stal, and G. Weiglein (2012). “Interpreting the LHC Higgs Search Results in the MSSM.” In: *Phys. Lett.* B710, pp. 201–206. DOI: [10.1016/j.physletb.2012.02.084](https://doi.org/10.1016/j.physletb.2012.02.084). arXiv: [1112.3026](https://arxiv.org/abs/1112.3026) [hep-ph].
- Hewett, J. L. (1997). “The Standard model and why we believe it.” In: *Supersymmetry, supergravity and supercolliders. Proceedings, Theoretical Advanced Study Institute in elementary particle physics, TASI’97, Boulder, USA, June 2-27, 1997*, pp. 3–83. arXiv: [hep-ph/9810316](https://arxiv.org/abs/hep-ph/9810316) [hep-ph]. URL: <http://www-public.slac.stanford.edu/sciDoc/docMeta.aspx?slacPubNumber=SLAC-PUB-7930>.
- Higgs, Peter W. (1964a). “Broken Symmetries and the Masses of Gauge Bosons.” In: *Phys. Rev. Lett.* 13, [160(1964)], pp. 508–509. DOI: [10.1103/PhysRevLett.13.508](https://doi.org/10.1103/PhysRevLett.13.508).
- (1964b). “Broken symmetries, massless particles and gauge fields.” In: *Phys. Lett.* 12, pp. 132–133. DOI: [10.1016/0031-9163\(64\)91136-9](https://doi.org/10.1016/0031-9163(64)91136-9).
- (1966). “Spontaneous Symmetry Breakdown without Massless Bosons.” In: *Phys. Rev.* 145, pp. 1156–1163. DOI: [10.1103/PhysRev.145.1156](https://doi.org/10.1103/PhysRev.145.1156).
- Hoecker, Andreas et al. (2007). “TMVA: Toolkit for Multivariate Data Analysis.” In: *PoS ACAT*, p. 040. arXiv: [physics/0703039](https://arxiv.org/abs/physics/0703039).
- Huber, Stephan J. (2003). “Flavor violation and warped geometry.” In: *Nucl. Phys.* B666, pp. 269–288. DOI: [10.1016/S0550-3213\(03\)00502-9](https://doi.org/10.1016/S0550-3213(03)00502-9). arXiv: [hep-ph/0303183](https://arxiv.org/abs/hep-ph/0303183) [hep-ph].
- Husemann, Ulrich (2017). “Top-Quark Physics: Status and Prospects.” In: *Prog. Part. Nucl. Phys.* 95, pp. 48–97. DOI: [10.1016/j.ppnp.2017.03.002](https://doi.org/10.1016/j.ppnp.2017.03.002). arXiv: [1704.01356](https://arxiv.org/abs/1704.01356) [hep-ex].
- Identification of b quark jets at the CMS Experiment in the LHC Run 2* (2016). Tech. rep. CMS-PAS-BTV-15-001. Geneva: CERN. URL: <https://cds.cern.ch/record/2138504>.

- Jackiw, R. and K. Johnson (1973). “Dynamical Model of Spontaneously Broken Gauge Symmetries.” In: *Phys. Rev. D* 8 (8), pp. 2386–2398. DOI: [10.1103/PhysRevD.8.2386](https://doi.org/10.1103/PhysRevD.8.2386). URL: <https://link.aps.org/doi/10.1103/PhysRevD.8.2386>.
- Jezabek, M. (1994). “Top quark physics.” In: *Nucl. Phys. Proc. Suppl.* 37B.2, p. 197. DOI: [10.1016/0920-5632\(94\)90677-7](https://doi.org/10.1016/0920-5632(94)90677-7). arXiv: [hep-ph/9406411](https://arxiv.org/abs/hep-ph/9406411) [hep-ph].
- Jezabek, M. and Johann H. Kuhn (1989). “Lepton Spectra from Heavy Quark Decay.” In: *Nucl. Phys.* B320, pp. 20–44. DOI: [10.1016/0550-3213\(89\)90209-5](https://doi.org/10.1016/0550-3213(89)90209-5).
- Jones, R. W. L. (2004). “A combination by the LEP QCD Working Group of  $\alpha(s)$  values derived from event shape variables at LEP.” In: *Nucl. Phys. Proc. Suppl.* 133. [13(2004)], pp. 13–20. DOI: [10.1016/j.nuclphysbps.2004.04.130](https://doi.org/10.1016/j.nuclphysbps.2004.04.130).
- Jueid, Adil (2018). “Probing anomalous  $Wtb$  couplings at the LHC in single  $t$ -channel top quark production.” In: *Phys. Rev.* D98.5, p. 053006. DOI: [10.1103/PhysRevD.98.053006](https://doi.org/10.1103/PhysRevD.98.053006). arXiv: [1805.07763](https://arxiv.org/abs/1805.07763) [hep-ph].
- Jungman, Gerard, Marc Kamionkowski, and Kim Griest (1996). “Supersymmetric dark matter.” In: *Phys. Rept.* 267, pp. 195–373. DOI: [10.1016/0370-1573\(95\)00058-5](https://doi.org/10.1016/0370-1573(95)00058-5). arXiv: [hep-ph/9506380](https://arxiv.org/abs/hep-ph/9506380) [hep-ph].
- Kaplan, David B. and Howard Georgi (1984). “SU(2) x U(1) Breaking by Vacuum Misalignment.” In: *Phys. Lett.* 136B, pp. 183–186. DOI: [10.1016/0370-2693\(84\)91177-8](https://doi.org/10.1016/0370-2693(84)91177-8).
- Kaplan, David E. et al. (2008). “Top Tagging: A Method for Identifying Boosted Hadronically Decaying Top Quarks.” In: *Phys. Rev. Lett.* 101, p. 142001. DOI: [10.1103/PhysRevLett.101.142001](https://doi.org/10.1103/PhysRevLett.101.142001). arXiv: [0806.0848](https://arxiv.org/abs/0806.0848) [hep-ph].
- Kasieczka, Gregor, Tilman Plehn, Michael Russell, et al. (2017). “Deep-learning Top Taggers or The End of QCD?” In: *JHEP* 05, p. 006. DOI: [10.1007/JHEP05\(2017\)006](https://doi.org/10.1007/JHEP05(2017)006). arXiv: [1701.08784](https://arxiv.org/abs/1701.08784) [hep-ph].
- Kasieczka, Gregor, Tilman Plehn, Torben Schell, et al. (2015). “Resonance Searches with an Updated Top Tagger.” In: *JHEP* 06, p. 203. DOI: [10.1007/JHEP06\(2015\)203](https://doi.org/10.1007/JHEP06(2015)203). arXiv: [1503.05921](https://arxiv.org/abs/1503.05921) [hep-ph].
- Kehoe, R., M. Narain, and A. Kumar (2008). “Review of Top Quark Physics Results.” In: *Int. J. Mod. Phys.* A23, pp. 353–470. DOI: [10.1142/S0217751X08039293](https://doi.org/10.1142/S0217751X08039293). arXiv: [0712.2733](https://arxiv.org/abs/0712.2733) [hep-ex].
- Kennedy, D. C. and Paul Langacker (1990). “Precision electroweak experiments and heavy physics: A global analysis.” In: *Phys. Rev. Lett.* 65 (24), pp. 2967–2970. DOI: [10.1103/PhysRevLett.65.2967](https://doi.org/10.1103/PhysRevLett.65.2967). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.65.2967>.
- (1991a). “Erratum: “Precision electroweak experiments and heavy physics: A global analysis [Phys. Rev. Lett. 65, 2967 (1990)].” In: *Phys. Rev. Lett.* 66 (3), pp. 395–395. DOI: [10.1103/PhysRevLett.66.395.2](https://doi.org/10.1103/PhysRevLett.66.395.2). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.66.395.2>.
- (1991b). “Precision electroweak experiments and heavy physics: An update.” In: *Phys. Rev. D* 44 (5), pp. 1591–1592. DOI: [10.1103/PhysRevD.44.1591](https://doi.org/10.1103/PhysRevD.44.1591). URL: <https://link.aps.org/doi/10.1103/PhysRevD.44.1591>.
- Khachatryan, V. et al. (2016). “Measurements of  $t\bar{t}$  spin correlations and top quark polarization using dilepton final states in pp collisions at  $\sqrt{s} = 8$  TeV.” In: *Phys. Rev.* D93.5, p. 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].
- Khachatryan, Vardan et al. (2014a). “Identification techniques for highly boosted W bosons that decay into hadrons.” In: *JHEP* 12, p. 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].
- (2014b). “Observation of the diphoton decay of the Higgs boson and measurement of its properties.” In: *Eur. Phys. J.* C74.10, p. 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].



- (2015a). “Search for a charged Higgs boson in pp collisions at  $\sqrt{s} = 8$  TeV.” In: *JHEP* 11, p. 018. DOI: [10.1007/JHEP11\(2015\)018](#). arXiv: [1508.07774 \[hep-ex\]](#).
- (2015b). “Search for a light charged Higgs boson decaying to  $c\bar{s}$  in pp collisions at  $\sqrt{s} = 8$  TeV.” In: *JHEP* 12, p. 178. DOI: [10.1007/JHEP12\(2015\)178](#). arXiv: [1510.04252 \[hep-ex\]](#).
- (2015c). “Searches for third-generation squark production in fully hadronic final states in proton-proton collisions at  $\sqrt{s} = 8$  TeV.” In: *JHEP* 06, p. 116. DOI: [10.1007/JHEP06\(2015\)116](#). arXiv: [1503.08037 \[hep-ex\]](#).
- (2016a). “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.” In: *JHEP* 01, p. 079. DOI: [10.1007/JHEP01\(2016\)079](#). arXiv: [1510.06534 \[hep-ex\]](#).
- (2016b). “Search for direct pair production of scalar top quarks in the single- and dilepton channels in proton-proton collisions at  $\sqrt{s} = 8$  TeV.” In: *JHEP* 07. [Erratum: *JHEP*09,056(2016)], p. 027. DOI: [10.1007/JHEP07\(2016\)027](#), [10.1007/JHEP09\(2016\)056](#). arXiv: [1602.03169 \[hep-ex\]](#).
- (2016c). “Search for direct pair production of supersymmetric top quarks decaying to all-hadronic final states in pp collisions at  $\sqrt{s} = 8$  TeV.” In: *Eur. Phys. J. C* 76.8, p. 460. DOI: [10.1140/epjc/s10052-016-4292-5](#). arXiv: [1603.00765 \[hep-ex\]](#).
- (2016d). “Search for supersymmetry in events with soft leptons, low jet multiplicity, and missing transverse energy in proton–proton collisions at  $\sqrt{s}=8$  TeV.” In: *Phys. Lett. B* 759, pp. 9–35. DOI: [10.1016/j.physletb.2016.05.033](#). arXiv: [1512.08002 \[hep-ex\]](#).
- (2017). “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.” In: *Phys. Lett. B* 767, pp. 403–430. DOI: [10.1016/j.physletb.2017.02.007](#). arXiv: [1605.08993 \[hep-ex\]](#).
- Kidonakis, Nikolaos (2005). “Charged Higgs production via  $b\bar{g} \rightarrow t\bar{H}^-$  at the LHC.” In: *JHEP* 05, p. 011. DOI: [10.1088/1126-6708/2005/05/011](#). arXiv: [hep-ph/0412422 \[hep-ph\]](#).
- (2006). “Charged Higgs production: Higher-order corrections.” In: *PoS HEP2005*, p. 336. arXiv: [hep-ph/0511235 \[hep-ph\]](#).
- (2014). “Top Quark Production.” In: *Proceedings, Helmholtz International Summer School on Physics of Heavy Quarks and Hadrons (HQ 2013): JINR, Dubna, Russia, July 15-28, 2013*, pp. 139–168. DOI: [10.3204/DESY-PROC-2013-03/Kidonakis](#). arXiv: [1311.0283 \[hep-ph\]](#).
- (2016). “Charged Higgs production in association with a top quark at approximate NNLO.” In: *Phys. Rev. D* 94.1, p. 014010. DOI: [10.1103/PhysRevD.94.014010](#). arXiv: [1605.00622 \[hep-ph\]](#).
- Kidonakis, Nikolaos and Ben D. Pecjak (2012). “Top-quark production and QCD.” In: *Eur. Phys. J. C* 72, p. 2084. DOI: [10.1140/epjc/s10052-012-2084-0](#). arXiv: [1108.6063 \[hep-ph\]](#).
- Kim, Jihn E. and Hans Peter Nilles (1984). “The mu Problem and the Strong CP Problem.” In: *Phys. Lett. B* 138, pp. 150–154. DOI: [10.1016/0370-2693\(84\)91890-2](#).
- King, S. F., M. Muhlleitner, and R. Nevzorov (2012). “NMSSM Higgs Benchmarks Near 125 GeV.” In: *Nucl. Phys. B* 860, pp. 207–244. DOI: [10.1016/j.nuclphysb.2012.02.010](#). arXiv: [1201.2671 \[hep-ph\]](#).
- King, S. F., M. Muhlleitner, et al. (2013). “Natural NMSSM Higgs Bosons.” In: *Nucl. Phys. B* 870, pp. 323–352. DOI: [10.1016/j.nuclphysb.2013.01.020](#). arXiv: [1211.5074 \[hep-ph\]](#).
- King, S.F. and P.L. White (1995). “Resolving the constrained minimal and next-to-minimal supersymmetric standard models.” In: *Phys. Rev. D* 52, pp. 4183–4216. DOI: [10.1103/PhysRevD.52.4183](#). arXiv: [hep-ph/9505326 \[hep-ph\]](#).

- Kingma, Diederik P. and Jimmy Ba (2014). “Adam: A Method for Stochastic Optimization.” In: *CoRR* abs/1412.6980. arXiv: [1412.6980](#). URL: <http://arxiv.org/abs/1412.6980>.
- Kingma, Diederik P and Max Welling (2013). “Auto-Encoding Variational Bayes.” In: *arXiv e-prints*, arXiv:1312.6114, arXiv:1312.6114. arXiv: [1312.6114](#) [stat.ML].
- Kitadono, Yoshio and Hsiang-nan Li (2014). “Jet substructures of boosted polarized top quarks.” In: *Phys. Rev.* D89.11, p. 114002. DOI: [10.1103/PhysRevD.89.114002](#). arXiv: [1403.5512](#) [hep-ph].
- (2016). “Jet substructures of boosted polarized hadronic top quarks.” In: *Phys. Rev.* D93.5, p. 054043. DOI: [10.1103/PhysRevD.93.054043](#). arXiv: [1511.08675](#) [hep-ph].
- Kobayashi, Makoto and Toshihide Maskawa (1973). “CP Violation in the Renormalizable Theory of Weak Interaction.” In: *Prog. Theor. Phys.* 49, pp. 652–657. DOI: [10.1143/PTP.49.652](#).
- Kolodziej, Karol (2013). “Anomalous  $Wtb$  coupling at the LHC.” In: *Acta Phys. Polon.* B44.8, pp. 1775–1789. DOI: [10.5506/APhysPolB.44.1775](#). arXiv: [1212.6733](#) [hep-ph].
- Komiske, Patrick T., Eric M. Metodiev, Benjamin Nachman, et al. (2017). “Pileup Mitigation with Machine Learning (PUMML).” In: *JHEP* 12, p. 051. DOI: [10.1007/JHEP12\(2017\)051](#). arXiv: [1707.08600](#) [hep-ph].
- (2018). “Learning to classify from impure samples with high-dimensional data.” In: *Phys. Rev.* D98.1, p. 011502. DOI: [10.1103/PhysRevD.98.011502](#). arXiv: [1801.10158](#) [hep-ph].
- Komiske, Patrick T., Eric M. Metodiev, and Jesse Thaler (2018). “Energy flow polynomials: A complete linear basis for jet substructure.” In: *JHEP* 04, p. 013. DOI: [10.1007/JHEP04\(2018\)013](#). arXiv: [1712.07124](#) [hep-ph].
- (2019). “Energy Flow Networks: Deep Sets for Particle Jets.” In: *JHEP* 01, p. 121. DOI: [10.1007/JHEP01\(2019\)121](#). arXiv: [1810.05165](#) [hep-ph].
- Kozaczuk, Jonathan and Travis A. W. Martin (2015). “Extending LHC coverage to light pseudoscalar mediators and coy dark sectors.” In: *Journal of High Energy Physics* 2015.4, p. 46. ISSN: 1029-8479. DOI: [10.1007/JHEP04\(2015\)046](#). URL: [http://dx.doi.org/10.1007/JHEP04\(2015\)046](http://dx.doi.org/10.1007/JHEP04(2015)046).
- Kraml, Sabine et al. (2014). “SModelS: a tool for interpreting simplified-model results from the LHC and its application to supersymmetry.” In: *Eur. Phys. J.* C74, p. 2868. DOI: [10.1140/epjc/s10052-014-2868-5](#). arXiv: [1312.4175](#) [hep-ph].
- Krause, A. et al. (1998). “Production of charged Higgs boson pairs in gluon-gluon collisions.” In: *Nucl. Phys.* B519, pp. 85–100. DOI: [10.1016/S0550-3213\(98\)00036-4](#). arXiv: [hep-ph/9707430](#) [hep-ph].
- Krawczyk, M et al. (2017). “Prospects for 2HDM charged Higgs searches.” In: *J. Phys. Conf. Ser.* 873.1, p. 012048. DOI: [10.1088/1742-6596/873/1/012048](#). arXiv: [1703.05925](#) [hep-ph].
- Krohn, David, Matthew D. Schwartz, et al. (2014). “Jet Cleansing: Pileup Removal at High Luminosity.” In: *Phys. Rev.* D90.6, p. 065020. DOI: [10.1103/PhysRevD.90.065020](#). arXiv: [1309.4777](#) [hep-ph].
- Krohn, David, Jessie Shelton, and Lian-Tao Wang (2010). “Measuring the Polarization of Boosted Hadronic Tops.” In: *JHEP* 07, p. 041. DOI: [10.1007/JHEP07\(2010\)041](#). arXiv: [0909.3855](#) [hep-ph].
- Krohn, David, Jesse Thaler, and Lian-Tao Wang (2010). “Jet Trimming.” In: *JHEP* 02, p. 084. DOI: [10.1007/JHEP02\(2010\)084](#). arXiv: [0912.1342](#) [hep-ph].
- Kulesza, Anna et al. (2016). “Soft gluon resummation for associated  $t\bar{t}H$  production at the LHC.” In: *JHEP* 03, p. 065. DOI: [10.1007/JHEP03\(2016\)065](#). arXiv: [1509.02780](#) [hep-ph].

- Kumar, Jacky and Michael Paraskevas (2016). “Distinguishing between MSSM and NMSSM through  $\Delta F = 2$  processes.” In: *JHEP* 10, p. 134. DOI: [10.1007/JHEP10\(2016\)134](https://doi.org/10.1007/JHEP10(2016)134). arXiv: [1608.08794](https://arxiv.org/abs/1608.08794) [hep-ph].
- Kuroda, Masaaki (1999). “Complete Lagrangian of MSSM.” In: arXiv: [hep-ph/9902340](https://arxiv.org/abs/hep-ph/9902340) [hep-ph].
- Lahanas, A. B., V. C. Spanos, and Vasilios Zarikas (2000). “Charge asymmetry in two-Higgs doublet model.” In: *Phys. Lett.* B472, p. 119. DOI: [10.1016/S0370-2693\(99\)01400-8](https://doi.org/10.1016/S0370-2693(99)01400-8). arXiv: [hep-ph/9812535](https://arxiv.org/abs/hep-ph/9812535) [hep-ph].
- Lapsien, Tobias, Roman Kogler, and Johannes Haller (2016). “A new tagger for hadronically decaying heavy particles at the LHC.” In: *Eur. Phys. J.* C76.11, p. 600. DOI: [10.1140/epjc/s10052-016-4443-8](https://doi.org/10.1140/epjc/s10052-016-4443-8). arXiv: [1606.04961](https://arxiv.org/abs/1606.04961) [hep-ph].
- Larkoski, Andrew J. (2017). “An Unorthodox Introduction to QCD.” In: arXiv: [1709.06195](https://arxiv.org/abs/1709.06195) [hep-ph].
- Larkoski, Andrew J., Simone Marzani, et al. (2014). “Soft Drop.” In: *JHEP* 05, p. 146. DOI: [10.1007/JHEP05\(2014\)146](https://doi.org/10.1007/JHEP05(2014)146). arXiv: [1402.2657](https://arxiv.org/abs/1402.2657) [hep-ph].
- Larkoski, Andrew J., Gavin P. Salam, and Jesse Thaler (2013). “Energy Correlation Functions for Jet Substructure.” In: *JHEP* 06, p. 108. DOI: [10.1007/JHEP06\(2013\)108](https://doi.org/10.1007/JHEP06(2013)108). arXiv: [1305.0007](https://arxiv.org/abs/1305.0007) [hep-ph].
- Lecun, Y. et al. (1998). “Gradient-based learning applied to document recognition.” In: *Proceedings of the IEEE* 86.11, pp. 2278–2324. ISSN: 0018-9219. DOI: [10.1109/5.726791](https://doi.org/10.1109/5.726791).
- Lee, Jounghun and Eiichiro Komatsu (2010). “Bullet Cluster: A Challenge to  $\Lambda$ CDM Cosmology.” In: *The Astrophysical Journal* 718.1, pp. 60–65. ISSN: 1538-4357. DOI: [10.1088/0004-637x/718/1/60](https://doi.org/10.1088/0004-637x/718/1/60). URL: <http://dx.doi.org/10.1088/0004-637X/718/1/60>.
- Li, Jinmian et al. (2016). “Boosting the charged Higgs search prospects using jet substructure at the LHC.” In: *JHEP* 11, p. 164. DOI: [10.1007/JHEP11\(2016\)164](https://doi.org/10.1007/JHEP11(2016)164). arXiv: [1609.02645](https://arxiv.org/abs/1609.02645) [hep-ph].
- Louppe, Gilles et al. (2019). “QCD-Aware Recursive Neural Networks for Jet Physics.” In: *JHEP* 01, p. 057. DOI: [10.1007/JHEP01\(2019\)057](https://doi.org/10.1007/JHEP01(2019)057). arXiv: [1702.00748](https://arxiv.org/abs/1702.00748) [hep-ph].
- Lykken, Joseph D. (1996). “Introduction to supersymmetry.” In: *Fields, strings and duality. Proceedings, Summer School, Theoretical Advanced Study Institute in Elementary Particle Physics, TASI’96, Boulder, USA, June 2-28, 1996*, pp. 85–153. arXiv: [hep-th/9612114](https://arxiv.org/abs/hep-th/9612114) [hep-th]. URL: [http://lss.fnal.gov/cgi-bin/find\\_paper.pl?pub-96-445-T](http://lss.fnal.gov/cgi-bin/find_paper.pl?pub-96-445-T).
- Macaluso, Sebastian and David Shih (2018). “Pulling Out All the Tops with Computer Vision and Deep Learning.” In: *JHEP* 10, p. 121. DOI: [10.1007/JHEP10\(2018\)121](https://doi.org/10.1007/JHEP10(2018)121). arXiv: [1803.00107](https://arxiv.org/abs/1803.00107) [hep-ph].
- Mahlon, Gregory and Stephen J. Parke (1996). “Angular correlations in top quark pair production and decay at hadron colliders.” In: *Phys. Rev.* D53, pp. 4886–4896. DOI: [10.1103/PhysRevD.53.4886](https://doi.org/10.1103/PhysRevD.53.4886). arXiv: [hep-ph/9512264](https://arxiv.org/abs/hep-ph/9512264) [hep-ph].
- (2000). “Single top quark production at the LHC: Understanding spin.” In: *Phys. Lett.* B476, pp. 323–330. DOI: [10.1016/S0370-2693\(00\)00149-0](https://doi.org/10.1016/S0370-2693(00)00149-0). arXiv: [hep-ph/9912458](https://arxiv.org/abs/hep-ph/9912458) [hep-ph].
- (2010). “Spin Correlation Effects in Top Quark Pair Production at the LHC.” In: *Phys. Rev.* D81, p. 074024. DOI: [10.1103/PhysRevD.81.074024](https://doi.org/10.1103/PhysRevD.81.074024). arXiv: [1001.3422](https://arxiv.org/abs/1001.3422) [hep-ph].
- Mahmoudi, F., U. Maitra, et al. (2016). “A Higgs in the Warped Bulk and LHC signals.” In: *JHEP* 11, p. 075. DOI: [10.1007/JHEP11\(2016\)075](https://doi.org/10.1007/JHEP11(2016)075). arXiv: [1608.07407](https://arxiv.org/abs/1608.07407) [hep-ph].
- Mahmoudi, F., N. Manglani, and K. Sridhar (2018). “The bulk Higgs in the Deformed RS Model.” In: *Phys. Lett.* B784, pp. 330–335. DOI: [10.1016/j.physletb.2018.08.007](https://doi.org/10.1016/j.physletb.2018.08.007). arXiv: [1712.04966](https://arxiv.org/abs/1712.04966) [hep-ph].

- Maki, Ziro, Masami Nakagawa, and Shoichi Sakata (1962). “Remarks on the unified model of elementary particles.” In: *Prog. Theor. Phys.* 28. [34(1962)], pp. 870–880. DOI: [10.1143/PTP.28.870](#).
- Maltoni, Fabio, Giovanni Ridolfi, and Maria Ubiali (2012). “b-initiated processes at the LHC: a reappraisal.” In: *JHEP* 07. [Erratum: JHEP04,095(2013)], p. 022. DOI: [10.1007/JHEP04\(2013\)095](#), [10.1007/JHEP07\(2012\)022](#). arXiv: [1203.6393 \[hep-ph\]](#).
- Mangano, Michelangelo (2017). “Physics at the FCC-hh, a 100 TeV pp collider.” In: DOI: [10.23731/CYRM-2017-003](#). arXiv: [1710.06353 \[hep-ph\]](#).
- Marciano, William J. and Jonathan L. Rosner (1990). “Atomic parity violation as a probe of new physics.” In: *Phys. Rev. Lett.* 65 (24), pp. 2963–2966. DOI: [10.1103/PhysRevLett.65.2963](#). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.65.2963>.
- (1992). “Atomic Parity Violation as a Probe of New Physics.” In: *Phys. Rev. Lett.* 68 (6), pp. 898–898. DOI: [10.1103/PhysRevLett.68.898](#). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.68.898>.
- Markevitch, Maxim et al. (2004). “Direct constraints on the dark matter self-interaction cross-section from the merging galaxy cluster 1E0657-56.” In: *Astrophys. J.* 606, pp. 819–824. DOI: [10.1086/383178](#). arXiv: [astro-ph/0309303 \[astro-ph\]](#).
- Martin, Stephen P. (1997). “A Supersymmetry primer.” In: [Adv. Ser. Direct. High Energy Phys.18,1(1998)], pp. 1–98. DOI: [10.1142/9789812839657\\_0001](#), [10.1142/9789814307505\\_0001](#). arXiv: [hep-ph/9709356 \[hep-ph\]](#).
- Marzani, Simone, Gregory Soyez, and Michael Spannowsky (2019). “Looking inside jets: an introduction to jet substructure and boosted-object phenomenology.” In: [Lect. Notes Phys.958,pp.(2019)]. DOI: [10.1007/978-3-030-15709-8](#). arXiv: [1901.10342 \[hep-ph\]](#).
- Masci, Jonathan et al. (2011). “[Stacked Convolutional Auto-Encoders for Hierarchical Feature Extraction](#).” In: *21st International Conference on Artificial Neural Networks, Espoo, Finland, June 14-17, 2011, Proceedings, Part I*. Ed. by Timo Honkela et al. International Conference on Artificial Neural Networks (ICANN).
- Mehta, Pankaj and David J. Schwab (2014). “An exact mapping between the Variational Renormalization Group and Deep Learning.” In: *arXiv e-prints*, arXiv:1410.3831, arXiv:1410.3831. arXiv: [1410.3831 \[stat.ML\]](#).
- Mertens, Alexandre (2015). “New features in Delphes 3.” In: *J. Phys. Conf. Ser.* 608.1, p. 012045. DOI: [10.1088/1742-6596/608/1/012045](#).
- Mescheder, Lars, Sebastian Nowozin, and Andreas Geiger (2017). “Adversarial Variational Bayes: Unifying Variational Autoencoders and Generative Adversarial Networks.” In: *arXiv e-prints*, arXiv:1701.04722, arXiv:1701.04722. arXiv: [1701.04722 \[cs.LG\]](#).
- Metodiev, Eric M., Benjamin Nachman, and Jesse Thaler (2017). “Classification without labels: Learning from mixed samples in high energy physics.” In: *JHEP* 10, p. 174. DOI: [10.1007/JHEP10\(2017\)174](#). arXiv: [1708.02949 \[hep-ph\]](#).
- Miller, D. J. et al. (2000). “Detecting heavy charged Higgs bosons at the CERN LHC with four *b* quark tags.” In: *Phys. Rev. D* 61, p. 055011. DOI: [10.1103/PhysRevD.61.055011](#). arXiv: [hep-ph/9906230 \[hep-ph\]](#).



- Miller, D.J., R. Nevzorov, and P.M. Zerwas (2004). “The Higgs sector of the next-to-minimal supersymmetric standard model.” In: *Nucl.Phys.* B681, pp. 3–30. DOI: [10.1016/j.nuclphysb.2003.12.021](https://doi.org/10.1016/j.nuclphysb.2003.12.021). arXiv: [hep-ph/0304049](https://arxiv.org/abs/hep-ph/0304049) [hep-ph].
- Mohapatra, R. N. (1997). “Supersymmetric grand unification.” In: *Supersymmetry, supergravity and supercolliders. Proceedings, Theoretical Advanced Study Institute in elementary particle physics, TASI’97, Boulder, USA, June 2-27, 1997*, pp. 601–657. arXiv: [hep-ph/9801235](https://arxiv.org/abs/hep-ph/9801235) [hep-ph].
- Monk, J. W. (2018). “Deep Learning as a Parton Shower.” In: arXiv: [1807.03685](https://arxiv.org/abs/1807.03685) [hep-ph].
- Moore, Liam et al. (2018). “Reports of My Demise Are Greatly Exaggerated:  $N$ -subjettiness Taggers Take On Jet Images.” In: arXiv: [1807.04769](https://arxiv.org/abs/1807.04769) [hep-ph].
- Moretti, S. and D. P. Roy (1999). “Detecting heavy charged Higgs bosons at the LHC with triple b tagging.” In: *Phys. Lett.* B470, pp. 209–214. DOI: [10.1016/S0370-2693\(99\)01291-5](https://doi.org/10.1016/S0370-2693(99)01291-5). arXiv: [hep-ph/9909435](https://arxiv.org/abs/hep-ph/9909435) [hep-ph].
- Moretti, Stefano (2000). “The  $W^\pm h$  decay channel as a probe of charged Higgs boson production at the Large Hadron Collider.” In: *Physics Letters B* 481.1, pp. 49–56. ISSN: 0370-2693. DOI: [https://doi.org/10.1016/S0370-2693\(00\)00423-8](https://doi.org/10.1016/S0370-2693(00)00423-8). URL: <http://www.sciencedirect.com/science/article/pii/S0370269300004238>.
- (2016). “2HDM Charged Higgs Boson Searches at the LHC: Status and Prospects.” In: *PoS CHARGED2016*, p. 014. arXiv: [1612.02063](https://arxiv.org/abs/1612.02063) [hep-ph].
- Moretti, Stefano and Shoaib Munir (2006). “Di-photon Higgs signals at the LHC in the next-to-minimal supersymmetric standard model.” In: *Eur. Phys. J.* C47, pp. 791–803. DOI: [10.1140/epjc/s2006-02585-7](https://doi.org/10.1140/epjc/s2006-02585-7). arXiv: [hep-ph/0603085](https://arxiv.org/abs/hep-ph/0603085) [hep-ph].
- Moretti, Stefano and Kosuke Odagiri (1997). “Production of charged Higgs bosons of the minimal supersymmetric standard model in b quark initiated processes at the large hadron collider.” In: *Phys. Rev.* D55, pp. 5627–5635. DOI: [10.1103/PhysRevD.55.5627](https://doi.org/10.1103/PhysRevD.55.5627). arXiv: [hep-ph/9611374](https://arxiv.org/abs/hep-ph/9611374) [hep-ph].
- (1999). “The Phenomenology of  $W^\pm H^\pm$  production at the large hadron collider.” In: *Phys. Rev.* D59, p. 055008. DOI: [10.1103/PhysRevD.59.055008](https://doi.org/10.1103/PhysRevD.59.055008). arXiv: [hep-ph/9809244](https://arxiv.org/abs/hep-ph/9809244) [hep-ph].
- Moretti, Stefano, Rui Santos, and Pankaj Sharma (2016). “Optimising Charged Higgs Boson Searches at the Large Hadron Collider Across  $b\bar{b}W^\pm$  Final States.” In: *Phys. Lett.* B760, pp. 697–705. DOI: [10.1016/j.physletb.2016.07.055](https://doi.org/10.1016/j.physletb.2016.07.055). arXiv: [1604.04965](https://arxiv.org/abs/1604.04965) [hep-ph].
- Moult, Ian, Lina Necib, and Jesse Thaler (2016). “New Angles on Energy Correlation Functions.” In: *JHEP* 12, p. 153. DOI: [10.1007/JHEP12\(2016\)153](https://doi.org/10.1007/JHEP12(2016)153). arXiv: [1609.07483](https://arxiv.org/abs/1609.07483) [hep-ph].
- Nambu, Yoichiro and G. Jona-Lasinio (1961a). “Dynamical Model of Elementary Particles Based on an Analogy with Superconductivity. 1.” In: *Phys. Rev.* 122. [127(1961)], pp. 345–358. DOI: [10.1103/PhysRev.122.345](https://doi.org/10.1103/PhysRev.122.345).
- (1961b). “DYNAMICAL MODEL OF ELEMENTARY PARTICLES BASED ON AN ANALOGY WITH SUPERCONDUCTIVITY. II.” In: *Phys. Rev.* 124. [141(1961)], pp. 246–254. DOI: [10.1103/PhysRev.124.246](https://doi.org/10.1103/PhysRev.124.246).
- Nelson, Ann E. and Tuhin S. Roy (2015). “New Supersoft Supersymmetry Breaking Operators and a Solution to the  $\mu$  Problem.” In: *Phys. Rev. Lett.* 114, p. 201802. DOI: [10.1103/PhysRevLett.114.201802](https://doi.org/10.1103/PhysRevLett.114.201802). arXiv: [1501.03251](https://arxiv.org/abs/1501.03251) [hep-ph].
- Odom, B. et al. (2006). “New Measurement of the Electron Magnetic Moment Using a One-Electron Quantum Cyclotron.” In: *Phys. Rev. Lett.* 97 (3), p. 030801. DOI: [10.1103/PhysRevLett.97.030801](https://doi.org/10.1103/PhysRevLett.97.030801).

- arXiv: [0801.1134 \[physics.atom-ph\]](#). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.97.030801>.
- Oliveira, Luke de et al. (2016). “Jet-images — deep learning edition.” In: *JHEP* 07, p. 069. DOI: [10.1007/JHEP07\(2016\)069](#). arXiv: [1511.05190 \[hep-ph\]](#).
- Optimisation of the ATLAS b-tagging performance for the 2016 LHC Run* (2016). Tech. rep. ATL-PHYS-PUB-2016-012. Geneva: CERN. URL: <http://cds.cern.ch/record/2160731>.
- O’Raifeartaigh, L. (1975). “Spontaneous Symmetry Breaking for Chiral Scalar Superfields.” In: *Nucl. Phys.* B96, pp. 331–352. DOI: [10.1016/0550-3213\(75\)90585-4](#).
- Patrick, Riley, Pankaj Sharma, and Anthony G. Williams (2017). “Exploring a heavy charged Higgs using jet substructure in a fully hadronic channel.” In: *Nucl. Phys.* B917, pp. 19–30. DOI: [10.1016/j.nuclphysb.2017.01.031](#). arXiv: [1610.05917 \[hep-ph\]](#).
- Pauli, W. (1941). “Relativistic Field Theories of Elementary Particles.” In: *Rev. Mod. Phys.* 13 (3), pp. 203–232. DOI: [10.1103/RevModPhys.13.203](#). URL: <https://link.aps.org/doi/10.1103/RevModPhys.13.203>.
- Pearkes, Jannicke et al. (2017). “Jet Constituents for Deep Neural Network Based Top Quark Tagging.” In: arXiv: [1704.02124 \[hep-ex\]](#).
- Peccei, R.D. and Helen R. Quinn (1977). “CP Conservation in the Presence of Instantons.” In: *Phys.Rev.Lett.* 38, pp. 1440–1443. DOI: [10.1103/PhysRevLett.38.1440](#).
- Pedersen, Keith and Zack Sullivan (2017). “Probing the two Higgs doublet wedge region with charged Higgs boson decays to boosted jets.” In: *Phys. Rev.* D95.3, p. 035037. DOI: [10.1103/PhysRevD.95.035037](#). arXiv: [1612.03978 \[hep-ph\]](#).
- Perelstein, Maxim and Andreas Weiler (2009). “Polarized Tops from Stop Decays at the LHC.” In: *JHEP* 03, p. 141. DOI: [10.1088/1126-6708/2009/03/141](#). arXiv: [0811.1024 \[hep-ph\]](#).
- Peskin, Michael E. and Tatsu Takeuchi (1990). “New constraint on a strongly interacting Higgs sector.” In: *Phys. Rev. Lett.* 65 (8), pp. 964–967. DOI: [10.1103/PhysRevLett.65.964](#). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.65.964>.
- (1992). “Estimation of oblique electroweak corrections.” In: *Phys. Rev. D* 46 (1), pp. 381–409. DOI: [10.1103/PhysRevD.46.381](#). URL: <https://link.aps.org/doi/10.1103/PhysRevD.46.381>.
- Plehn, Tilman (2003). “Charged Higgs boson production in bottom gluon fusion.” In: *Phys. Rev.* D67, p. 014018. DOI: [10.1103/PhysRevD.67.014018](#). arXiv: [hep-ph/0206121 \[hep-ph\]](#).
- Plehn, Tilman, Gavin P. Salam, and Michael Spannowsky (2010). “Fat Jets for a Light Higgs.” In: *Phys. Rev. Lett.* 104, p. 111801. DOI: [10.1103/PhysRevLett.104.111801](#). arXiv: [0910.5472 \[hep-ph\]](#).
- Plehn, Tilman and Michael Spannowsky (2012). “Top Tagging.” In: *J. Phys.* G39, p. 083001. DOI: [10.1088/0954-3899/39/8/083001](#). arXiv: [1112.4441 \[hep-ph\]](#).
- Plehn, Tilman, Michael Spannowsky, and Michihisa Takeuchi (2011). “Boosted Semileptonic Tops in Stop Decays.” In: *JHEP* 05, p. 135. DOI: [10.1007/JHEP05\(2011\)135](#). arXiv: [1102.0557 \[hep-ph\]](#).
- Plehn, Tilman, Michael Spannowsky, Michihisa Takeuchi, and Dirk Zerwas (2010). “Stop Reconstruction with Tagged Tops.” In: *JHEP* 10, p. 078. DOI: [10.1007/JHEP10\(2010\)078](#). arXiv: [1006.2833 \[hep-ph\]](#).
- Politzer, H. David (1973). “Reliable Perturbative Results for Strong Interactions?” In: *Phys. Rev. Lett.* 30 (26), pp. 1346–1349. DOI: [10.1103/PhysRevLett.30.1346](#). URL: <https://link.aps.org/doi/10.1103/PhysRevLett.30.1346>.



- Pomarol, Alex (2000). “Gauge bosons in a five-dimensional theory with localized gravity.” In: *Phys. Lett.* B486, pp. 153–157. DOI: [10.1016/S0370-2693\(00\)00737-1](https://doi.org/10.1016/S0370-2693(00)00737-1). arXiv: [hep-ph/9911294](https://arxiv.org/abs/hep-ph/9911294) [hep-ph].
- Prasath V, Arun, Rohini M. Godbole, and Saurabh D. Rindani (2015). “Longitudinal top polarisation measurement and anomalous  $Wtb$  coupling.” In: *Eur. Phys. J.* C75.9, p. 402. DOI: [10.1140/epjc/s10052-015-3601-8](https://doi.org/10.1140/epjc/s10052-015-3601-8). arXiv: [1405.1264](https://arxiv.org/abs/1405.1264) [hep-ph].
- “Precision Electroweak Measurements and Constraints on the Standard Model” (2008). In: arXiv: [0811.4682](https://arxiv.org/abs/0811.4682) [hep-ex].
- Prescott Adams, Ryan and Richard S. Zemel (2011). “Ranking via Sinkhorn Propagation.” In: *arXiv e-prints*, arXiv:1106.1925, arXiv:1106.1925. arXiv: [1106.1925](https://arxiv.org/abs/1106.1925) [stat.ML].
- Profumo, Stefano and Tim Stefaniak (2016). “Alignment without Decoupling: the Portal to Light Dark Matter in the MSSM.” In: *Phys. Rev.* D94.9, p. 095020. DOI: [10.1103/PhysRevD.94.095020](https://doi.org/10.1103/PhysRevD.94.095020). arXiv: [1608.06945](https://arxiv.org/abs/1608.06945) [hep-ph].
- Qu, Huilin and Loukas Gouskos (2019). “ParticleNet: Jet Tagging via Particle Clouds.” In: arXiv: [1902.08570](https://arxiv.org/abs/1902.08570) [hep-ph].
- Quevedo, Fernando, Sven Krippendorff, and Oliver Schlotterer (2010). “Cambridge Lectures on Supersymmetry and Extra Dimensions.” In: arXiv: [1011.1491](https://arxiv.org/abs/1011.1491) [hep-th].
- Randall, Lisa and Raman Sundrum (1999a). “A Large mass hierarchy from a small extra dimension.” In: *Phys. Rev. Lett.* 83, pp. 3370–3373. DOI: [10.1103/PhysRevLett.83.3370](https://doi.org/10.1103/PhysRevLett.83.3370). arXiv: [hep-ph/9905221](https://arxiv.org/abs/hep-ph/9905221) [hep-ph].
- (1999b). “An Alternative to compactification.” In: *Phys. Rev. Lett.* 83, pp. 4690–4693. DOI: [10.1103/PhysRevLett.83.4690](https://doi.org/10.1103/PhysRevLett.83.4690). arXiv: [hep-th/9906064](https://arxiv.org/abs/hep-th/9906064) [hep-th].
- Rathsman, Johan and Thomas Rossler (2012). “Closing the Window on Light Charged Higgs Bosons in the NMSSM.” In: *Adv. High Energy Phys.* 2012, p. 853706. DOI: [10.1155/2012/853706](https://doi.org/10.1155/2012/853706). arXiv: [1206.1470](https://arxiv.org/abs/1206.1470) [hep-ph].
- Raychaudhuri, Sreerup and D. P. Roy (1996). “Sharpening up the charged Higgs boson signature using  $\tau$  polarization at LHC.” In: *Phys. Rev.* D53, pp. 4902–4908. DOI: [10.1103/PhysRevD.53.4902](https://doi.org/10.1103/PhysRevD.53.4902). arXiv: [hep-ph/9507388](https://arxiv.org/abs/hep-ph/9507388) [hep-ph].
- Reina, L. and S. Dawson (2001a). “Next-to-leading order results for  $t$  anti- $t$   $h$  production at the Tevatron.” In: *Phys. Rev. Lett.* 87, p. 201804. DOI: [10.1103/PhysRevLett.87.201804](https://doi.org/10.1103/PhysRevLett.87.201804). arXiv: [hep-ph/0107101](https://arxiv.org/abs/hep-ph/0107101) [hep-ph].
- (2001b). “Next-to-Leading Order Results for  $t\bar{t}h$  Production at the Tevatron.” In: *Phys. Rev. Lett.* 87.20. URL: <http://journals.aps.org/prl/abstract/10.1103/PhysRevLett.87.201804>.
- Rosiek, Janusz (1995). “Complete set of Feynman rules for the MSSM: Erratum.” In: arXiv: [hep-ph/9511250](https://arxiv.org/abs/hep-ph/9511250) [hep-ph].
- Roy, D. P. (1999). “The Hadronic  $\tau$  decay signature of a heavy charged Higgs boson at LHC.” In: *Phys. Lett.* B459, pp. 607–614. DOI: [10.1016/S0370-2693\(99\)00724-8](https://doi.org/10.1016/S0370-2693(99)00724-8). arXiv: [hep-ph/9905542](https://arxiv.org/abs/hep-ph/9905542) [hep-ph].
- (2006). “Charged higgs boson search at the LHC.” In: *AIP Conf. Proc.* 805. [110(2005)], pp. 110–116. DOI: [10.1063/1.2149685](https://doi.org/10.1063/1.2149685). arXiv: [hep-ph/0510070](https://arxiv.org/abs/hep-ph/0510070) [hep-ph].
- Roy, Joydeep (2018). “Probing leptoquark chirality via top polarization at the Colliders.” In: arXiv: [1811.12058](https://arxiv.org/abs/1811.12058) [hep-ph].
- Roy, Tuhin S. and Aravind H. Vijay (2019). “A robust anomaly finder based on autoencoder.” In: arXiv: [1903.02032](https://arxiv.org/abs/1903.02032) [hep-ph].

- Rumelhart, David E., Geoffrey E. Hinton, and Ronald J. Williams (1986). “Learning representations by back-propagating errors.” In: *Nature* 323.6088, pp. 533–536. ISSN: 1476-4687. URL: <https://doi.org/10.1038/323533a0>.
- Sakharov, A. D. (1967). “Violation of CP Invariance, C asymmetry, and baryon asymmetry of the universe.” In: *Pisma Zh. Eksp. Teor. Fiz.* 5. [Usp. Fiz. Nauk161,no.5,61(1991)], pp. 32–35. DOI: [10.1070/PU1991v034n05ABEH002497](https://doi.org/10.1070/PU1991v034n05ABEH002497).
- Salam, Abdus (1968). “Weak and Electromagnetic Interactions.” In: *Conf. Proc.* C680519, pp. 367–377.
- Salam, Gavin P. (2010). “Towards Jetography.” In: *Eur. Phys. J.* C67, pp. 637–686. DOI: [10.1140/epjc/s10052-010-1314-6](https://doi.org/10.1140/epjc/s10052-010-1314-6). arXiv: [0906.1833](https://arxiv.org/abs/0906.1833) [hep-ph].
- Schael, S. et al. (2006). “Precision electroweak measurements on the  $Z$  resonance.” In: *Phys. Rept.* 427, pp. 257–454. DOI: [10.1016/j.physrep.2005.12.006](https://doi.org/10.1016/j.physrep.2005.12.006). arXiv: [hep-ex/0509008](https://arxiv.org/abs/hep-ex/0509008) [hep-ex].
- Schapire, Robert E. (1990). “The strength of weak learnability.” In: *Machine Learning* 5.2, pp. 197–227. ISSN: 1573-0565. DOI: [10.1007/BF00116037](https://doi.org/10.1007/BF00116037). URL: <https://doi.org/10.1007/BF00116037>.
- Schwienhorst, Reinhard et al. (2011). “Single top quark production and decay in the  $t$ -channel at next-to-leading order at the LHC.” In: *Phys. Rev.* D83, p. 034019. DOI: [10.1103/PhysRevD.83.034019](https://doi.org/10.1103/PhysRevD.83.034019). arXiv: [1012.5132](https://arxiv.org/abs/1012.5132) [hep-ph].
- Search for a high-mass resonance decaying into a dilepton final state in  $13\text{ fb}^{-1}$  of  $pp$  collisions at  $\sqrt{s} = 13\text{ TeV}$*  (2016). Tech. rep. CMS-PAS-EXO-16-031. Geneva: CERN. URL: <https://cds.cern.ch/record/2205764>.
- Search for Charged Higgs boson to  $c\bar{b}$  in lepton+jets channel using top quark pair events* (2016). Tech. rep. CMS-PAS-HIG-16-030. Geneva: CERN. URL: <https://cds.cern.ch/record/2209237>.
- Search for charged Higgs bosons in the  $H^\pm \rightarrow tb$  decay channel in  $pp$  collisions at  $\sqrt{s} = 13\text{ TeV}$  using the ATLAS detector* (2016). Tech. rep. ATLAS-CONF-2016-089. Geneva: CERN. URL: <http://cds.cern.ch/record/2206809>.
- Search for charged Higgs bosons in the  $\tau$ +jets final state using  $14.7\text{ fb}^{-1}$  of  $pp$  collision data recorded at  $\sqrt{s} = 13\text{ TeV}$  with the ATLAS experiment* (2016). Tech. rep. ATLAS-CONF-2016-088. Geneva: CERN. URL: <http://cds.cern.ch/record/2206282>.
- Search for charged Higgs bosons with the  $H^\pm \rightarrow \tau^\pm \nu_\tau$  decay channel in the fully hadronic final state at  $\sqrt{s} = 13\text{ TeV}$*  (2016). Tech. rep. CMS-PAS-HIG-16-031. Geneva: CERN. URL: <https://cds.cern.ch/record/2223865>.
- Seiberg, Nathan (1993). “Naturalness versus supersymmetric nonrenormalization theorems.” In: *Phys. Lett.* B318, pp. 469–475. DOI: [10.1016/0370-2693\(93\)91541-T](https://doi.org/10.1016/0370-2693(93)91541-T). arXiv: [hep-ph/9309335](https://arxiv.org/abs/hep-ph/9309335) [hep-ph].
- Sekhar Chivukula, R., Elizabeth H. Simmons, and Natascia Vignaroli (2015). “Distinguishing dijet resonances at the LHC.” In: *Phys. Rev.* D91.5, p. 055019. DOI: [10.1103/PhysRevD.91.055019](https://doi.org/10.1103/PhysRevD.91.055019). arXiv: [1412.3094](https://arxiv.org/abs/1412.3094) [hep-ph].
- Selvaggi, Michele (2014). “DELPHES 3: A modular framework for fast-simulation of generic collider experiments.” In: *J. Phys. Conf. Ser.* 523, p. 012033. DOI: [10.1088/1742-6596/523/1/012033](https://doi.org/10.1088/1742-6596/523/1/012033).
- Seymour, M. H. (1991). “Tagging a heavy Higgs boson.” In: *ECFA Large Hadron Collider Workshop, Aachen, Germany, 4-9 Oct 1990: Proceedings.2*. Pp. 557–569.
- Seymour, Michael H. (1994a). “Searches for new particles using cone and cluster jet algorithms: A Comparative study.” In: *Z. Phys.* C62, pp. 127–138. DOI: [10.1007/BF01559532](https://doi.org/10.1007/BF01559532).

- (1994b). “The Average number of subjects in a hadron collider jet.” In: *Nucl. Phys.* B421, pp. 545–564. DOI: [10.1016/0550-3213\(94\)90516-9](https://doi.org/10.1016/0550-3213(94)90516-9).
- Shelton, Jessie (2009). “Polarized tops from new physics: signals and observables.” In: *Phys. Rev.* D79, p. 014032. DOI: [10.1103/PhysRevD.79.014032](https://doi.org/10.1103/PhysRevD.79.014032). arXiv: [0811.0569 \[hep-ph\]](https://arxiv.org/abs/0811.0569).
- (2013). “Jet Substructure.” In: *Proceedings, Theoretical Advanced Study Institute in Elementary Particle Physics: Searching for New Physics at Small and Large Scales (TASI 2012): Boulder, Colorado, June 4-29, 2012*, pp. 303–340. DOI: [10.1142/9789814525220\\_0007](https://doi.org/10.1142/9789814525220_0007). arXiv: [1302.0260 \[hep-ph\]](https://arxiv.org/abs/1302.0260).
- Sirunyan, A. M. et al. (2018a). “Identification of heavy-flavour jets with the CMS detector in pp collisions at 13 TeV.” In: *Journal of Instrumentation* 13.05, P05011. URL: <http://stacks.iop.org/1748-0221/13/i=05/a=P05011>.
- (2018b). “Identification of heavy-flavour jets with the CMS detector in pp collisions at 13 TeV.” In: *JINST* 13.05, P05011. DOI: [10.1088/1748-0221/13/05/P05011](https://doi.org/10.1088/1748-0221/13/05/P05011). arXiv: [1712.07158 \[physics.ins-det\]](https://arxiv.org/abs/1712.07158).
- Sirunyan, Albert M et al. (2017). “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.” In: *Phys. Rev. Lett.* 119.14, p. 141802. DOI: [10.1103/PhysRevLett.119.141802](https://doi.org/10.1103/PhysRevLett.119.141802). arXiv: [1705.02942 \[hep-ex\]](https://arxiv.org/abs/1705.02942).
- (2018a). “Search for additional neutral MSSM Higgs bosons in the  $\tau\tau$  final state in proton-proton collisions at  $\sqrt{s} = 13$  TeV.” In: arXiv: [1803.06553 \[hep-ex\]](https://arxiv.org/abs/1803.06553).
- (2018b). “Search for natural and split supersymmetry in proton-proton collisions at  $\sqrt{s} = 13$  TeV in final states with jets and missing transverse momentum.” In: *JHEP* 05, p. 025. DOI: [10.1007/JHEP05\(2018\)025](https://doi.org/10.1007/JHEP05(2018)025). arXiv: [1802.02110 \[hep-ex\]](https://arxiv.org/abs/1802.02110).
- (2018c). “Search for resonant  $t\bar{t}$  production in proton-proton collisions at  $\sqrt{s} = 13$  TeV.” In: *Submitted to: JHEP*. arXiv: [1810.05905 \[hep-ex\]](https://arxiv.org/abs/1810.05905).
- (2019a). “Measurement of electroweak WZ boson production and search for new physics in WZ + two jets events in pp collisions at  $\sqrt{s} = 13$  TeV.” In: *Phys. Lett.* B795, pp. 281–307. DOI: [10.1016/j.physletb.2019.05.042](https://doi.org/10.1016/j.physletb.2019.05.042). arXiv: [1901.04060 \[hep-ex\]](https://arxiv.org/abs/1901.04060).
- (2019b). “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.” In: *Phys. Rev. Lett.* 123.13, p. 131802. DOI: [10.1103/PhysRevLett.123.131802](https://doi.org/10.1103/PhysRevLett.123.131802). arXiv: [1905.07453 \[hep-ex\]](https://arxiv.org/abs/1905.07453).
- (2019c). “Search for anomalous electroweak production of vector boson pairs in association with two jets in proton-proton collisions at 13 TeV.” In: *Phys. Lett.* B798, p. 134985. DOI: [10.1016/j.physletb.2019.134985](https://doi.org/10.1016/j.physletb.2019.134985). arXiv: [1905.07445 \[hep-ex\]](https://arxiv.org/abs/1905.07445).
- (2019d). “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.” In: *JHEP* 07, p. 142. DOI: [10.1007/JHEP07\(2019\)142](https://doi.org/10.1007/JHEP07(2019)142). arXiv: [1903.04560 \[hep-ex\]](https://arxiv.org/abs/1903.04560).
- Sjöstrand, Torbjorn, Stephen Mrenna, and Peter Z. Skands (2006). “PYTHIA 6.4 Physics and Manual.” In: *JHEP* 05, p. 026. DOI: [10.1088/1126-6708/2006/05/026](https://doi.org/10.1088/1126-6708/2006/05/026). arXiv: [hep-ph/0603175 \[hep-ph\]](https://arxiv.org/abs/hep-ph/0603175).
- Sjöstrand, Torbjörn et al. (2015). “An Introduction to PYTHIA 8.2.” In: *Comput. Phys. Commun.* 191, pp. 159–177. DOI: [10.1016/j.cpc.2015.01.024](https://doi.org/10.1016/j.cpc.2015.01.024). arXiv: [1410.3012 \[hep-ph\]](https://arxiv.org/abs/1410.3012).
- Soper, Davison E. and Michael Spannowsky (2013). “Finding top quarks with shower deconstruction.” In: *Phys. Rev.* D87, p. 054012. DOI: [10.1103/PhysRevD.87.054012](https://doi.org/10.1103/PhysRevD.87.054012). arXiv: [1211.3140 \[hep-ph\]](https://arxiv.org/abs/1211.3140).
- (2014). “Finding physics signals with event deconstruction.” In: *Phys. Rev.* D89.9, p. 094005. DOI: [10.1103/PhysRevD.89.094005](https://doi.org/10.1103/PhysRevD.89.094005). arXiv: [1402.1189 \[hep-ph\]](https://arxiv.org/abs/1402.1189).

- Spira, Michael (1998). “QCD effects in Higgs physics.” In: *Fortsch. Phys.* 46, pp. 203–284. DOI: [10.1002/\(SICI\)1521-3978\(199804\)46:3<203::AID-PROP203>3.0.CO;2-4](#). arXiv: [hep-ph/9705337 \[hep-ph\]](#).
- Spira, M. et al. (1995). “Higgs boson production at the LHC.” In: *Nucl. Phys.* B453, pp. 17–82. DOI: [10.1016/0550-3213\(95\)00379-7](#). arXiv: [hep-ph/9504378 \[hep-ph\]](#).
- Sterman, George F. (2008). “Some Basic Concepts of Perturbative QCD.” In: *Acta Phys. Polon.* B39, pp. 2151–2172. arXiv: [0807.5118 \[hep-ph\]](#).
- Stewart, Iain W., Frank J. Tackmann, and Wouter J. Waalewijn (2010). “N-Jettiness: An Inclusive Event Shape to Veto Jets.” In: *Phys. Rev. Lett.* 105, p. 092002. DOI: [10.1103/PhysRevLett.105.092002](#). arXiv: [1004.2489 \[hep-ph\]](#).
- Sullivan, Zack (2002). “Fully Differential  $W'$  Production and Decay at Next-to-Leading Order in QCD.” In: *Phys. Rev.* D66, p. 075011. DOI: [10.1103/PhysRevD.66.075011](#). arXiv: [hep-ph/0207290 \[hep-ph\]](#).
- Susskind, Leonard (1979). “Dynamics of spontaneous symmetry breaking in the Weinberg-Salam theory.” In: *Phys. Rev. D* 20 (10), pp. 2619–2625. DOI: [10.1103/PhysRevD.20.2619](#). URL: <https://link.aps.org/doi/10.1103/PhysRevD.20.2619>.
- ’t Hooft, Gerard (1971a). “Renormalizable Lagrangians for Massive Yang-Mills Fields.” In: *Nucl. Phys.* B35. [201(1971)], pp. 167–188. DOI: [10.1016/0550-3213\(71\)90139-8](#).
- (1971b). “Renormalization of Massless Yang-Mills Fields.” In: *Nucl. Phys.* B33, pp. 173–199. DOI: [10.1016/0550-3213\(71\)90395-6](#).
- Tanabashi, M. et al. (2018). “Review of Particle Physics.” In: *Phys. Rev.* D98.3, p. 030001. DOI: [10.1103/PhysRevD.98.030001](#).
- Tang, Yuan (2016). “TF.Learn: TensorFlow’s High-level Module for Distributed Machine Learning.” In: *CoRR* abs/1612.04251. arXiv: [1612.04251](#). URL: <http://arxiv.org/abs/1612.04251>.
- Terning, J. (2006). *Modern supersymmetry: Dynamics and duality*. DOI: [10.1093/acprof:oso/9780198567639.001.0001](#).
- Thaler, Jesse and Ken Van Tilburg (2011). “Identifying Boosted Objects with N-subjettiness.” In: *JHEP* 03, p. 015. DOI: [10.1007/JHEP03\(2011\)015](#). arXiv: [1011.2268 \[hep-ph\]](#).
- (2012). “Maximizing Boosted Top Identification by Minimizing N-subjettiness.” In: *JHEP* 02, p. 093. DOI: [10.1007/JHEP02\(2012\)093](#). arXiv: [1108.2701 \[hep-ph\]](#).
- The ALEPH, DELPHI, L3, OPAL Collaborations, the LEP Electroweak Working Group (2013). “Electroweak Measurements in Electron-Positron Collisions at W-Boson-Pair Energies at LEP.” In: *Phys. Rept.* 532, p. 119. arXiv: [1302.3415 \[hep-ex\]](#).
- Thompson, Robert, Romeel Dave, and Kentaro Nagamine (2015). “The rise and fall of a challenger: the Bullet Cluster in  $\Lambda$  cold dark matter simulations.” In: *Mon. Not. Roy. Astron. Soc.* 452.3, pp. 3030–3037. DOI: [10.1093/mnras/stv1433](#). arXiv: [1410.7438 \[astro-ph.CO\]](#).
- Tkachov, Fyodor V. (1997). “Measuring multi - jet structure of hadronic energy flow or What is a jet?” In: *Int. J. Mod. Phys.* A12, pp. 5411–5529. DOI: [10.1142/S0217751X97002899](#). arXiv: [hep-ph/9601308 \[hep-ph\]](#).
- Trimble, Virginia (1987). “Existence and Nature of Dark Matter in the Universe.” In: *Ann. Rev. Astron. Astrophys.* 25, pp. 425–472. DOI: [10.1146/annurev.aa.25.090187.002233](#).
- Tweedie, Brock (2014). “Better Hadronic Top Quark Polarimetry.” In: *Phys. Rev.* D90.9, p. 094010. DOI: [10.1103/PhysRevD.90.094010](#). arXiv: [1401.3021 \[hep-ph\]](#).



- Uwer, Peter (2005). “Maximizing the spin correlation of top quark pairs produced at the Large Hadron Collider.” In: *Phys. Lett. B* 609, pp. 271–276. DOI: [10.1016/j.physletb.2005.01.005](https://doi.org/10.1016/j.physletb.2005.01.005). arXiv: [hep-ph/0412097](https://arxiv.org/abs/hep-ph/0412097) [hep-ph].
- Veelken, Christian (2014). *Searches for MSSM and NMSSM Higgs bosons with the CMS detector*. Tech. rep. CMS-CR-2014-260. Geneva: CERN. URL: <https://cds.cern.ch/record/1953441>.
- Weinberg, S. (1979). “Implications of dynamical symmetry breaking: An addendum.” In: *Phys. Rev. D* 19 (4), pp. 1277–1280. DOI: [10.1103/PhysRevD.19.1277](https://doi.org/10.1103/PhysRevD.19.1277). URL: <https://link.aps.org/doi/10.1103/PhysRevD.19.1277>.
- Weinberg, Steven (1967). “A Model of Leptons.” In: *Phys. Rev. Lett.* 19, pp. 1264–1266. DOI: [10.1103/PhysRevLett.19.1264](https://doi.org/10.1103/PhysRevLett.19.1264).
- (1976). “Implications of dynamical symmetry breaking.” In: *Phys. Rev. D* 13 (4), pp. 974–996. DOI: [10.1103/PhysRevD.13.974](https://doi.org/10.1103/PhysRevD.13.974). URL: <https://link.aps.org/doi/10.1103/PhysRevD.13.974>.
- (1979). “Gauge hierarchies.” In: *Physics Letters B* 82.3, pp. 387–391. ISSN: 0370-2693. DOI: [https://doi.org/10.1016/0370-2693\(79\)90248-X](https://doi.org/10.1016/0370-2693(79)90248-X). URL: <http://www.sciencedirect.com/science/article/pii/037026937990248X>.
- Weinstein, Marvin (1973). “Conserved Currents, Their Commutators, and the Symmetry Structure of Renormalizable Theories of Electromagnetic, Weak, and Strong Interactions.” In: *Phys. Rev. D* 8 (8), pp. 2511–2524. DOI: [10.1103/PhysRevD.8.2511](https://doi.org/10.1103/PhysRevD.8.2511). URL: <https://link.aps.org/doi/10.1103/PhysRevD.8.2511>.
- Wess, J. and J. Bagger (1992). *Supersymmetry and supergravity*. Princeton, NJ, USA: Princeton University Press. ISBN: 9780691025308.
- Wilson, Kenneth G. (1971). “Renormalization Group and Strong Interactions.” In: *Phys. Rev. D* 3 (8), pp. 1818–1846. DOI: [10.1103/PhysRevD.3.1818](https://doi.org/10.1103/PhysRevD.3.1818). URL: <https://link.aps.org/doi/10.1103/PhysRevD.3.1818>.
- Yang, C. N. and R. L. Mills (1954). “Conservation of Isotopic Spin and Isotopic Gauge Invariance.” In: *Phys. Rev.* 96 (1), pp. 191–195. DOI: [10.1103/PhysRev.96.191](https://doi.org/10.1103/PhysRev.96.191). URL: <https://link.aps.org/doi/10.1103/PhysRev.96.191>.
- Yang, Shuo and Qi-Shu Yan (2012). “Searching for Heavy Charged Higgs Boson with Jet Substructure at the LHC.” In: *JHEP* 02, p. 074. DOI: [10.1007/JHEP02\(2012\)074](https://doi.org/10.1007/JHEP02(2012)074). arXiv: [1111.4530](https://arxiv.org/abs/1111.4530) [hep-ph].
- Yaser Ayazi, Seyed and Mojtaba Mohammadi Najafabadi (2011). “The Impact of Kaluza-Klein Excited W Boson on the Single Top at LHC and Comparison with other Models.” In: *J. Phys.* G38, p. 085002. DOI: [10.1088/0954-3899/38/8/085002](https://doi.org/10.1088/0954-3899/38/8/085002). arXiv: [1006.2647](https://arxiv.org/abs/1006.2647) [hep-ph].
- Yukawa, Hideki (1935). “On the Interaction of Elementary Particles I.” In: *Proc. Phys. Math. Soc. Jap.* 17. [Prog. Theor. Phys. Suppl.1,1(1935)], pp. 48–57. DOI: [10.1143/PTPS.1.1](https://doi.org/10.1143/PTPS.1.1).
- Zarikas, Vasilios (1996). “The Phase transition of the two Higgs extension of the standard model.” In: *Phys. Lett. B* 384, pp. 180–184. DOI: [10.1016/0370-2693\(96\)00701-0](https://doi.org/10.1016/0370-2693(96)00701-0). arXiv: [hep-ph/9509338](https://arxiv.org/abs/hep-ph/9509338) [hep-ph].
- Zhang, Yu et al. (2014). “QCD NLO and EW NLO corrections to  $t\bar{t}H$  production with top quark decays at hadron collider.” In: *Phys. Lett. B* 738, pp. 1–5. DOI: [10.1016/j.physletb.2014.09.022](https://doi.org/10.1016/j.physletb.2014.09.022). arXiv: [1407.1110](https://arxiv.org/abs/1407.1110) [hep-ph].
- Zucconi, Alan (n.d.). *AN INTRODUCTION TO AUTOENCODERS*. URL: <https://www.alanzucconi.com/2018/03/14/an-introduction-to-autoencoders/>.