

PERSONAL INFORMATION **Giovanni Padovano**CV APPLIED FOR **Pubblicazione amministrazione trasparente - Bando DD 303/2023**

EDUCATION

UniversityNovember 2020 – ongoing **Ph.D student in Physics**

Sapienza University of Rome, Rome (IT).

Supervisors: Prof. S. Giagu and M. Bauce. Referee: A. Nisati.

Ph.D project in searches for leptoquark particles via the di-tau Drell-Yan process with the ATLAS experiment at the LHC.

September 2017 - March 2020 **Master's Degree in Physics**

Sapienza University of Rome, Rome (IT).

Curriculum in Particle and Astroparticle Physics. Average grade of exams: 30.0.

Thesis: *Search for invisible Higgs boson decays in the VBF production channel with the ATLAS experiment at the LHC*, supervisor: Prof. S. Giagu.

Mark: 110/110 cum laude.

September 2015 - November 2017 **Bachelor's Degree in Physics**

Sapienza University of Rome, Rome (IT).

Curriculum in Physics. Average grade of exams: 29.4.

Thesis: *Direct Dark Matter detection with directional techniques*, supervisor: Prof. S. Giagu.

Mark: 110/110 cum laude.

September 2012 - July 2015 **Bachelor's Degree in Aerospace Engineering**

Sapienza University of Rome, Rome (IT).

Curriculum in Aerospace Engineering. Average grade of exams: 29.16.

Thesis: *Zero-dimensional internal ballistics modelling of a hybrid rocket motor*, supervisor: Prof. D. Bianchi.

Mark: 110/110 cum laude.

High SchoolSeptember 2007 - July 2012 **Diploma di Liceo Scientifico**

Liceo Scientifico Statale "C. Cavour", Rome (IT).

Mark: 100/100.

ADDITIONAL INFORMATION ON
PH.D. RESEARCH AND THESES

Ph.D. research activity

My Ph.D. project is focused on leptoquark searches via the di-tau Drell-Yan process, $pp \rightarrow \tau\tau$, with the ATLAS detector at the LHC. I investigate scalar and vector leptoquark models able to address the B -physics anomalies measured by the LHCb experiment. I'm also part of the ATLAS Phase-II upgrade project for the muon trigger system and I'm in charge of developing and testing of firmware for the L0 Barrel Sector-Logic FPGA board, using VHDL language and the Xilinx Vivado toolkit.

Master's thesis

- Title *Search for invisible Higgs boson decays in the VBF production channel with the ATLAS experiment at the LHC*, supervisor: Prof. S. Giagu.
- Description The thesis presents a search for invisible decays into Dark Matter of the Higgs boson in the vector boson fusion production channel, performed using 36 fb^{-1} of pp collision data at a center-of-mass energy of $\sqrt{s} = 13 \text{ TeV}$, recorded in 2015 – 16 by the ATLAS experiment at the LHC. A measurement of the Higgs-to-invisible branching fraction has been obtained and identification strategies for hadronic jets have been discussed, with focus on high pseudorapidity jets emitted in high pile-up conditions. In particular, a new forward pile-up jet tagging algorithm is presented - consisting in a Deep Neural Network trained on Monte Carlo QCD multijet events - and is recognized as having higher performances with respect to the current jet tagging algorithm and the alternative proposals advanced for its future replacement.

Bachelor's thesis

B.S. in Physics

- Title *Direct Dark Matter detection with directional techniques*, supervisor: Prof. S. Giagu.
- Description The thesis work discusses Dark Matter search with direct detection experimental techniques. The state of the art of direct detection experiments is outlined and directional direct detection techniques are discussed, aiming at measuring the direction of the incoming Dark Matter particle and to exploit the daily modulation of such direction instead of the annual modulation of the rate of events. The DarkSide-50 experiment at "Laboratori Nazionali del Gran Sasso" is presented as a case study and the implementation of a directional measurement is discussed, with focus on the role of columnar recombination.

B.S. in Engineering

- Title *Zero-dimensional internal ballistics modelling of a hybrid rocket motor*, supervisor: Prof. D. Bianchi.
- Description This study examines modern propulsion systems comparing liquid, solid and finally hybrid propulsors. In particular, a zero-dimensional numerical solver for internal ballistics prediction and performance calculation of a hybrid motor has been developed and used to discuss three preliminary design examples.

RESEARCH ACTIVITIES

I am involved in research activities as a member of the ATLAS Collaboration. Activities span across physics measurements and searches, hardware development and detector operations. Each entry in this list, except for operations, corresponds to an ATLAS working group with weekly meetings.

Physics analyses

- **High-Mass Drell-Yan (ongoing)**. Search for leptoquark particles coupling to third generation fermions via the non resonant t-channel. I am involved in all aspects of the analysis.
- **Afb Ztautau (ongoing)**. Differential cross section measurement of the Drell-Yan process with tau leptons. I am involved in all aspects of the analysis.
- **VBF+MET (completed)**. Search for Dark-matter particles through invisible Higgs boson decays. Involved in data/MC comparisons and statistical interpretation.

Hardware

- **L0 Barrel Muon trigger Phase-II upgrade (ongoing)**. FPGA firmware development for the Phase-II Sector Logic board of the barrel muon trigger. Involved in development of trigger readout firmware.

Operations

- **Muon shifter in the ATLAS Control Room (ongoing)**. Responsible for muon system in detector operations during early Run3 (Feb. 2023 - Nov. 2023).

TALKS AT NATIONAL OR INTERNATIONAL CONFERENCES AND WORKSHOPS

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- September 2021 107° congress of the Italian Physical Society.
Presentation title: Search for Higgs boson invisible decays in the VBF production channel with the ATLAS experiment at the LHC.
 - September 2022 108° congress of the Italian Physical Society - Milano.
Presentation title: Cross section measurement for the $Z \rightarrow \tau\tau$ process and forward-backward asymmetry.
 - April 2023 Incotri di Fisica delle Alte Energie (IFAE 2023) - Catania.
Presentation title: Misura del processo Drell-Yan con leptoni tau e ricerche di leptoquark con l'esperimento ATLAS ad LHC.
 - May 2023 Large Hadron Collider Physics conference (LHCP 2023) - Belgrade (Serbia).
Presentation title: Leptoquarks and other leptonic final states - ATLAS.
 - September 2023 109° congress of the Italian Physical Society - Salerno.
Presentation title: Misura del processo Drell-Yan con leptoni tau e ricerche di leptoquark con l'esperimento ATLAS ad LHC.

POSTERS AT NATIONAL OR INTERNATIONAL WORKSHOPS AND SCHOOLS

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- December 2022 ESHEP 2022 - Tel Aviv (Israel).
Title: Standard Model precision physics with tau leptons with the ATLAS experiment at the LHC.

PROCEEDINGS AT NATIONAL OR INTERNATIONAL CONFERENCES AND WORKSHOPS

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- April 2023 Incotri di Fisica delle Alte Energie (IFAE 2023).
Title: Measurement of the High Mass Drell-Yan process in di-tau final states and leptoquark searches with the ATLAS experiment at the LHC. Publication on "Il nuovo Cimento".
 - May 2023 Large Hadron Collider Physics conference (LHCP 2023).
Title: Leptoquarks and other leptonic final states - ATLAS. Publication on "Proceedings of Science".

INTERNAL REVIEW TALKS

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- September 2021 ATLAS Young workshop. Presentation title: Development of the readout system for the Phase-II upgrade of the ATLAS muon trigger.
 - December 2021 ATLAS Phase-II trigger firmware Preliminary Design Report. L0 barrel muon Trigger Phase-II upgrade status.
 - May 2022 ATLAS LPX exotics meeting. High Mass Drell-Yan analysis status.
 - November 2022 ATLAS upgrade week. L0 barrel muon Trigger Phase-II upgrade status.
 - April 2023 ATLAS LPX exotics meeting. High Mass Drell-Yan analysis status.
 - September 2023 ATLAS Italia workshop - Rimini. Presentation title: Search for leptoquarks in high-mass Drell-Yan events with taus in the final state.
 - December 2023 Editorial board meeting. High Mass Drell-Yan analysis status.
 - December 2023 Roma - Tokyo trigger meeting. L0 barrel muon Trigger Phase-II upgrade status.

PHYSICS SCHOOLS AND POST-GRADUATE COURSES

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- 18 – 22 January 2021 **2nd HEP C++ Course and Hands-on Training**

Online due to COVID-19 pandemic.

Post-graduate course on advanced C++ programming techniques, organised by HEP Software foundation. The course was organised into 12.5 hours of lectures plus 8 hours of training sessions.

15 - 20 May 2022 **INFN school of statistics 2022**

INFN sez. di Napoli, Paestum (Italy).

School on statistics and data analysis techniques, organized by INFN. The school included 25 hours of lectures and hands-on sessions with specialized data analysis software tools.

14 - 23 June 2022 **ISOTDAQ school 2022**

University of Catania and INFN Laboratori Nazionali del Sud, Catania (Italy).

School on trigger and data-acquisition for high energy physics, organized by CERN. The school included 28 lectures and 24 hours of hands-on electronics laboratories.

30 November - 13 December 2022 **CERN European school of High Energy Physics 2022**

University of Tel Aviv, Tel Aviv (Israel).

Physics school organised by CERN which included 31 lectures, discussions sessions and group projects on current topics in particle physics.

GRANTS

- **Avvio alla ricerca 2023**, Sapienza Università di Roma, 2000 euros.

Grant to support reasearch activities on ATLAS physics analyses. Grant obtained as PI.

- **Avvio alla terza missione 2022**, Sapienza Università di Roma, 3000 euros.

Grant to support outreach activities on the HEPscape project. Grant obtained as team member, together with M. Campana, R. Tramontano with coordination of Prof. Livia Soffi.

PRIZES AND AWARDS

Premio Tito Maiani 2023 - Accademia Nazionale dei Lincei

For master's degree theses concerning the experimental study of the Universe, also in connection with elementary particle physics, gravitational waves detection from astrophysical and cosmological sources, the experimental study of the gravitational field properties.

PUBLICATIONS

I am author, as member of the ATLAS Collaboration, of the papers listed below:

- [1] Search for the decay of the Higgs boson to a Z boson and a light pseudoscalar particle decaying to two photons, [arXiv:2312.01942](#) [[hep-ex](#)]
- [2] Measurement and interpretation of same-sign W boson pair production in association with two jets in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, [arXiv:2312.00420](#) [[hep-ex](#)]
- [3] Search for light long-lived neutral particles from Higgs boson decays via vector-boson-fusion production from pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, [arXiv:2311.18298](#) [[hep-ex](#)]
- [4] Combination of searches for resonant Higgs boson pair production using pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, [arXiv:2311.15956](#) [[hep-ex](#)]
- [5] Measurement of ZZ production cross-sections in the four-lepton final state in pp collisions at $\sqrt{s} = 13.6$ TeV with the ATLAS experiment, [arXiv:2311.09715](#) [[hep-ex](#)]
- [6] Simultaneous energy and mass calibration of large-radius jets with the ATLAS detector using a deep neural network, [arXiv:2311.08885](#) [[hep-ex](#)]
- [7] Observation of quantum entanglement in top-quark pairs using the ATLAS detector, [arXiv:2311.07288](#) [[hep-ex](#)]

- [8] Search for a CP-odd Higgs boson decaying into a heavy CP-even Higgs boson and a Z boson in the $\ell^+ \ell^- t\bar{t}$ and $\nu\bar{\nu}b\bar{b}$ final states using 140 fb^{-1} of data collected with the ATLAS detector, arXiv:2311.04033 [hep-ex]
- [9] Search for Resonant Production of Dark Quarks in the Dijet Final State with the ATLAS Detector, arXiv:2311.03944 [hep-ex]
- [10] Improving topological cluster reconstruction using calorimeter cell timing in ATLAS, arXiv:2310.16497 [physics.ins-det]
- [11] Studies of new Higgs boson interactions through nonresonant HH production in the $b\bar{b}\gamma\gamma$ final state in pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector, arXiv:2310.12301 [hep-ex]
- [12] Search for non-resonant Higgs boson pair production in the $2b + 2\ell + E_{\text{T}}^{\text{miss}}$ final state in pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector, arXiv:2310.11286 [hep-ex]
- [13] Study of $Z \rightarrow \ell\ell\gamma$ decays at $\sqrt{s} = 8 \text{ TeV}$ with the ATLAS detector, arXiv:2310.11574 [hep-ex]
- [14] Search for direct production of electroweakinos in final states with one lepton, jets and missing transverse momentum in pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector, arXiv:2310.08171 [hep-ex]
- [15] Evidence of pair production of longitudinally polarised vector bosons and study of CP properties in $ZZ \rightarrow 4\ell$ events with the ATLAS detector at $\sqrt{s} = 13 \text{ TeV}$, arXiv:2310.04350 [hep-ex]
- [16] Measurement of t -channel single-top-quark production in pp collisions at $\sqrt{s} = 5.02 \text{ TeV}$ with the ATLAS detector, arXiv:2310.01518 [hep-ex]
- [17] Measurement of the production cross-section of J/ψ and $\psi(2S)$ mesons in pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector, arXiv:2309.17177 [hep-ex]
- [18] Search for the exclusive W boson hadronic decays $W^\pm \rightarrow \pi^\pm\gamma$, $W^\pm \rightarrow K^\pm\gamma$ and $W^\pm \rightarrow \rho^\pm\gamma$ with the ATLAS detector, arXiv:2309.15887 [hep-ex]
- [19] A precise determination of the strong-coupling constant from the recoil of Z bosons with the ATLAS experiment at $\sqrt{s} = 8 \text{ TeV}$, arXiv:2309.12986 [hep-ex]
- [20] Search for flavor-changing neutral tqH interactions with $H \rightarrow \gamma\gamma$ in pp collisions at $\sqrt{s} = 13 \text{ TeV}$ using the ATLAS detector, arXiv:2309.12817 [hep-ex]
- [21] A precise measurement of the Z -boson double-differential transverse momentum and rapidity distributions in the full phase space of the decay leptons with the ATLAS experiment at $\sqrt{s} = 8 \text{ TeV}$, arXiv:2309.09318 [hep-ex]
- [22] Electron and photon energy calibration with the ATLAS detector using LHC Run 2 data, arXiv:2309.05471 [hep-ex]
- [23] Search for the $Z\gamma$ decay mode of new high-mass resonances in pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector, arXiv:2309.04364 [hep-ex]
- [24] Evidence for the Higgs boson decay to a Z boson and a photon at the LHC, arXiv:2309.03501 [hep-ex]
- [25] Azimuthal angle correlations of muons produced via heavy-flavor decays in 5.02 TeV Pb+Pb and pp collisions with the ATLAS detector, arXiv:2308.16652 [nucl-ex]
- [26] Measurements of longitudinal flow decorrelations in pp and Xe+Xe collisions with the ATLAS detector, arXiv:2308.16745 [nucl-ex]
- [27] Measurement of the centrality dependence of the dijet yield in $p+\text{Pb}$ collisions at $\sqrt{s_{\text{NN}}} = 8.16 \text{ TeV}$ with the ATLAS detector, arXiv:2309.00033 [nucl-ex]
- [28] Electron and photon efficiencies in LHC Run 2 with the ATLAS experiment, arXiv:2308.13362 [hep-ex]
- [29] Differential cross-section measurements of the production of four charged leptons in association with two jets using the ATLAS detector, arXiv:2308.12324 [hep-ex]
- [30] Measurement of the $t\bar{t}$ cross section and its ratio to the Z production cross section using pp collisions at $\sqrt{s} = 13.6 \text{ TeV}$ with the ATLAS detector, arXiv:2308.09529 [hep-ex]
- [31] Software Performance of the ATLAS Track Reconstruction for LHC Run 3, arXiv:2308.09471 [hep-ex]
- [32] Search for vector-boson resonances decaying into a top quark and a bottom quark using pp collisions at $\sqrt{s} = 13 \text{ TeV}$ with the ATLAS detector, arXiv:2308.08521 [hep-ex]

- [33] Measurement of the Higgs boson mass with $H \rightarrow \gamma\gamma$ decays in 140fb^{-1} of $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector, Phys. Lett. B 847 (2023), 138315doi:10.1016/j.physletb.2023.138315, arXiv:2308.07216 [hep-ex]
- [34] Search for magnetic monopoles and stable particles with high electric charges in $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector, arXiv:2308.04835 [hep-ex]
- [35] Combined measurement of the Higgs boson mass from the $H \rightarrow \gamma\gamma$ and $H \rightarrow ZZ^* \rightarrow 4\ell$ decay channels with the ATLAS detector using $\sqrt{s} = 7, 8$ and 13 TeV pp collision data, arXiv:2308.04775 [hep-ex]
- [36] Observation of $W\gamma\gamma$ triboson production in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2308.03041 [hep-ex]
- [37] Measurement of the $B_s^0 \rightarrow \mu\mu$ effective lifetime with the ATLAS detector, JHEP 09 (2023), 199doi:10.1007/JHEP09(2023)199, arXiv:2308.01171 [hep-ex]
- [38] Performance and calibration of quark/gluon-jet taggers using 140fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2308.00716 [hep-ex]
- [39] Pursuit of paired dijet resonances in the Run 2 dataset with ATLAS, arXiv:2307.14944 [hep-ex]
- [40] Search for heavy Higgs bosons with flavour-violating couplings in multi-lepton plus b -jets final states in pp collisions at 13 TeV with the ATLAS detector, arXiv:2307.14759 [hep-ex]
- [41] Search for a new heavy scalar particle decaying into a Higgs boson and a new scalar singlet in final states with one or two light leptons and a pair of τ -leptons with the ATLAS detector, JHEP 10 (2023), 009doi:10.1007/JHEP10(2023)009, arXiv:2307.11120 [hep-ex]
- [42] Search for singly produced vector-like top partners in multilepton final states with 139fb^{-1} of pp collision data at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2307.07584 [hep-ex]
- [43] Search for new phenomena in two-body invariant mass distributions using unsupervised machine learning for anomaly detection at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2307.01612 [hep-ex]
- [44] Search for pair production of squarks or gluinos decaying via sleptons or weak bosons in final states with two same-sign or three leptons with the ATLAS detector, arXiv:2307.01094 [hep-ex]
- [45] Search for leptoquark pair production decaying into $t\bar{e}e^+$ or $t\mu^-\bar{e}\mu^+$ in multi-lepton final states in pp collisions at 13 TeV with the ATLAS detector, arXiv:2306.17642 [hep-ex]
- [46] Measurement of the $H \rightarrow \gamma\gamma$ and $H \rightarrow ZZ^* \rightarrow 4\ell$ cross-sections in pp collisions at $\sqrt{s} = 13.6$ TeV with the ATLAS detector, arXiv:2306.11379 [hep-ex]
- [47] Fast b -tagging at the high-level trigger of the ATLAS experiment in LHC Run 3, JINST 18 (2023) no.11, P11006doi:10.1088/1748-0221/18/11/P11006, arXiv:2306.09738 [hep-ex]
- [48] Search for dark photons in rare Z boson decays with the ATLAS detector, arXiv:2306.07413 [hep-ex]
- [49] Anomaly detection search for new resonances decaying into a Higgs boson and a generic new particle X in hadronic final states using $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector, arXiv:2306.03637 [hep-ex]
- [50] Combination and summary of ATLAS dark matter searches interpreted in a 2HDM with a pseudo-scalar mediator using 139fb^{-1} of $\sqrt{s} = 13$ TeV pp collision data, arXiv:2306.00641 [hep-ex]
- [51] Measurement of the cross-sections of the electroweak and total production of a $Z\gamma$ pair in association with two jets in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, Phys. Lett. B 846 (2023), 138222doi:10.1016/j.physletb.2023.138222, arXiv:2305.19142 [hep-ex]
- [52] Search for non-resonant production of semi-visible jets using Run 2 data in ATLAS, Phys. Lett. B 848 (2024), 138324doi:10.1016/j.physletb.2023.138324, arXiv:2305.18037 [hep-ex]
- [53] Measurements of multijet event isotropies using optimal transport with the ATLAS detector, JHEP 10 (2023), 060doi:10.1007/JHEP10(2023)060, arXiv:2305.16930 [hep-ex]
- [54] Observation of $WZ\gamma$ production in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2305.16994 [hep-ex]
- [55] The ATLAS Experiment at the CERN Large Hadron Collider: A Description of the Detector Configuration for Run 3, arXiv:2305.16623 [physics.ins-det]

- [56] Search for leptoquarks decaying into the $b\tau$ final state in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, JHEP 10 (2023), 001doi:10.1007/JHEP10(2023)001, arXiv:2305.15962 [hep-ex]
- [57] Search for Majorana neutrinos in same-sign WW scattering events from pp collisions at $\sqrt{s} = 13$ TeV, Eur. Phys. J. C 83 (2023) no.9, 824doi:10.1140/epjc/s10052-023-11915-y, arXiv:2305.14931 [hep-ex]
- [58] Search for dark matter produced in association with a Higgs boson decaying to tau leptons at $\sqrt{s} = 13$ TeV with the ATLAS detector, JHEP 09 (2023), 189doi:10.1007/JHEP09(2023)189, arXiv:2305.12938 [hep-ex]
- [59] Search for periodic signals in the dielectron and diphoton invariant mass spectra using 139 fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, JHEP 10 (2023), 079 doi:10.1007/JHEP10(2023)079, arXiv:2305.10894 [hep-ex]
- [60] Search for direct production of winos and higgsinos in events with two same-charge leptons or three leptons in pp collision data at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2305.09322 [hep-ex]
- [61] Search for single production of vector-like T quarks decaying into Ht or Zt in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, JHEP 08 (2023), 153doi:10.1007/JHEP08(2023)153, arXiv:2305.03401 [hep-ex]
- [62] Search for pairs of muons with small displacements in pp collisions at $s=13$ TeV with the ATLAS detector, Phys. Lett. B 846 (2023), 138172doi:10.1016/j.physletb.2023.138172, arXiv:2305.02005 [hep-ex]
- [63] Search for a new pseudoscalar decaying into a pair of muons in events with a top-quark pair at $s=13$ TeV with the ATLAS detector, Phys. Rev. D 108 (2023) no.9, 092007doi:10.1103/PhysRevD.108.092007, arXiv:2304.14247 [hep-ex]
- [64] Performance of the reconstruction of large impact parameter tracks in the inner detector of ATLAS, Eur. Phys. J. C 83 (2023) no.11, 1081doi:10.1140/epjc/s10052-023-12024-6, arXiv:2304.12867 [hep-ex]
- [65] Search in diphoton and dielectron final states for displaced production of Higgs or Z bosons with the ATLAS detector in $s=13$ TeV pp collisions, Phys. Rev. D 108 (2023) no.1, 012012doi:10.1103/PhysRevD.108.012012, arXiv:2304.12885 [hep-ex]
- [66] Search for an axion-like particle with forward proton scattering in association with photon pairs at ATLAS, JHEP 07 (2023), 234doi:10.1007/JHEP07(2023)234, arXiv:2304.10953 [hep-ex]
- [67] Test of CP-invariance of the Higgs boson in vector-boson fusion production and its decay into four leptons, arXiv:2304.09612 [hep-ex]
- [68] Search for heavy Majorana or Dirac neutrinos and right-handed W gauge bosons in final states with charged leptons and jets in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2304.09553 [hep-ex]
- [69] Observation of an Excess of Dicharmonium Events in the Four-Muon Final State with the ATLAS Detector, Phys. Rev. Lett. 131 (2023) no.15, 151902doi:10.1103/PhysRevLett.131.151902, arXiv:2304.08962 [hep-ex]
- [70] Fiducial and differential cross-section measurements for the vector-boson-fusion production of the Higgs boson in the $H \rightarrow WW \rightarrow e\nu\mu\nu$ decay channel at 13 TeV with the ATLAS detector, Phys. Rev. D 108 (2023) no.7, 072003doi:10.1103/PhysRevD.108.072003, arXiv:2304.03053 [hep-ex]
- [71] Search for top-philic heavy resonances in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, arXiv:2304.01678 [hep-ex]
- [72] Evidence of off-shell Higgs boson production from ZZ leptonic decay channels and constraints on its total width with the ATLAS detector, Phys. Lett. B 846 (2023), 138223doi:10.1016/j.physletb.2023.138223, arXiv:2304.01532 [hep-ex]
- [73] New techniques for jet calibration with the ATLAS detector, Eur. Phys. J. C 83 (2023) no.8, 761doi:10.1140/epjc/s10052-023-11837-9, arXiv:2303.17312 [hep-ex]
- [74] Measurement of the Sensitivity of Two-Particle Correlations in pp Collisions to the Presence of Hard Scatterings, Phys. Rev. Lett. 131 (2023) no.16, 162301doi:10.1103/PhysRevLett.131.162301, arXiv:2303.17357 [nucl-ex]

- [75] Observation of four-top-quark production in the multilepton final state with the ATLAS detector, *Eur. Phys. J. C* 83 (2023) no.6, 496doi:10.1140/epjc/s10052-023-11573-0, arXiv:2303.15061 [hep-ex]
- [76] Inclusive and differential cross-sections for dilepton $t\bar{t}$ production measured in $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector, *JHEP* 07 (2023), 141doi:10.1007/JHEP07(2023)141, arXiv:2303.15340 [hep-ex]
- [77] Search for heavy long-lived multi-charged particles in the full LHC Run 2 pp collision data at $s=13$ TeV using the ATLAS detector, *Phys. Lett. B* 847 (2023), 138316doi:10.1016/j.physletb.2023.138316, arXiv:2303.13613 [hep-ex]
- [78] Comparison of inclusive and photon-tagged jet suppression in 5.02 TeV Pb+Pb collisions with ATLAS, *Phys. Lett. B* 846 (2023), 138154doi:10.1016/j.physletb.2023.138154, arXiv:2303.10090 [nucl-ex]
- [79] Search for excited τ -leptons and leptoquarks in the final state with τ -leptons and jets in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, *JHEP* 06 (2023), 199doi:10.1007/JHEP06(2023)199, arXiv:2303.09444 [hep-ex]
- [80] Search for third-generation vector-like leptons in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, *JHEP* 07 (2023), 118doi:10.1007/JHEP07(2023)118, arXiv:2303.05441 [hep-ex]
- [81] Search for pair production of third-generation leptoquarks decaying into a bottom quark and a τ -lepton with the ATLAS detector, *Eur. Phys. J. C* 83 (2023) no.11, 1075doi:10.1140/epjc/s10052-023-12104-7, arXiv:2303.01294 [hep-ex]
- [82] Searches for lepton-flavour-violating decays of the Higgs boson into $e\tau$ and $\mu\tau$ in $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector, *JHEP* 07 (2023), 166doi:10.1007/JHEP07(2023)166, arXiv:2302.05225 [hep-ex]
- [83] Measurements of the suppression and correlations of dijets in Xe+Xe collisions at $s_{NN}=5.44$ TeV, *Phys. Rev. C* 108 (2023) no.2, 024906doi:10.1103/PhysRevC.108.024906, arXiv:2302.03967 [nucl-ex]
- [84] Observation of Single-Top-Quark Production in Association with a Photon Using the ATLAS Detector, *Phys. Rev. Lett.* 131 (2023) no.18, 181901doi:10.1103/PhysRevLett.131.181901, arXiv:2302.01283 [hep-ex]
- [85] Measurement of the production of a W boson in association with a charmed hadron in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector, *Phys. Rev. D* 108 (2023), 032012doi:10.1103/PhysRevD.108.032012, arXiv:2302.00336 [hep-ex]
- [86] Inclusive-photon production and its dependence on photon isolation in pp collisions at $\sqrt{s} = 13$ TeV using 139 fb^{-1} of ATLAS data, *JHEP* 07 (2023), 086doi:10.1007/JHEP07(2023)086, arXiv:2302.00510 [hep-ex]
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OUTREACH ACTIVITIES

Recurrent activities and projects:

- **Hepscape: the high energy physics escape room** (from Sept. 2021). Escape room on particle physics designed for children and high school students. The project started in the INFN Rome section in 2021, coordinated by L. Soffi and F. Cavallari and is now spread over several institutes across Italy.
- **INFN Arts and Science project** (from May 2022). INFN outreach project involving High Schools students. It consists of seminars and production and exhibition of works of art on scientific subjects.
- **CERN official guide** (from April 2023). I am qualified as guide for the experimental facilities in CERN Meyrin site.

Other events

- International masterclass of particle physics (2021 + 2022 editions). Tutor.
- European Researchers Night (2021 + 2022 editions). Staff member
- OpenLabs Laboratori Nazionali di Frascati (2022 edition). Staff member.
- Festival della scienza di Roma (2022 edition). Staff member.

OUTREACH TALKS AND PRESENTATIONS

- May 2023 Liceo Scientifico Talete, as part of Arts and Science project
Presentation title: Alla scoperta delle particelle elementari. La fisica dell'INFN e del CERN di Ginevra.

OUTREACH PUBLICATIONS

- [1] L. Soffi, P. Astone, M. Bauce, G. Padovano et al., "HEPscape: High Energy Physics Escape Room (Un viaggio nel più grande acceleratore di particelle del mondo)", proceedings della Associazione per l'insegnamento della Fisica (AIF), October 2021.
- [2] F. Cavallari, L. Soffi, M. Bauce, G. Padovano et al., "HEPscape: an escape room about high energy physics", proceedings of the 30th International Symposium on Lepton Photon Interactions at High Energies, hosted by the University of Manchester, 10-14 January 2022.

[3] C. Rovelli, P. Astone, G. Padovano et al., "HEPScape! The High Energy Physics Escape Room", proceedings of the International Conference of High Energy Physics, hosted by the University of Bologna, 6-13 July 2022.

TEACHING ASSISTANCE & STUDENTS SUPERVISION

Teaching assistance

September 2021 - February 2022 Bachelor's Physics course Laboratorio di Calcolo, Sapienza University of Rome, Prof. L. Soffi (resp.) and Prof. S. Rahatlou.

I have been responsible for 40 hours of tutorship during laboratory sessions and exams sessions.

Students supervision

December 2021 - July 2022 D. Fiacco: Algoritmi basati su deep learning geometrico per l'identificazione di leptoni tau nell'esperimento ATLAS.

Master's thesis in Physics, Sapienza University of Rome, advisor: Prof. S. Giagu.

EDUCATIONAL TRAINING

March 2020 - July 2020 **Percorso "24CFU".**

Sapienza University of Rome, Rome (IT).

"Percorso 24CFU" consists of four exams in the fields of Pedagogy, Anthropology, Didactic methods that provide training in education and didactics.

Exams sustained: "Didattica Generale" (Prof. P. Sposetti, mark: 30/30 cum laude), "Pedagogia" (Prof F. Pesci, mark: 28/30), "Antropologia Culturale I" (Prof. A. Iuso, mark: 30/30), "Antropologia Culturale II" (Prof. A. Iuso, mark: 30/30).

COMPUTER AND PROGRAMMING SKILLS

Programming languages and software

C, C++ Excellent knowledge, which includes HEP software packages (ROOT).

Python Excellent knowledge, which includes deep-learning packages (Keras, Tensorflow).

R, Matlab Good knowledge.

Other software Mathematica, Latex, Office, MSC Nastran.

Hardware programming VHDL, Xilinx Vivado toolkit.

Operating systems Mac OS, Windows, Linux.

AWARDS

March 2014 - July 2015 **"Percorso di eccellenza"**

Sapienza University of Rome, Rome (IT).

"Percorso di eccellenza" is the excellent students program offered by Sapienza University of Rome and includes extra advanced courses. Followed courses: partial differential equations, materials laboratory.

LANGUAGES

Italian Mother tongue.

English Excellent knowledge (C1). Master's degree in Physics attended in English language. Summer language courses at Surrey University (2010) and Staffordshire University (2011).

French Basic knowledge (B2).

OTHER PERSONAL INTERESTS

Musical interests

October 2011 **Compimento of Flute**, Conservatorio di Musica "L. Refice", Frosinone.

June 2011 **Licenza di teoria, solfeggio e dettato musicale**, Conservatorio di Musica "L. Refice", Frosinone.

Activities: I have been part of Sapienza University student orchestra (MuSa) for several years. I have attended summer music courses of Accademia Musicale Jacopo Napoli in Cava de Tirreni for 5 consecutive years.

Other

I am interested in practising sports. I have practised at amateur level fencing, tennis, swimming.