

Luca Pernié

Curriculum Vitae

Education

- 2011-2015 **Ph.D.**, *Université Libre de Bruxelles; Sapienza Università di Roma.*
Supervisor: Pascal Vanlaer: Chargé de cours at the Université Libre de Bruxelles.
Daniele Del Re: Assistant Professor at Sapienza Università di Roma.
- 2006-2011 **Bachelor-Master's Degree**, *Sapienza Università di Roma, Grade: 110/110.*
Supervisor: Daniele Del Re: Assistant Professor at Sapienza Università di Roma.

Experience

- 2015-present **Postdoctoral fellow**, *Texas A&M University.*
Principal Investigator: Alexei Safonov, professor at Texas A&M University
- Physics analysis**
Search for Beyond the Standard Model light bosons decaying into muon pairs.
Resonant di-Higgs production into the $H \rightarrow hh \rightarrow WWbb \rightarrow \ell\nu\ell\nu bb$ final state.
- Detector**
Track-based alignment of the CMS muon system
- Leadership and Service**
Level 2 convener in the Physics Performance Detector group (Alignment, Calibration and Databases area).
Muon Alignment representative at Muon Detector Performance Group Office.
- 2011-2015 **Ph.D.**, *Université Libre de Bruxelles; Sapienza Università di Roma.*
- Physics analysis**
Measurement of the Z boson pair-production cross section in proton-proton collisions at 7 and 8 TeV.
Search for the Higgs boson in the $H \rightarrow ZZ \rightarrow 2l2\nu$ decay channel in pp collisions with the CMS detector.
- Detector**
Intercalibration of the CMS Electromagnetic calorimeter.
ECAL timing studies for the phase-2 upgrade of the CMS experiment.
- 2006-2011 **Bachelor-Master's Degree**, *Sapienza Università di Roma.*

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Physics analysis

Search for a Standard Model Higgs boson in the $H \rightarrow WW \rightarrow l\nu jj$ decay channel at the CMS experiment.

Awards

- 09/2016 Distinguished Postdoctoral Flash talk
- 01/2014-15 One year grant as CERN-INFN associate (fellow position at CERN)
- 01/2013 Best group presentation at CMSSDAS, Hamburg, Germany

Responsibilities

- 11/2017 Organizer of the workshop: Machine Learning in Science
- 09/2017 Data Manager for the CERN Tier2
- 09/2017 Level 2 convener of the CMS Physics Performance Detector group in Alca/DB (Alignment Calibration and Database)
- 04/2017 Organizer of the Large hadron Collider Virtual Tour for the physics and engineering Festival at Texas A&M University
- 09-12/2016-17 Organizer of the autumn High Energy Physics Experiment Cosmology (HEPEC) seminars at Texas A&M University
- 03/2016-17 Muon Alignment responsible in the CMS DPGO (Detector Performance Group Office)
- 01-06/2016-17 Organizer of the spring High Energy Physics Experiment Cosmology (HEPEC) seminars at Texas A&M University
- 03-04/2015 ECAL High Voltage Calibration
- 09/2014-17 Official guide of the CMS experiment

Computer

- OS Linux, Mac Os X, Windows
- Computing Bash, C, C++, Python, ROOT
- Deep Learning Keras, TensorFlow, Theano, TMVA
- Code SVN, Git
- Maintenance

Languages

- Italian Mother tongue
- English Advanced
- Spanish Advanced
- French Basic

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Publications

Full list of publications (over 400 as a member of CMS Collaborations) is available upon request, or it can be accessed through this [link](#).

[Refereed journal publication \(major contribution\)](#)

- Phys. Rev. D 96 (2017) Resonant Di-Higgs Production in the $bbWW$ Channel: Probing the Electroweak Phase Transition at the LHC, doi:10.1103/PhysRevD.96.035007
- Eur. Phys. J. C 75 (2015) Measurements of the ZZ production cross sections in the $2l2\nu$ channel in proton-proton collisions at $\sqrt{s} = 7$ and 8 TeV and combined constraints on triple gauge couplings
- NIMA vol. 797 Response of microchannel plates to single particles and to electromagnetic showers (Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment, doi:10.1016/j.nima.2015.06.057)

[Unrefereed publication \(major contribution\)](#)

- CMS DP 2017-046 Performance of the Track-Based Muon alignment algorithm
- CMS PAS HIG-16-035 A Search for BSM Light Bosons Decaying into Muon Pairs
- CMS AN 2016-044 A Search for Beyond Standard Model Light Bosons Decaying into Muon Pairs
- CMS DP 2016-053 Performance of Track-based Muon Alignment
- CMS CR 2015-101 Simulation studies on precise timing information during High Luminosity LHC
- CMS CR 2014-181 Measurement of the ZZ production cross section in the $2l2\nu$ decay channel and limits on anomalous triple gauge couplings (preliminary results)
- CMS AN 2014-088 Performance of jets and missing transverse energy with fast ECAL timing
- CMS DN 2014-06 Studies on a precision timing electromagnetic calorimeter for the CMS upgrade
- CMS CR 013-453 ZZ cross section measurements and limits on anomalous coupling constants for neutral triple gauge boson
- CMS AN 2013-411 Bounding the Higgs width using Z to ll events with high missing transverse energy
- CMS AN 2013-344 CMS ECAL calibration with π^0 and η in the LHC RUN1
- CMS AN 2013-333 Search for $Z(\rightarrow ll) H(\rightarrow \text{invisible})$ at $\sqrt{s} = 7$ and 8 TeV
- CMS CR 2013-284 Evolution of the response of the CMS ECAL, and upgrade design options for electromagnetic calorimetry at the HL-LHC, CMS Conference report

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- CMS PAS SMP-12-016 Measurements of the ZZ production cross sections in the $2l2\nu$ channel in proton-proton collisions at $\sqrt{s} = 7$ and 8 TeV and combined constraints on triple gauge couplings
- CMS AN 2012-371 Search for a high-mass Higgs boson in the $H \rightarrow ZZ \rightarrow 2l2\nu$ decay channel in pp collisions with the CMS detector
- CMS AN 2012-148 Measurement of ZZ production cross section at 7 and 8 TeV and anomalous gauge couplings limits in $2l2\nu$ decay channel
- CMS AN 2012-138 Search for the Higgs boson in the $H \rightarrow ZZ \rightarrow 2l2\nu$ decay channel in pp collisions with the CMS detector
- CMS AN 2012-123 Search for Invisible Higgs Decays in the $ZH \rightarrow ll + \text{MET}$ channel
- CMS AN 2012-004 Search for a Standard Model Higgs boson in the decay channel $H \rightarrow WW \rightarrow lvjj$
- CMS AN 2011-432 Search for Higgs Boson Decays to two W Bosons in the Fully Leptonic Final State with Full 2011 pp Dataset at $\sqrt{s} = 7$ TeV
- CMS AN 2011-110 Search for a Standard Model Higgs boson produced via vector boson fusion, in the decay channel $H \rightarrow WW \rightarrow lvjj$
- [Refereed journal publication \(serving as referee\)](#)
- Under Review Physical Review Letters for: Search for dark matter produced in association with a Higgs boson decaying to bb using 36 fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector
- CERN-EP-2017-243 Analysis Review Committee for: Search for SUSY with multileptons in 13 TeV data

Selected talks and presentations

- 06/2017 Talk; Madrid, Instituto de Fisica Teorica. Title: Searches for extended Higgs sectors with the CMS experiment.
- 05/2017 Invited talk; Costing Review: motivation for the construction of each element of the alignment system for GE2/1 and ME0 detectors. Title: A summary of the current techniques/methods used in CMS for Muon Alignment.
- 05/2017 Plenary talk; Texas A&M University. Mitchell Workshop on Collider and Dark Matter Physics. Title: Hidden sectors at colliders.
- 02/2017 Plenary talk; Santa Fe Jets and Heavy Flavor 2017, Los Alamos National Laboratory. Title: CMS measurements of the Higgs, Higgs properties, and BSM searches.
- 02/2017 Invited seminar (Plenary); Heavy Energy Physics Experiment and Cosmology Seminars, Texas A&M University. Title: Resonant Di-Higgs Production: Probing the Electroweak Phase Transition at the LHC.
- 01/2017 Plenary talk, CMS Run and Detector performance Group Workshop; Turin, Italy. Title: Status and plans for the CMS Track-based muon alignment.
- 25/2016 Invited seminar (Plenary); University of Massachusetts Amherst, Title: Resonant Di-Higgs Production in the $bbWW$ Channel: Probing the Electroweak Phase Transition at the LHC.

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- 21/2016 Plenary flash talk; Texas A&M University, TAMU Postdoctoral Research Symposium, Title: Extending The Higgs sector.
- 05/2016 Invited seminar (Plenary); Texas A&M University, Mitchell Workshop on Collider and Dark Matter Physics, Title: Search for Beyond Standard Model Higgs with the CMS experiment.
- 05/2016 Talk; Pittsburgh, Pheno2016: Phenomenology 2016 Symposium, Title: Extended Higgs searches at the CMS experiment.
- 04/2015 Invited seminar (Plenary); Texas A&M University, Title: Measurement of the Z boson pair-production cross section in proton-proton collisions at 7 and 8 TeV, and ECAL timing studies for the phase-2 upgrade of the CMS experiment.
- 03/2015 Poster; LHCC Conference, CERN, Title: Simulation studies on precise timing information during High Luminosity LHC [CMS CR-2015/101].
- 06/2014 Poster: Large Hadron Collider Physics (LHCP) Conference; ZZ cross-section measurement and limits on anomalous neutral triple gauge couplings at the CMS detector. Proceeding CMS CR-2014/181 published in eConf (arXiv:1409.1740).
- 09/2013 Talk: 14th ICATPP Conference on Astroparticle, Particle, Space Physics and Detectors for Physics Applications; Evolution of the response of the CMS ECAL, and upgrade design options for electromagnetic calorimetry at the HL-LHC. Proceeding CMS CR-2013/284 published in World Scientific (doi:10.1142/9789814603164_0061).
- 08/2013 Plenary talk: 16th Lomonosov Conference on Elementary Particle Physics, Moscow State University; ZZ cross section measurements and limits on anomalous coupling constants for neutral triple gauge boson. Proceeding CMS CR-2013/453 published on World Scientific Publ. Co., Singapore.
- 05/2013 Plenary talk: Belgian physics Society (BPS); Title: ZZ cross section measurement at CMS experiment and aTGC limits [CMS PAS SMP-12-016].
- 05/2013 Plenary talk: Annual meeting of particles AND astrophysics (PANDA); Title: ZZ cross section measurement at CMS experiment and aTGC limits [CMS PAS SMP-12-016].
- 09/2013 Poster; LHCC, CERN, Title: ZZ cross-section measurement and limits on anomalous neutral triple gauge couplings [CMS PAS SMP-12-016].

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