

Prof. Laura Gonella

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EDUCATION AND ACADEMIC APPOINTMENTS

09/2024 – present	Permanent appointment as Associate Professor in Physics at the University of Trieste, Italy.
09/2024 – present	Associated member of the National Institute for Nuclear Physics (INFN) in Trieste , Italy, for reasearch in Experimental Physics of Fundamental Interactions and Applications.
11/2015 – 07/2024	Permanent teaching and research appointment at the University of Birmingham, United Kingdom, serving as Lecturer from 1 November 2015 to 31 July 2019, and, following promotion, as Associate Professor from 1 August 2019 onward.
10/2013 – 10/2015	Fixed-term teaching and research appointment as Akademische Rätin at the University of Bonn, Germany.
07/2008 – 09/2013	Fixed-term research appointment as Wissenschaftliche Mitarbeiterin at the University of Bonn, Germany.
07/2008 – 09/2013	Degree of Doctor Rerum Naturalium (Ph.D.) in Physics awarded on 23 September 2013 at the University of Bonn, Germany. Dissertation: Low Mass Hybrid Pixel Detectors for the High Luminosity LHC Upgrade.
10/2005 – 10/2007	Employed as Associate Member of Personnel in the Microelectronics Group at CERN, Switzerland, funded through a fellowship from the Association for Scientific and Technological Development of Piedmont.
10/2003 – 10/2006	Master's degree in Physics of Advanced technologies awarded on 27 October 2006, with highest honors (110/110 cum laude), at the University of Turin, Italy. Thesis: TID Tolerance of Commercial 130 nm CMOS Technologies for HEP Experiments.
10/2000 – 10/2003	Bachelor's Degree in Physics awarded on 23 October 2003, with a final grade of 110/110, at the University of Turin, Italy. Thesis: Characterization and Optimization of an Analogue Memory in VLSI Technology.

RESEARCH ACTIVITY

Scientific Leadership and Coordination

2024 – Present	Coordinator of the Laboratory of Advanced Electronics and Sensors (LEA) at the University of Trieste, Italy.
2023 – 2026	Technical Coordinator of the Silicon Vertex Tracker Detector for the ePIC experiment.
2023 – 2024	Co-Coordinator of the DRD3 Solid State Detectors Group within the UK Strategic R&D Programme.
2022 – 2024	Director of the Birmingham Instrumentation Laboratory for Particle Physics and Applications (BILPA) at the University of Birmingham, UK.
2022 – 2024	Facility Coordinator for the University of Birmingham Proton Irradiation Beamline within the EURO-LABS project.
2022 – 2023	Co-Convener of the Tracking Working Group of the ePIC experiment.
2021 – 2023	Leader of the MAPS Work Package within the UK EIC Scoping Project.
2021 – 2022	Co-Convener of the Tracking Working Group of the ATHENA proto-collaboration.
2020 – 2023	Co-Coordinator of the EIC Silicon Consortium.
2017 – 2024	Co-Coordinator of the Strip Module Work Package for the ATLAS-ITk project in the UK.
2015 – 2023	Deputy Team Leader of the University of Birmingham Particle Physics group within the RD50 Collaboration.
2015 – 2019	Co-Coordinator of the ITk Strip ASIC Working Group for the ATLAS experiment.

Membership in International Collaborations

- 2024 – present **ALICE Collaboration**; a detector dedicated to heavy-ion physics at the LHC.
- 2022 – present **ePIC Collaboration**; the first detector for the realisation of the EIC science programme.
- 2022 – 2024 **EURO-LABS Consortium**; European laboratories for accelerator-based science.
- 2016 – present **EIC Users Group**; development of an Electron-Ion Collider experimental facility.
- 2015 – 2023 **RD50 Collaboration**; development of radiation-hard semiconductor devices.
- 2015 – 2020 **AIDA-2020 Consortium**; advanced European infrastructures for detectors at accelerators.
- 2011 – 2015 **AIDA Consortium**; advanced European infrastructures for detectors at accelerators.
- 2008 – 2024 **ATLAS Collaboration**; a multi-purpose detector at the LHC.

Summary of Research Activities

My research focuses on the **development of advanced instrumentation for the detection of nuclear and subnuclear particles in the study of fundamental interactions**. For many years, I have been involved in **frontier particle and nuclear physics experiments at major international laboratories**, including the ATLAS and ALICE experiments at the Large Hadron Collider (LHC) at CERN (Switzerland), and the ePIC experiment at the Electron-Ion Collider (EIC) at the Brookhaven National Laboratory (BNL, USA). These activities are part of a broader research programme that I led as **Director of the Birmingham Instrumentation Laboratory for Particle Physics and Applications (BILPA)** at the University of Birmingham, and currently as **Coordinator of the Laboratory of Advanced Electronics and Sensors (LEA)** at the University of Trieste.

My work is primarily concerned with the development of **silicon detector technologies** for interaction and decay vertices reconstruction, and momentum measurements of particles produced in high-energy, high-luminosity collider experiments. These detectors operate close to the interaction point and measure all charged particles generated in collisions. Silicon detectors play a central role in experimental particle and nuclear physics, particularly in studies requiring the identification of heavy-flavour quarks.

A significant portion of the ATLAS physics programme, including studies of the Higgs boson and the scalar sector, top-quark physics, searches for new heavy resonances, precision measurements of QCD and electroweak processes, and detailed investigations of proton structure, relies on the identification of bottom quarks through the precise reconstruction of charged-particle tracks and high-resolution measurements of primary and secondary decay vertices (**b-tagging**). **One of the most notable examples of the impact of silicon detector technology on the ATLAS physics programme is the measurement of the dominant Higgs boson decay channel into a pair of bottom quarks.** This achievement was made possible by the enhanced b-tagging capabilities provided by the first major detector upgrade, the **Insertable B-Layer (IBL)**, to which I made direct contributions. My research focused on achieving the detector performance specifications most critical for b-tagging. The High-Luminosity LHC upgrade, to which I contributed both during the R&D and pre-production phases, has the potential to enable the measurement of the Higgs boson decay into a pair of charm quarks, a measurement considered unfeasible when the accelerator and experiment were originally designed.

The EIC will be constructed to investigate the role of gluons in the fundamental structure and dynamics of atomic nuclei and nucleons. Its scientific programme aims to uncover phenomena arising from gluon self-interactions and to understand the mechanisms of hadron formation. These effects may become visible through changes in structure functions, significant variations in the size and shape of diffractive cross-sections, and modifications to hadron and di-hadron production rates. **Many of these processes involve charm mesons in the final state, whose identification and measurement require a high-precision tracking detector.** The development of a **high-precision silicon tracking detector for the EIC, which I led from 2016 to 2026**, for momentum measurements of electrons and hadrons, and for the reconstruction of decay vertices of heavy-flavour hadrons, is **essential to enable many of the key physics measurements of the EIC programme.**

Throughout my career, I have been involved in both the research and development, and the construction phases of silicon detectors. I have developed technologies for sensors and front-end electronics through advances in the **radiation tolerance of commercial CMOS technologies**, **novel interconnection techniques**,

and **innovative power-distribution systems**, aimed at improving detector performance in vertex and track reconstruction, through a combination of high spatial resolution, radiation tolerance, and low material budget.

As a member of the **ATLAS Collaboration** from 2008 to 2024, I carried out R&D and construction activities, and had leadership roles at both national and international level within the silicon detector upgrade projects of the ATLAS Inner Detector (ID). I contributed to two major detector upgrades:

- **Insertable B-Layer (IBL)**: Upgrade of the pixel detector through the addition of a new detector layer closer to the interaction point. The IBL was installed in 2014.

- **ATLAS Inner Tracker (ITk)**: Complete replacement of the Inner Detector with a new all-silicon tracking system based on pixel and strip technologies. The ITk detector will be installed between 2026 and 2030.

For the IBL project, I characterised the voltage distribution system based on a novel regulator technology and developed the **flip-chip bump-bonding technology for thin chips** used in detector module production. This work also formed part of the **AIDA** project, where I contributed to the characterisation of the first pixel detector prototypes using **Through-Silicon Vias (TSVs)** and the first prototypes developed using **3D vertical integration technologies**.

Within the ITk project, I was responsible for the development and **proof-of-principle demonstration of serial powering**, a constant-current power-distribution concept that, based on my work, was subsequently adopted not only by ATLAS but also by the CMS experiment for their pixel detector upgrades. For the ITk strip detector, I worked on improving the tolerance to ionising-radiation of the front-end electronics. This work built on expertise acquired during a two-year appointment in the CERN microelectronics group, where I characterised the **radiation hardness of three different 130 nm CMOS technologies**, including the technology later selected for the electronics of both the ATLAS and CMS upgrades.

I subsequently contributed to detector construction activities for the ITk strip detector, including the development of the **Quality Assurance (QA) programme for strip sensor production**, through the commissioning of irradiation procedures at the University of Birmingham cyclotron facility, as well as the development of **assembly and Quality Control (QC) techniques for detector module production**.

At the international level, I served as **Co-Coordinator of the ATLAS ITk Strip ASIC Working Group**, leading the design and characterisation of the front-end electronics developed for the ITk strip detector. I also contributed to the preparation and successful completion of two of the three major design reviews required by the collaboration: the Preliminary Design Review and the Final Design Review. From 2016 to 2024, I acted as **national co-coordinator for the UK ITk strip detector programme**, first for the R&D phase and subsequently for module production, within projects funded by the Science and Technology Facilities Council (STFC). The United Kingdom is responsible for approximately 5,500 detector modules, representing around 30% of the total detector production and involving seven universities and one national laboratory.

Since 2016, I have been working on the development of the experimental apparatus for the EIC at BNL as a member of the **EIC Users Group** and, since its formation in 2022, of the **ePIC Collaboration**. My work has focused on the development of a silicon tracking detector based on **Monolithic Active Pixel Sensors (MAPS)**. I have led simulation studies and optimisation efforts to define the detector layout, as well as R&D activities on **next-generation monolithic sensors in 65 nm CMOS technology**, power-distribution systems, and flexible printed-circuit technologies with aluminium traces for GHz-frequency signal transmission.

Initially, this work was carried out within the EIC Generic Detector R&D Programme in collaboration with colleagues at Lawrence Berkeley National Laboratory (LBNL). It culminated in the definition of two candidate pixel-detector configurations and the selection of the sensor technology adopted in the EIC Yellow Report. Together with colleagues at LBNL, I co-founded the **EIC Silicon Consortium (SiC)**, which I subsequently co-coordinated. The consortium brought together around a dozen institutions from the United States, the United Kingdom, and Italy to develop technologies required for an EIC silicon detector, including sensors, modules, support structures, cooling systems, power-distribution networks, and data acquisition systems. Following the establishment of the ePIC experiment, these activities evolved into the **ePIC Silicon Vertex Tracker (SVT) Collaboration**, where I was appointed **Technical Coordinator** in recognition of my expertise across multiple aspects of the detector system.

As **Co-Convener of the Tracking Working Group**, first within the ATHENA proto-collaboration and later within ePIC, I continued to lead efforts to optimise the detector configuration, with particular emphasis on detector integration and adaptation to evolving experimental requirements.

Thanks to my efforts, the University of Birmingham secured sustained funding for EIC MAPS detector R&D from the U.S. Department of Energy (DOE), the European Union, and UK Research and Innovation (UKRI).

Within the UK EIC programme, I coordinated the **MAPS Work Package**, involving five universities and two national laboratories, with the goal of delivering approximately 30% of the ePIC Silicon Vertex Tracker.

Since 2024, I am a member of the **ALICE Collaboration**, contributing to the ITS3 and ALICE3 detector upgrade projects. The **ITS3 project** will deliver a new vertex detector to be installed in ALICE experiment in the 2026 – 2029 LHC shutdown. This detector will be made of three ultra-light, bent, curved layers based on **wafer-scale, stitched MAPS sensors in 65 nm CMOS technologies**. The **ALICE3** detector will replace the current ALICE experiment for data taking from 2035. My activities within these projects include the development of the MAPS sensors through extensive characterisation studies, as well as the design and development of a low-material-budget concept for the middle layers of the ALICE3 tracking detector, based on flexible printed circuits with aluminium traces and a constant-current power-distribution concept.

At the University of Birmingham, I played a **key role in the establishment and commissioning of the Birmingham Instrumentation Laboratory for Particle Physics and Applications (BILPA)**, funded through a university initiative to strengthen solid-state detector research. The BILPA laboratory includes a **200 m² cleanroom facility** equipped with infrastructure for silicon detector development, characterisation, and production.

I also completed the **qualification of the proton irradiation beamline at the University of Birmingham MC40 cyclotron**, which I managed from 2016 to 2024. In addition to supporting the quality assurance programme of the ATLAS ITk strip sensors, this facility was used for radiation-hardness studies within the **RD50 Collaboration** and the broader detector R&D programme. Through the European Horizon programmes **AIDA-2020** and **EURO-LABS**, the facility has been made accessible to the international high-energy physics community. Within EURO-LABS, I served as **Transnational Access Facility Coordinator**. Funding obtained through EURO-LABS also enabled a significant upgrade of the irradiation system to support detector developments for future collider projects such as **FCC-hh**.

As **Director of BILPA**, I led a **15-member team** comprising academics, research staff, technicians, and doctoral students. The group worked on the construction of the **ATLAS ITk strip detector**, the development of the **detector technologies for the ePIC experiment**, and a range of **strategic R&D projects** on advanced instrumentation for future particle physics experiments and medical applications.

A major component of the BILPA research programme focused on **Monolithic Active Pixel Sensors (MAPS)**, building on expertise I had acquired during my appointment as Akademische Rätin at the University of Bonn. Together with collaborators in the UK and abroad, I led three major MAPS development programmes: - the **MALTA** sensor for environments with very high radiation levels and data rates; - the **DECAL** sensor with reconfigurable granularity for tracking detectors and digital electromagnetic calorimetry; - the **next-generation 65 nm CMOS stitched sensors**, enabling the production of large-area, ultra-thin, flexible, and low-power detector systems.

The BILPA research programme also included the development of **ultra-fast timing detectors**. Through STFC funding and collaboration with UK partners and Teledyne e2v, I contributed to the development of **Low Gain Avalanche Detectors (LGADs)** capable of achieving time resolutions of a few tens of picoseconds.

Finally, I pursued a programme of detector development for **medical applications**. The combination of high spatial resolution, radiation tolerance, and low material budget is particularly important for radiotherapy and hadron-therapy instrumentation. Within this framework, strip and MAPS sensors developed for particle-physics applications were used to build **prototype proton computed tomography (pCT) systems**, which have the potential to significantly reduce treatment-planning uncertainties and minimise radiation damage to healthy tissue.

At the University of Trieste, I currently serve as **Coordinator of the Laboratory of Advanced Electronics and Sensors (LEA)**, an interdisciplinary research infrastructure under development through funding from the Italian Ministry of University and Research (MUR) **Department of Excellence Programme (2023-2027)**. The LEA laboratory is dedicated to research and development in advanced sensor technologies, electronics, and scientific instrumentation, and is designed as a facility supporting **experimental research, advanced training, and technology transfer** across the Department of Physics.

Research Grants

ATLAS Project

- 04/2023 – 03/2026 **Co-Investigator** (1/5), Upgrade of the ATLAS detector at the LHC (2023-26), STFC, £472,528.
- 01/2022 – 09/2023 **Co-Investigator** (1/4), ATLAS Upgrade Phase 2 Construction, STFC, £134,892.
- 04/2018 – 03/2024 **Co-Investigator** (1/7), ATLAS Upgrade Construction proposal, STFC, £677,978.
- 04/2016 – 03/2018 **Co-Investigator** (1/5), ATLAS Upgrade R&D 2016, STFC, £148,214.

EIC Project

- 10/2021 – 09/2025 **Co-Investigator** (1/3), EIC Scoping Project, UKRI/STFC-UK, £885,875.
- 06/2019 – 07/2024 **Principal Investigator**, STRONG2020 The Strong Interaction at the Frontier of Knowledge: Fundamental Research and Applications, H2020-EU, €62,500.
- 01/2017 – 09/2022 **Co-Investigator** (1/2), Precision Central Silicon Tracking & Vertexing for the EIC, U.S. DoE, \$269,600.

Strategic R&D Projects

- 09/2022 – 08/2026 **Principal Investigator**, EURO-LABS European Laboratories for Accelerator Based Science, H2020-EU, €225,325.
- 10/2019 – 06/2021 **Principal Investigator**, Radiation-Hard Monolithic Active Pixel Sensors for Tracking in pCT and Beam Profiling, STFC, £10,000.
- 10/2019 – 09/2021 **Co-Investigator** (1/5), Development of Radiation Tolerant Low Gain Avalanche Detectors (LGAD) for Fast Timing Applications, STFC, £44,800.
- 05/2016 – 11/2018 **Co-Investigator** (1/5), Development of a Reconfigurable Monolithic Active Pixel Sensor in Radiation-Hard Technology for Outer Tracking and Digital Electromagnetic Calorimetry, STFC, £145,042.

Funding for the Research Activities of the University of Birmingham Particle Physics Group

- 04/2024 – 09/2025 **Co-Investigator** (1/6), Responsive RAs For The Birmingham Experimental Particle Physics Programme, STFC, £801,719.
- 10/2022 – 09/2025 **Co-Investigator** (1/10), Experimental Particle Physics Consolidated Grant, STFC, £3,832,224.
- 10/2019 – 03/2023 **Co-Investigator** (1/13), Experimental Particle Physics Consolidated Grant, STFC, £3,352,874.
- 10/2018 – 03/2019 **Co-Investigator** (1/13), STFC PPRP Capital Equipment Call 2018, STFC, £67,254.
- 01/2017 – 09/2019 **Co-Investigator** (1/13), Birmingham Experimental Particle Physics Capital Equipment Round, STFC, £88,849.
- 07/2016 – 09/2019 **Principal Investigator**, Proposal under the new applicants scheme, STFC, £5,210.

Organization of Conferences, Workshops, and Collaboration Meetings

- 2025: Co-organizer of the “**ELMA Workshop on Energy Measurements with MAPS**”. Trieste, Italy, 10-11 September, 46 participants.
- 2023: Co-organizer of the “**UK Tracker Strategic R&D Workshop**”. Liverpool, UK, 26-27 June, 38 participants.
- 2022: Co-organizer of the “**Future UK Silicon Vertex & Tracker R&D Workshop**”. Birmingham, UK, 7-8 September, 55 participants.
- 2021: Member of the Organizing Committee of the international conference “**12th International Conference on Position Sensitive Detectors (PSD12)**”. Birmingham, UK, 12-17 September, 146 participants.
- 2020: Member of the Organizing Committee of the international workshop “**Workshop on Silicon Pixel-based Particle Vertex and Tracking Detectors towards the US Electron-Ion Collider**”. Online, 2-4 September, 87 participants.
- 2020: Co-organizer of the “**Workshop on Physics, Detector and Accelerator Opportunities at the Electron-Ion Collider**”. Online, 27-28 July, 42 participants.

- 2019: Member of the Organizing Committee of the international conference “**IEEE Nuclear Science Symposium and Medical Imaging Conference (NSS/MIC)**”, serving as Co-Chair of the Short Courses Programme. Manchester, UK, 26 October-2 November, approximately 1,600 participants.
- 2018: Co-organizer and Convener of the “**Detector, Readout and New Technologies**” session at the EIC Users Group Meeting. Washington, DC, USA, 30 July-2 August, 165 participants.
- 2018: Co-organizer of the international “**EIC Tracking Workshop**”. University of Virginia, USA, 24 July, 21 participants.
- 2017: Co-organizer of the international meeting “**Advances in Radiation-Hard Monolithic Pixel Detectors**”. Birmingham, UK, 19 July, 41 participants.
- 2014: Member of the Organizing Committee of the international workshop “**Workshop on CMOS Active Pixel Sensors for Particle Tracking (CPIX14)**”. Bonn, Germany, 15-17 September, 81 participants.

SCIENTIFIC OUTPUTS

Publications

My scientific output from 2007 to today comprises **more than 1,500 peer-reviewed publications**, with an **H-index of 128** and **over 83,000 citations** (Web of Science, August 2026). My publications include papers related to the **research, development, and construction of advanced instrumentation for high-energy physics experiments**, as well as publications of the **ATLAS** and **ALICE** collaborations, for which I obtained authorship status according to collaboration rules through significant contributions to detector upgrade projects. The complete list of publications is provided in the appendix to this document.

In addition to my publication record, my scientific output includes regular contributions as an invited and contributed speaker at **international conferences, workshops, and collaboration meetings**, as well as at **national scientific meetings**; the delivery of **research seminars**; and contributions to **technical design documents** for experimental facilities and detector systems at the **LHC** and the **EIC**. A complete list of these activities is provided below.

Presentations at International Conferences and Workshops

Design and status of the ePIC Silicon Vertex Tracker detector for the Electron-Ion Collider

34th International Workshop on Vertex Detectors, Stoos, Switzerland, July 2026. Invited talk.

Vertex and tracking detector developments for the future Electron-Ion Collider

32nd International Workshop on Vertex Detectors, Sestri Levante, Italy, October 2023. Invited talk.

The ATLAS ITk Detector System for the Phase-II LHC Upgrade.

15th Pisa Meeting on Advanced Detectors, La Biodola, Italy, May 2022. Invited talk.

Development of Low Gain Avalanche Detectors at Teledyne e2v.

17th Trento Workshop on Advanced Silicon Radiation Detectors, online, February 2022.

65nm CMOS imaging process for a high-resolution pixel detector.

2020 International Workshop on the High Energy Circular Electron Positron Collider, Shanghai, China, October 2020. Invited talk.

ATLAS ITk strips ASICs: design and radiation hardness.

12th Trento Workshop on Advanced Silicon Radiation Detectors, Trento, Italy, February 2017. Invited talk.

Developments for serial powering applications.

ACES 2016 5th Common ATLAS CMS Electronics Workshop for LHC Upgrades, CERN, Ginevra, Switzerland, March 2016.

Experience with 3D integration technologies in the framework of the ATLAS pixel detector upgrade for the HL-LHC.

Pixel 2012 International Workshop on Semiconductor Pixel Detectors for Particles and Imaging, Inawashiro, Japan, September 2012.

The Shunt-LDO regulator to power the upgraded ATLAS pixel detector.

TWEPP 2011 Topical Workshop on Electronics for Particle Physics, Vienna, Austria, September 2011.

A serial powering scheme for the ATLAS pixel detector at SLHC.

TWEPP 2010 Topical Workshop on Electronics for Particle Physics, Aachen, Germany, September 2010.

Towards minimum material trackers for High Energy Physics experiments at upgraded luminosities.

Pixel 2010 International Workshop on Semiconductor Pixel Detectors for Particles and Imaging, Grindelwald, Switzerland, September 2010.

Presentations at International Collaboration Meetings

EURO-LABS WP4 - Task 4.3 Irradiation Facilities

Kick-off meeting EURO-LABS, Bologna, Italy, October 2022.

Novel silicon detector technologies for the HL-LHC and beyond.

NA62 Collaboration Future Detectors R&D meeting, online, February 2022. Invited talk.

Synergies in silicon development between CERN and EIC.

CERN Experimental Physics Department R&D Day 2021, online, November 2021.

Tracking detector for the ATHENA proposal.

EIC Users Group Meeting, online, August 2021.

Vertex and tracking at the EIC.

IR2@EIC: Science and Instrumentation of the 2nd Interaction Region for the EIC, online, March 2021.

Overview of silicon detector technologies.

Workshop on Silicon Pixel-based Particle Vertex and Tracking Detectors towards the US Electron-Ion Collider, online, September 2020.

EIC silicon vertex and tracking: technology survey.

1st EIC Yellow Report Workshop at Temple University, online, March 2020.

University of Birmingham MC40 Cyclotron irradiation facility.

AIDA-2020 4th Annual Meeting, Oxford, UK, April 2019.

University of Birmingham MC40 Cyclotron irradiation facility.

AIDA-2020 3rd Annual Meeting, Bologna, Italy, April 2018.

The Birmingham irradiation facility.

28th RD50 Workshop, Torino, Italy, June 2016.

Pixel serial power experience in ATLAS.

RD53 general meeting, STFC Rutherford Appleton Laboratory, Didcot, UK, October 2014.

3D integration activities at Bonn/CPPM.

AIDA 2nd Annual Meeting 10-12 April 2013, Frascati (Italy).

Invited seminars

Innovative semiconductor detectors for particle physics and beyond.

University of Trieste, Italy, June 2023.

Novel silicon detector technologies for the HL-LHC and beyond.

Particle Physics Seminar, University of Warwick, UK, January 2023.

Particle Physics Seminar, University of Bristol, UK, December 2021.

Particle Physics Seminar, University of Birmingham, UK, November 2021.

The ATLAS Inner Tracker detector for the High-Luminosity LHC upgrade.

Particle Physics Seminar, University of Birmingham, UK, November 2018.

Particle Physics Seminar, University of Genova, Italy, June 2018.

Pixel Detectors: from segmented diodes to monolithic imaging sensors.

Particle Physics Seminar, University of Birmingham, November 2017.

Presentations at National Meetings

Opportunities in vertexing and tracking.

UK meeting on future e⁺e⁻ Higgs/EW/top factory, Oxford, UK, July 2022. Invited talk.

EIC vertex and tracking detector.

Workshop on Physics, Detector and Accelerator Opportunities at the Electron-Ion Collider, online, July 2020.

Radiation-hard Monolithic Active Pixel Sensor for calorimetry.

Particle Detectors and Instrumentation UK Meeting, London, September 2017. Invited talk.

Precision central silicon tracking and vertexing for the EIC.

Advances in Radiation-Hard Monolithic Pixel Detectors Meeting, Birmingham, UK, 19 July 2017.

UK R&D on silicon tracking and vertexing for the EIC.

Workshop on Physics and Engineering Opportunities at the Electron-Ion Collider, Loch Lomond, UK, October 2016.

Planar pixel sensors in commercial CMOS technologies.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Wuppertal, Germany, March 2015.

Serial powering stave prototype for the ATLAS pixel detector at the HL-LHC.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Dresden, Germany, March 2013.

ATLAS low mass pixels.

5th Detector Workshop of the Helmholtz Alliance "Physics at the Terascale", Bonn, Germany, March 2012.

Module concepts with ultra-thin FE chips and Through Silicon Vias for the upgrades of the ATLAS pixel detector.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Göttingen, Germany, March 2012.

Serial powering for the upgrades of the ATLAS pixel detector.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Göttingen, Germany, March 2012.

DC-DC and serial powering tests in ATLAS.

5th Annual Workshop of the Helmholtz Alliance "Physics at the Terascale", Bonn, Germany, December 2011.

Low material trackers for High Energy Physics experiments at upgraded luminosities.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Karlsruhe, Germany, March 2011.

Towards minimum material trackers for High Energy Physics experiments at upgraded luminosities.

3rd Detector Workshop of the Helmholtz Alliance "Physics at the Terascale", Heidelberg, Germany, October 2010.

Serial powering scheme for the ATLAS pixel detector at SLHC.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Bonn, Germany, March 2010.

Module concepts with (ultra)-thin chips for ATLAS IBL and SLHC.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Bonn, Germany, March 2010.

The ATLAS pixel stave emulator for serial powering.

Annual Meeting of the German Physical Society (Deutsche Physikalische Gesellschaft Frühjahrstagung), Munich, Germany, March 2009.

Detector Proposals and Technical Design Reports

Science Requirements and Detector Concepts for the Electron-Ion Collider: EIC Yellow Report.

EIC Users Group, BNL-220990-2021-FORE, JLAB-PHY-21-3198, LA-UR-21-20953, March 2021.

Technical Design Report for the ATLAS Inner Tracker Strip Detector.

ATLAS Collaboration, CERN-LHCC-2017-005, ATLAS-TDR-025, April 2017.

ATLAS Insertable B-Layer Technical Design Report.

ATLAS Collaboration, CERN-LHCC-2010-013, ATLAS-TDR-19, September 2010.

TEACHING AND SUPERVISION

I have developed a broad portfolio of research-led teaching activities including undergraduate and graduate lecture courses, laboratory teaching, M.Sc. and Ph.D. project supervision. Using my expertise in instrumentation for particle and nuclear physics, and CMOS technology, my teaching activities aim to deliver modern methods and tools for the development of advanced scientific and commercial instrumentation, to prepare students to work in research and industrial environments. The growth in both the scope and quality of my teaching activities has been recognized by the UK's Higher Education Academy, which awarded me the status of Fellow.

Doctoral Supervision and Teaching

In the AY 2012/22 and 2023/24, I have delivered lectures on **Radiation Hardness of Silicon Detector Technologies** at the **Advanced UK Instrumentation Training School** for PhD students and early-career researchers. The school is organized by the UK particle physics community. The lectures have been held online and are open to an international audience.

Since the AY 2015/16, I supervise PhD students working on projects related to the ATLAS ITk detector, the silicon detector for the Electron-Ion Collider (EIC), the development of MAPS and LGAD sensors, radiation-tolerance studies of silicon technologies, and potential medical applications of silicon detector technologies. In addition, I regularly examine PhD theses as an external examiner.

09/2022 – present	Co-supervisor. Mr E. Liu, Development of Solid-State Detector Technologies for Extreme Fluence Environments at Future Colliders, University of Birmingham, UK.
09/2021 – 01/2026	Co-supervisor. Mr J. Lomas, Measurement of Single Dissociative Diffraction of Protons in 13 TeV Collisions with the ATLAS Experiment, University of Birmingham, UK.
09/2020 – 10/2024	Primary supervisor. Mr. S. Maple, Development of a 65 nm MAPS Vertex and Tracking Detector and Study of DIS Kinetic Variable Reconstruction for an EIC experimental facility, University of Birmingham, UK.
09/2020 – 09/2024	Primary supervisor. Mr. J. Mulvey, Development and Evaluation of Radiation-Hard Segmented Fast Timing Detectors Based on Low Gain Avalanche Detectors (LGADs) with Teledyne e2v, University of Birmingham, UK.
01/2020 – 02/2024	Co-supervisor. Mr W. George, Searches for Charged Lepton Flavour Violation in Top Quark Decays with the ATLAS Detector, University of Birmingham, UK.
09/2019 – 09/2023	Co-supervisor. Mr M. Granado, Application of High Energy Physics Tracking and Calorimetry Technology to Develop Improved pCT Scanner Concepts, University of Birmingham, UK.
02/2018 – 03/2022	Primary Supervisor. Mr P. Freeman, Characterization of CMOS Sensors for Particle Physics Applications, University of Birmingham, UK. Ph.D. completed, appointed Postdoc at University of California Santa Barbara, US.
09/2017 – 06/2021	Primary Supervisor. Mr H. Wennlöf, Development of a Silicon Vertex Tracker for the Electron-Ion Collider, University of Birmingham, UK. Ph.D. completed, appointed Postdoc at DESY, Germany.
09/2015 – 09/2020	Co-supervisor. Mr D. Briglin, Prospect studies for Higgs Boson pair production to $b\bar{b}\gamma\gamma$ final state at the HL-LHC with the ATLAS detector, University of Birmingham, UK. Ph.D. completed, appointed Researcher at NIKON METROLOGY.

Ph.D. Thesis Committees

2026	Thesis referee, Giulia Gioachin, Design and characterization of an innovative monolithic silicon sensor with additional gain for the ALICE3 Time of Flight Detector, Polytechnic University of Turin, Italy.
2025	Member of the defense committee, Corentin Lemoine, Développement d'une nouvelle génération de capteurs à pixels CMOS de très grande taille pour la localisation fine des particules chargées, University of Strasbourg, France.
2024	Thesis referee, Stefano Durando, Development of Monolithic CMOS Radiation Sensors in 110 nm Technology for Sub-Nanosecond Timing Applications, Polytechnic University of Turin, Italy.

2023	Thesis referee , Edoardo Bianco, Low Power CMOS Front-End For Medical Application, Polytechnic University of Turin, Italia.
2022	Thesis referee , Mr Raffaele Aaron Giampaolo, A novel fully depleted monolithic active CMOS microstrip sensor, Polytechnic University of Turin, Italy.
2022	Thesis referee , Mr Andrea Di Salvo, CMOS distributed signal processing systems for radiation sensors, Polytechnic University of Turin, Italy.
2021	Member of the Award Panel of the 2021 Emilio Gatti and Franco Manfredi Best Ph.D. Thesis Award in Radiation Instrumentation, Italy.
2021	Thesis Assessor , Mr Ignacio Asensi Tortajada, Design and Development of Safety and Control Systems in ATLAS, University of Valencia, Spain.
2021	External Examiner , Mrs Morag Jean Williams, Evaluation of Fine-Pitch Hybrid Silicon Pixel Detector Prototypes for the CLIC Vertex Detector in Laboratory and Test-Beam Measurements, University of Glasgow, UK.
2020	External Examiner , Mrs Alice Georgina Fleur Dunford, Novel Developments in Scientific EMCCDs, The Open University, UK.
2020	Rapporteur de thèse , Mrs Blerina Gkotse, Ontology-based Generation of Personalised Data Management Systems: an Application to Experimental Particle Physics, Université PSL, France.

Undergraduate teaching and supervision

University of Trieste, Italy (AY 2024/25 – present)

Since the AY 2025/26, I teach the course of **Advanced Electronics for Experimental Physics** in the final year of the master's degree in physics. The course aims at addressing the interest of physics students in electronics by providing an introduction to modern analog and digital electronic circuits in CMOS technology. Lectures include examples of electronic circuits for experimental physics and are supported by practical sessions with a PSPICE simulator.

Since I arrived in Trieste, I share the course of **Physics of Electronic Devices** for the bachelor in physics with a colleague. The course provides an overview of circuit theory, introduces the basis of semiconductor physics, and discussed the main semiconductor devices. I have expanded the content of the course covering the analysis of circuits operating under sinusoidal steady-state conditions and RC filters, and introduced the topics of operational amplifiers and MOSFET transistors, both in lectures and hands-on lab sessions.

I am one of the professors of the **Laboratory of Data Acquisition and Control** in which I have introduced the use of FPGA to acquire data in counting and energy measurement experiments. The students learn FPGA architecture and design flow, VHDL hardware description language, and implement data processing and acquisition tools on FPGA for data taking in the lab.

At the University of Trieste, I have also taught part of the **General Physics** course of the bachelor degree in Geology (AY 2024/25), and I have been assisting in the **Lab III (Optics)** course of the bachelor degree in physics (AY 2024/25).

I regularly supervise and assess Bachelor and Master Thesis projects.

AY 2025/26 **Supervisor**, D. Gallerio, Master Thesis, University of Trieste, Italy (ongoing).
 Supervisor, P. De Pascalis, Master Thesis, University of Trieste, Italy (ongoing).
 Co-supervisor, F. Battistiol, Bachelor Thesis, University of Trieste, Italy (ongoing).
 Thesis assessor, T. Boasso, Particle identification by Cherenkov imaging techniques in the experiment ePIC at EIC, Master Thesis, University of Trieste, Italy.

University of Birmingham, UK (AY 2015/16 – 2023/24)

Starting in the AY 2017/18, I delivered the **Year 2 Electronics** course. I completely redesigned the delivery approach and content of this 22-hour module to introduce methods of microelectronics circuits design and analysis applicable to the development of state-of-the-art instrumentation for particle physics, and CMOS integrated circuits and imaging sensors. Very positive student feedback has been received through the years,

consistently well above 80%, which was also commended by the Head of the School of Physics and Astronomy. The number of students registered for this optional module has also increased from about a dozen to approximately 40 students since I became course lead.

From the AY 2017/18, I supervised **Year 4 projects**. The Year 4 project corresponds to 40% of the effort for final year M.Sc. students. Each project is assigned to a pair of collaborating students, working on different aspects. I have supervised 8 completed M.Sc. projects on the following topics: - Development and optimisation of Depleted Monolithic Active Pixel Sensors for future collider experiments using **TCAD technologies**; - Optimisation of **current monitoring and beam quality** at the high intensity irradiation line of the Birmingham MC40 cyclotron; - Laboratory characterisation of **Low Gain Avalanche Detectors** before and after proton irradiations, using laser and radioactive sources.

Since the academic year 2016/17, I contributed to the **Year 3 Nuclear Physics Laboratory**, attended by about 70 students per year, providing support and supervision for projects involving the use of solid-state detectors. Throughout the academic years 2015/2016 and 2016/2017, I supervised students in **Year 2 Projects Laboratory** building and conducting experiments with cosmic rays telescope and cloud chamber setups.

Since the academic year 2016/17, I have been **Year 1 Academic Tutor** for six years. Each year I supervised three groups of four students. During the tutorials I actively involved students in the discussion of the material presented in the lecture courses to encourage peer discussions, covered a broad range of problem sets based on previous years exam papers, stimulated further interest by presenting current topics in particle physics and instrumentation. Since the academic year 2016/17, I taught the **Year 1 Physics and Communication Skill workshop**. Starting in the academic year 2022/23, I have been deputy coordinator for the **Physics Critique** module for Year 3 and Year 4 students.

University of Bonn, Germany (AY 2009/10 – 2014/15)

In the academic year 2013/2014, I have been assistant for the **M.Sc. Physics of Particle Detectors course**, preparing exercise sheets for example classes and the exam script. As a graduate student at the University of Bonn, I have been demonstrator in the **M.Sc. Particle Physics and Nuclei course example classes** (2010/11), and in the **B.Sc. Electronics Lab** (2009/10 – 2014/15).

ACADEMIC SERVICE AND ADMINISTRATION

- 2025 – present Member of the group for **Quality Assurance of the Bachelor's Degree in Physics** at the University of Trieste, Italy.
- 2023 – present Member of the **Editorial Board of the Journal of Instrumentation** (JINST) published by IOP Publishing on behalf of the International School for Advanced Studies (SISSA).
- 2022 – 2024 Member of the **STFC Oversight Committee** for the CMS upgrade project, UK.
- 2021 – 2024 Member of the **Steering Committee of the Advanced UK Instrumentation Training Programme** for doctoral students and early-career researchers.
- 2016 – 2023 Member of the **Graduate Studies Committee** of the Department of Physics at the University of Birmingham. Initially served as **PhD Students Mentor** (academic years 2016/17-2017/18) and subsequently as **PhD Admissions Tutor** (academic years 2018/19-2022/23) for the Particle Physics Group.
- 2018 – 2021 Member of the **Equality and Diversity Committee**, School of Physics and Astronomy, University of Birmingham, UK.
- 2018 – 2020 Experimental Particle Physics Expert on the **STFC Industrial CASE Studentships Awarding Panel**, UK.
- 2016 Member of the **Experimental Readiness Review (ERR) Committee** for the CLAS12 Experiment at the Thomas Jefferson National Accelerator Facility (JLab), Virginia, USA (upon invitation by the JLAB Deputy Director for Nuclear Research).

FURTHER TRAINING, PROFESSIONAL DEVELOPMENT, AND QUALIFICATIONS

- 2025: Awarded the **National Scientific Qualification (ASN) for Full Professor** by the Italian Ministry of University and Research, in Sector 02/A1 – Experimental Physics of Fundamental Interactions (11/2025 – 11/2037).
- 2023: Awarded the **National Scientific Qualification (ASN) for Associate Professor** by the Italian Ministry of University and Research, in Sector 02/A1 – Experimental Physics of Fundamental Interactions (02/2023 – 02/2035).
- 2023: **Emerging Leaders Programme**, University of Birmingham, UK.
- 2018: **Fellow of the Higher Education Academy**, UK.
- 2017: **Developing as Academic Team Leader**, University of Birmingham, UK.
- 2016 – 2017: **Postgraduate Certificate in Higher Education**, University of Birmingham, UK.
- 2015: **CERN-Fermilab Hadron Collider Physics Summer School**.
- 2005: **CERN Summer Student Programme 2005**.

PUBLIC ENGAGEMENT

- 2023: **From Phone Cameras to Particle Physics Discovery: Technologies for Science**, IOP Public Lecture, University of Birmingham, UK.
- 2018 – 2020: **SQUEEKIE Workshop**, multiple schools, UK. Outreach activity targeting Year 8/9 pupils (13 to 14 years old), developed to introduce basic electronics concepts.
- 2018: **Physics Experience Week**, University of Birmingham, UK. Two-week long hands-on workshop on experimental physics techniques, targeting Year 10/11 pupils (15 to 16 years old).
- 2016: **Skirting Science**, Light Hall School, Shirley, UK. Hands-on workshop on radiation detection targeting Year 9 female pupils (14 years old) to stimulate engagement in STEM.
- 2015 – 2024: **Open Days for prospective undergraduate applicants**, University of Birmingham, UK.
- 2015: **Eine Digitalkamera für 40 Millionen Bilder pro Sekunde: Der ATLAS-Pixel detector**, lecture (in German), “Detektoren: Die Augen der Teilchenphysik” exhibition at UniMuseum, University of Bonn, Germany.
- 2010 – 2015: **Physics Workshop Rhineland**, Silicon Lab, University Bonn, Germany. Interactive tours of the Silicon Lab of the University Bonn for secondary school pupils.

Prof. Laura Gonella
List of publications
August 2026

- [1] M. Aaboud et al. “Measurement of the Inelastic Proton-Proton Cross Section at $\sqrt{s} = 13$ TeV with the ATLAS Detector at the LHC”. In: *Phys. Rev. Lett.* 117.18 (2016), p. 182002. DOI: 10.1103/PhysRevLett.117.182002. arXiv: 1606.02625 [hep-ex].
- [2] M. Aaboud et al. “Evidence for the $H \rightarrow b\bar{b}$ decay with the ATLAS detector”. In: *JHEP* 12 (2017), p. 024. DOI: 10.1007/JHEP12(2017)024. arXiv: 1708.03299 [hep-ex].
- [3] M. Aaboud et al. “Jet energy scale measurements and their systematic uncertainties in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Rev. D* 96.7 (2017), p. 072002. DOI: 10.1103/PhysRevD.96.072002. arXiv: 1703.09665 [hep-ex].
- [4] M. Aaboud et al. “Measurement of b -hadron pair production with the ATLAS detector in proton-proton collisions at $\sqrt{s} = 8$ TeV”. In: *JHEP* 11 (2017), p. 062. DOI: 10.1007/JHEP11(2017)062. arXiv: 1705.03374 [hep-ex].
- [5] M. Aaboud et al. “Measurement of lepton differential distributions and the top quark mass in $t\bar{t}$ production in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”. In: *Eur. Phys. J. C* 77.11 (2017), p. 804. DOI: 10.1140/epjc/s10052-017-5349-9. arXiv: 1709.09407 [hep-ex].
- [6] M. Aaboud et al. “Measurement of the cross-section for electroweak production of dijets in association with a Z boson in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 775 (2017), pp. 206–228. DOI: 10.1016/j.physletb.2017.10.040. arXiv: 1709.10264 [hep-ex].
- [7] M. Aaboud et al. “Measurement of the Drell-Yan triple-differential cross section in pp collisions at $\sqrt{s} = 8$ TeV”. In: *JHEP* 12 (2017), p. 059. DOI: 10.1007/JHEP12(2017)059. arXiv: 1710.05167 [hep-ex].
- [8] M. Aaboud et al. “Measurements of top-quark pair differential cross-sections in the lepton+jets channel in pp collisions at $\sqrt{s} = 13$ TeV using the ATLAS detector”. In: *JHEP* 11 (2017), p. 191. DOI: 10.1007/JHEP11(2017)191. arXiv: 1708.00727 [hep-ex].
- [9] M. Aaboud et al. “Performance of the ATLAS Track Reconstruction Algorithms in Dense Environments in LHC Run 2”. In: *Eur. Phys. J. C* 77.10 (2017), p. 673. DOI: 10.1140/epjc/s10052-017-5225-7. arXiv: 1704.07983 [hep-ex].
- [10] M. Aaboud et al. “Search for direct top squark pair production in final states with two leptons in $\sqrt{s} = 13$ TeV pp collisions with the ATLAS detector”. In: *Eur. Phys. J. C* 77.12 (2017), p. 898. DOI: 10.1140/epjc/s10052-017-5445-x. arXiv: 1708.03247 [hep-ex].
- [11] M. Aaboud et al. “Search for pair production of heavy vector-like quarks decaying to high- p_T W bosons and b quarks in the lepton-plus-jets final state in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 10 (2017), p. 141. DOI: 10.1007/JHEP10(2017)141. arXiv: 1707.03347 [hep-ex].
- [12] M. Aaboud et al. “Searches for the $Z\gamma$ decay mode of the Higgs boson and for new high-mass resonances in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 10 (2017), p. 112. DOI: 10.1007/JHEP10(2017)112. arXiv: 1708.00212 [hep-ex].
- [13] M. Aaboud et al. “Study of $WW\gamma$ and $WZ\gamma$ production in pp collisions at $\sqrt{s} = 8$ TeV and search for anomalous quartic gauge couplings with the ATLAS experiment”. In: *Eur. Phys. J. C* 77.9 (2017), p. 646. DOI: 10.1140/epjc/s10052-017-5180-3. arXiv: 1707.05597 [hep-ex].
- [14] M. Aaboud et al. “Study of ordered hadron chains with the ATLAS detector”. In: *Phys. Rev. D* 96.9 (2017), p. 092008. DOI: 10.1103/PhysRevD.96.092008. arXiv: 1709.07384 [hep-ex].
- [15] M. Aaboud et al. “Combined measurement of differential and total cross sections in the $H \rightarrow \gamma\gamma$ and the $H \rightarrow ZZ^* \rightarrow 4\ell$ decay channels at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 786 (2018), pp. 114–133. DOI: 10.1016/j.physletb.2018.09.019. arXiv: 1805.10197 [hep-ex].

- [16] M. Aaboud et al. “Measurement of dijet azimuthal decorrelations in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector and determination of the strong coupling”. In: *Phys. Rev. D* 98.9 (2018), p. 092004. DOI: 10.1103/PhysRevD.98.092004. arXiv: 1805.04691 [hep-ex].
- [17] M. Aaboud et al. “Measurement of inclusive jet and dijet cross-sections in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 05 (2018), p. 195. DOI: 10.1007/JHEP05(2018)195. arXiv: 1711.02692 [hep-ex].
- [18] M. Aaboud et al. “Measurement of the production cross-section of a single top quark in association with a Z boson in proton-proton collisions at 13 TeV with the ATLAS detector”. In: *Phys. Lett. B* 780 (2018), pp. 557–577. DOI: 10.1016/j.physletb.2018.03.023. arXiv: 1710.03659 [hep-ex].
- [19] M. Aaboud et al. “Observation of Higgs boson production in association with a top quark pair at the LHC with the ATLAS detector”. In: *Phys. Lett. B* 784 (2018), pp. 173–191. DOI: 10.1016/j.physletb.2018.07.035. arXiv: 1806.00425 [hep-ex].
- [20] M. Aaboud et al. “Search for a Structure in the $B_s^0 \pi^\pm$ Invariant Mass Spectrum with the ATLAS Experiment”. In: *Phys. Rev. Lett.* 120.20 (2018), p. 202007. DOI: 10.1103/PhysRevLett.120.202007. arXiv: 1802.01840 [hep-ex].
- [21] M. Aaboud et al. “Search for an invisibly decaying Higgs boson or dark matter candidates produced in association with a Z boson in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 776 (2018), pp. 318–337. DOI: 10.1016/j.physletb.2017.11.049. arXiv: 1708.09624 [hep-ex].
- [22] M. Aaboud et al. “Search for dark matter in events with a hadronically decaying vector boson and missing transverse momentum in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 10 (2018), p. 180. DOI: 10.1007/JHEP10(2018)180. arXiv: 1807.11471 [hep-ex].
- [23] M. Aaboud et al. “Search for electroweak production of supersymmetric particles in final states with two or three leptons at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Eur. Phys. J. C* 78.12 (2018), p. 995. DOI: 10.1140/epjc/s10052-018-6423-7. arXiv: 1803.02762 [hep-ex].
- [24] M. Aaboud et al. “Search for flavour-changing neutral current top-quark decays $t \rightarrow qZ$ in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 07 (2018), p. 176. DOI: 10.1007/JHEP07(2018)176. arXiv: 1803.09923 [hep-ex].
- [25] M. Aaboud et al. “Search for heavy ZZ resonances in the $\ell^+ \ell^- \ell^+ \ell^-$ and $\ell^+ \ell^- \nu \bar{\nu}$ final states using proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Eur. Phys. J. C* 78.4 (2018), p. 293. DOI: 10.1140/epjc/s10052-018-5686-3. arXiv: 1712.06386 [hep-ex].
- [26] M. Aaboud et al. “Search for Higgs boson pair production in the $\gamma\gamma b\bar{b}$ final state with 13 TeV pp collision data collected by the ATLAS experiment”. In: *JHEP* 11 (2018), p. 040. DOI: 10.1007/JHEP11(2018)040. arXiv: 1807.04873 [hep-ex].
- [27] M. Aaboud et al. “Search for low-mass dijet resonances using trigger-level jets with the ATLAS detector in pp collisions at $\sqrt{s} = 13$ TeV”. In: *Phys. Rev. Lett.* 121.8 (2018), p. 081801. DOI: 10.1103/PhysRevLett.121.081801. arXiv: 1804.03496 [hep-ex].
- [28] M. Aaboud et al. “Search for pair production of heavy vector-like quarks decaying into hadronic final states in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Rev. D* 98.9 (2018), p. 092005. DOI: 10.1103/PhysRevD.98.092005. arXiv: 1808.01771 [hep-ex].
- [29] M. Aaboud et al. “Search for pair production of higgsinos in final states with at least three b -tagged jets in $\sqrt{s} = 13$ TeV pp collisions using the ATLAS detector”. In: *Phys. Rev. D* 98.9 (2018), p. 092002. DOI: 10.1103/PhysRevD.98.092002. arXiv: 1806.04030 [hep-ex].
- [30] M. Aaboud et al. “Search for resonant WZ production in the fully leptonic final state in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 787 (2018), pp. 68–88. DOI: 10.1016/j.physletb.2018.10.021. arXiv: 1806.01532 [hep-ex].

- [31] M. Aaboud et al. “Search for the Decay of the Higgs Boson to Charm Quarks with the ATLAS Experiment”. In: *Phys. Rev. Lett.* 120.21 (2018), p. 211802. DOI: 10.1103/PhysRevLett.120.211802. arXiv: 1802.04329 [hep-ex].
- [32] M. Aaboud et al. “Search for the Higgs boson produced in association with a vector boson and decaying into two spin-zero particles in the $H \rightarrow aa \rightarrow 4b$ channel in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 10 (2018), p. 031. DOI: 10.1007/JHEP10(2018)031. arXiv: 1806.07355 [hep-ex].
- [33] M. Aaboud et al. “Search for scalar resonances decaying into $\mu^+\mu^-$ in events with and without b -tagged jets produced in proton-proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *JHEP* 07 (2019), p. 117. DOI: 10.1007/JHEP07(2019)117. arXiv: 1901.08144 [hep-ex].
- [34] Morad Aaboud et al. “A measurement of material in the ATLAS tracker using secondary hadronic interactions in 7 TeV pp collisions”. In: *JINST* 11.11 (2016), P11020. DOI: 10.1088/1748-0221/11/11/P11020. arXiv: 1609.04305 [hep-ex].
- [35] Morad Aaboud et al. “Charged-particle distributions at low transverse momentum in $\sqrt{s} = 13$ TeV pp interactions measured with the ATLAS detector at the LHC”. In: *Eur. Phys. J. C* 76.9 (2016), p. 502. DOI: 10.1140/epjc/s10052-016-4335-y. arXiv: 1606.01133 [hep-ex].
- [36] Morad Aaboud et al. “Dark matter interpretations of ATLAS searches for the electroweak production of supersymmetric particles in $\sqrt{s} = 8$ TeV proton-proton collisions”. In: *JHEP* 09 (2016), p. 175. DOI: 10.1007/JHEP09(2016)175. arXiv: 1608.00872 [hep-ex].
- [37] Morad Aaboud et al. “Luminosity determination in pp collisions at $\sqrt{s} = 8$ TeV using the ATLAS detector at the LHC”. In: *Eur. Phys. J. C* 76.12 (2016), p. 653. DOI: 10.1140/epjc/s10052-016-4466-1. arXiv: 1608.03953 [hep-ex].
- [38] Morad Aaboud et al. “Measurement of W^+W^- production in association with one jet in proton-proton collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 763 (2016), pp. 114–133. DOI: 10.1016/j.physletb.2016.10.014. arXiv: 1608.03086 [hep-ex].
- [39] Morad Aaboud et al. “Measurement of exclusive $\gamma\gamma \rightarrow W^+W^-$ production and search for exclusive Higgs boson production in pp collisions at $\sqrt{s} = 8$ TeV using the ATLAS detector”. In: *Phys. Rev. D* 94.3 (2016), p. 032011. DOI: 10.1103/PhysRevD.94.032011. arXiv: 1607.03745 [hep-ex].
- [40] Morad Aaboud et al. “Measurement of jet activity in top quark events using the $e\mu$ final state with two b -tagged jets in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”. In: *JHEP* 09 (2016), p. 074. DOI: 10.1007/JHEP09(2016)074. arXiv: 1606.09490 [hep-ex].
- [41] Morad Aaboud et al. “Measurement of the $b\bar{b}$ dijet cross section in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector”. In: *Eur. Phys. J. C* 76.12 (2016), p. 670. DOI: 10.1140/epjc/s10052-016-4521-y. arXiv: 1607.08430 [hep-ex].
- [42] Morad Aaboud et al. “Measurement of the $t\bar{t}$ production cross-section using $e\mu$ events with b -tagged jets in pp collisions at $\sqrt{s}=13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 761 (2016). [Erratum: *Phys.Lett.B* 772, 879–879 (2017)], pp. 136–157. DOI: 10.1016/j.physletb.2016.08.019. arXiv: 1606.02699 [hep-ex].
- [43] Morad Aaboud et al. “Measurement of the $W^\pm Z$ boson pair-production cross section in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS Detector”. In: *Phys. Lett. B* 762 (2016), pp. 1–22. DOI: 10.1016/j.physletb.2016.08.052. arXiv: 1606.04017 [hep-ex].
- [44] Morad Aaboud et al. “Measurement of the photon identification efficiencies with the ATLAS detector using LHC Run-1 data”. In: *Eur. Phys. J. C* 76.12 (2016), p. 666. DOI: 10.1140/epjc/s10052-016-4507-9. arXiv: 1606.01813 [hep-ex].

- [45] Morad Aaboud et al. “Measurement of the relative width difference of the $B^0\text{--}\bar{B}^0$ system with the ATLAS detector”. In: *JHEP* 06 (2016), p. 081. DOI: 10.1007/JHEP06(2016)081. arXiv: 1605.07485 [hep-ex].
- [46] Morad Aaboud et al. “Measurement of the top quark mass in the $t\bar{t} \rightarrow$ dilepton channel from $\sqrt{s} = 8$ TeV ATLAS data”. In: *Phys. Lett. B* 761 (2016), pp. 350–371. DOI: 10.1016/j.physletb.2016.08.042. arXiv: 1606.02179 [hep-ex].
- [47] Morad Aaboud et al. “Measurement of the total cross section from elastic scattering in pp collisions at $\sqrt{s} = 8$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 761 (2016), pp. 158–178. DOI: 10.1016/j.physletb.2016.08.020. arXiv: 1607.06605 [hep-ex].
- [48] Morad Aaboud et al. “Measurement of top quark pair differential cross-sections in the dilepton channel in pp collisions at $\sqrt{s} = 7$ and 8 TeV with ATLAS”. In: *Phys. Rev. D* 94.9 (2016). [Addendum: *Phys.Rev.D* 101, 119901 (2020)], p. 092003. DOI: 10.1103/PhysRevD.94.092003. arXiv: 1607.07281 [hep-ex].
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- [50] Morad Aaboud et al. “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 (2016), pp. 555–574. DOI: 10.1016/j.physletb.2016.06.017. arXiv: 1603.09203 [hep-ex].
- [51] Morad Aaboud et al. “Search for dark matter produced in association with a hadronically decaying vector boson in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 763 (2016), pp. 251–268. DOI: 10.1016/j.physletb.2016.10.042. arXiv: 1608.02372 [hep-ex].
- [52] Morad Aaboud et al. “Search for heavy long-lived charged R -hadrons with the ATLAS detector in 3.2 fb $^{-1}$ of proton–proton collision data at $\sqrt{s} = 13$ TeV”. In: *Phys. Lett. B* 760 (2016), pp. 647–665. DOI: 10.1016/j.physletb.2016.07.042. arXiv: 1606.05129 [hep-ex].
- [53] Morad Aaboud et al. “Search for Higgs and Z Boson Decays to $\phi\gamma$ with the ATLAS Detector”. In: *Phys. Rev. Lett.* 117.11 (2016), p. 111802. DOI: 10.1103/PhysRevLett.117.111802. arXiv: 1607.03400 [hep-ex].
- [54] Morad Aaboud et al. “Search for high-mass new phenomena in the dilepton final state using proton–proton collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector”. In: *Phys. Lett. B* 761 (2016), pp. 372–392. DOI: 10.1016/j.physletb.2016.08.055. arXiv: 1607.03669 [hep-ex].
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