Dr. Ismet Siral

Experimental Particle Physicist
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RESEARCH INTERESTS

- Detector R&D focusing on tracking detectors based on silicon (pixel, SiPM), scintillating fiber and diamond detector technologies.
- Design and conceptualization of detectors and their TDAQ systems.
- Experimental particle physics with over eleven years of experience in data analysis, focusing on:
  - Searches for long-lived particles and supersymmetric models
  - Standard Model electroweak physics

EDUCATION

University Of Michigan *Ph.D. Physics, USA* 2014 – 2019
Bogazici University *M.S. Physics, Turkey* 2012 – 2014
Sabanci University *B.S. Electronics Eng. and Physics Minor, Turkey* 2008 – 2012

WORK EXPERIENCE

EPFL *Postdoctoral Researcher, Switzerland* 2025 – Present
Detector R&D for FCC-ee and LHCb upgrades within the DRD4 collaboration, focusing on scintillating fiber and silicon detector technologies

CERN *Fellow, Switzerland* 2022 – 2025
Designed and prototyped the BCM' luminosity detector and its TDAQ system. Coordinated the ATLAS SUSY dE/dx search team of 30+ physicists. Served as ITk FELIX liaison providing support across all ITk institutes

University Of Oregon *Postdoctoral Researcher, USA* 2019 – 2022
Developed the ITk Pixel DAQ software and readout prototype, with extended stays at SLAC and LBNL. Worked on the ATLAS SUSY dE/dx search for long-lived particles. Developed a new isolated high-momentum track trigger for long-lived particle searches in ATLAS.

University Of Michigan *Doctoral Researcher, USA* 2014 – 2019
Led the analysis establishing the first evidence of triboson WWW production (PhD thesis). Developed and maintained the NSW electronics database. Contributed to the WW/WZ resonance search

Experiment affiliations: ATLAS (2011–2025), LHCb, FCCee, DRD4 (2025–Present)

AWARDS & GRANTS

Best Poster Award, FCC Week 2026, Helsinki 2026
Breakthrough Prize in Fundamental Physics, *shared with the ATLAS Collaboration* 2023
ATC Proposal Grant ($15,500), *with Laura Jeanty, for on-site collaboration at SLAC and LBNL* 2020
Sabanci University Merit Scholarship, *top ∼0.5% in Turkey* 2008

PAPERS AND CONFERENCE PROCEEDINGS

?? quoted publications (**594** total citations — INSPIRE-HEP).
Member of the **ATLAS** (2011–2025) and **LHCb** (2025–Present); **900+** collaboration publications.

1. **Limits on long-lived chargino production using large specific ionisation and low-β in 140 fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV using the ATLAS experiment**
   Paper [25 citations] – Feb. 2025 – *arXiv:2502.06694* – Analysis contact

2. **Measuring the ATLAS ITk Pixel Detector Material via Multiple Scattering of Positrons at the CERN PS**
   Paper [1 citation] – Apr. 2025 – *Eur. Phys. J. C 85, 381 (2025)* – TDAQ architect
3. **Limits on long-lived chargino production using large specific ionisation and low-β in 140 fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV using the ATLAS experiment**
   Pub. Note – May. 2024 – *ATL-PHYS-PUB-2024-009* – Analysis contact
4. **Performance of the ATLAS Trigger System in 2022**
   Paper [167 citations] – Jan. 2024 – *JINST 19 P06029* – Trigger developer
5. **Development of the BCM' System for Beam Abort and Luminosity Monitoring at the HL-LHC**
   Proceeding – Mar. 2023 – *Pixel2022 (2023) 040* – TDAQ architect
6. **Search for massive, long-lived charged particles with large specific ionisation and low-β in 140 fb^{-1} of pp collisions at $\sqrt{s} = 13$ TeV using the ATLAS experiment**
   Conference Note [7 citations] – Aug. 2023 – *ATLAS-CONF-2023-044* – Analysis contact
7. **Search for heavy, long-lived, charged particles with large ionisation energy loss in pp collisions at $\sqrt{s} = 13$ TeV using the ATLAS experiment and the full Run 2 dataset**
   Paper [93 citations] – June. 2023 – *JHEP 06 (2023) 158* – Key analyzer
8. **Evidence for the production of three massive vector bosons with the ATLAS detector.**
   Paper [92 citations] – Nov. 2019 – *Phys. Let. B 798 (2019) 134913* – Lead analyzer in WWW channel
9. **Evidence for the WWW production in pp collisions with the ATLAS detector.**
   Ph.D. Thesis – May, 2019 – *Deep Blue 2027.42/151603* – Lead analyzer
10. **Search for WW/WZ resonance production in $\ell\nu qq$ final states in pp collisions at 13 TeV with the ATLAS detector**
    Paper [148 citations] – March 2018 – *JHEP03 (2018) 042* – Contributing analyzer
11. **Search for triboson $W^{\pm}W^{\pm}W^{\mp}$ production at 8 TeV with the ATLAS detector.**
    Paper [68 citations] – March 2017 – *Eur. Phys. J. C (2017) 77: 141 Cover of EPJC March 2017 issue.* – Key analyzer
12. **Search for WW/WZ resonance production in $\ell\nu qq$ final states at $\sqrt{s} = 13$ TeV with the ATLAS detector**
    Conference Note [15 citations] – July 2017 – *ATLAS-CONF-2017-051* – Contributing analyzer
13. **Search for WW/WZ resonance production in $\ell\nu qq$ final states at $\sqrt{s} = 13$ TeV with the ATLAS detector at LHC**
    Conference Note [50 citations] – Aug. 2016 – *ATLAS-CONF-2016-062* – Contributing analyzer
14. **Search for E6 iso-singlet quarks in atlas, through the $HjZj$ decay channel**
    Master Thesis – July 2014 – *YOK Tez No: 387400* – Sole analyzer

SUPERVISION

5 students *Ph.D. Students* 2019 – Present

8 students, 1 received the ITk thesis award *Master's Students* 2019 – Present

4 students, 1 won the best poster award *Summer Students* 2019 – Present

DETECTOR R&D AND INSTRUMENTATION PROJECTS

April 2025 - Ongoing

Design and Simulation of Scintillating Fiber Tracker for the FCCee Project

Poster Award Winner at FCC 2026

Design and development of a new tracker detector based on the Scintillating Fiber (SciFi) technology for the FCCee project.

- Design and maintain the GEANT4 and Key4Hep simulation
- Extract efficiencies and particle ID capabilities of the FCCee SciFi proposal
- R&D for the detector architecture and technologies

April 2025 - Ongoing

R&D and Qualification LHCb SciFi Mighty Tracker Project

R&D and qualification of the cryogenic SciFi detector (Mighty SciFi Tracker) for LHCb Upgrade-II (2033), where LHCb SciFi detector is being rebuilt to survive high-lumi LHC.

- Qualification of the cryogenic prototype to quantify its performance.
- Irradiation measurements of SciFi mats for testing new SciFi fiber mat prototypes
- R&D new fibers, SiPMs, glue prototypes and flexible interfaces for SciFi mats
- In-Situ measuring for radiated LHCb SciFi mats for testing radiation damage models in real detector conditions

May 2022 - March 2025

Design and Prototyping BCM' luminosity detector and its TDAQ system

Architected TDAQ system and led the detector design of the BCM' detector which is a luminosity detector that will be situated inside the ITk (ATLAS Inner Tracker). The project involved a small team of three institutes. Initially tasked with the TDAQ design but rapidly extended my role into detector design from PCB design to mechanics.

- Designed and built the TDAQ architecture
- Led the design of the readout PCBs and the mechanical design
- Designed the software, firmware and hardware of the readout system.
- Became an expert in fiber optical readout and FELIX systems.
- Led test beam campaigns for testing the front-end hardware

June 2019 – March 2025

ITk pixel DAQ software development and testing

Designed, developed and implemented the ATLAS Inner Tracker (ITk) Pixel DAQ software prototype and validated the first full working prototype with the complete data-chain.

- Became one of the few FELIX (FPGA based TDAQ hardware) readout system expert of ITk
- Established a communication bridge between FE and readout hardware (TDAQ)
- Debugged the firmware and provided feedback to the FELIX team
- Built and tested the TDAQ system to be integrated with ATLAS TDAQ system, and provided detailed documentation.
- Worked on building the first ITk demonstrator in SR1.
- Supported other scientific labs on ITk readout who were building their readouts

January 2020 – March 2025

Isolated high momentum track-based trigger for ATLAS

Developed a new trigger (HLT) for the ATLAS detector aiming to identify isolated high-momentum tracks reconstructed inside the inner detector, designed for triggering on long-lived particles. The trigger relies solely on inner-detector tracks and is currently operational in ATLAS.

June 2015 – May 2019

Design and maintenance of the New Small Wheel's electronics database

Developed and designed a variety of databases, software, and webpage solutions for the ATLAS New Small Wheel (NSW) project for tracking electronics hardware and storing its status (Conditions database).

DATA ANALYSIS AND PHYSICS SEARCHES

January 2020 – February 2025

Search for long lived particles with large ionization energy loss

Analysis Contact (April 2022 – February 2025)

Pushed forward the ATLAS "Search for long lived particles with large ionization energy loss" for several years, where I acted as the project coordinator (Analysis contact) for part of the project. The project searched for long lived particles in ATLAS through the ionization energy method (dE/dx) and Time of Flight (ToF) targeting particles that evade standard calorimeter-based searches.

- Coordinated the team of 30+ researchers managing analysis strategy and deliverables.
- Optimized dedicated signal regions.
- Handled majority of the systematic uncertainties.
- Introduced new derivation formats to guarantee longevity of the analysis.
- Created new triggers for increased efficiencies.
- Served as the lead software developer and architect.
- Interviewed for the Nature magazine on the results of this analysis: https://www.nature.com/articles/d41586-022-01388-6

September 2014 – June 2019

Search for triboson $W^{\pm}W^{\pm}W^{\mp}$ production at 8 and 13 TeV

8 TeV: Published in EPJC as the cover in March 2017
13 TeV: PhD Thesis at University of Michigan and published in Phys. Let. B

Led the analysis that established the first evidence of the tri-boson WWW production which is a fundamental test for testing quartic gauge boson interactions of the SM. This work provided the foundation of the subsequent discovery of the tri-boson WWW production.

- Found the first evidence of WWW production
- Designed the analysis strategy for the WWW channel at 13 TeV version
- Served as the lead analyzer in the WWW channel at 13 TeV
- Solo-developed the analysis framework
- Resulted in an ATLAS briefing of the analysis which can be found here

September 2015 – February 2018

Search for WW/WZ resonance production in the $\ell\nu qq$ final state

Published in JHEP March 2018 along with multiple proceedings.

Contributed to the search for WW/WZ resonance production in the $\ell\nu qq$ final state, focusing on the decay channel where W/Z decays into large-radius jets. The analysis set upper limits on Heavy Vector Triplet, RS Graviton, and Narrow Width Higgs models. My main contributions were:

- Focused on the decay channel where W/Z decays into large-radius jets
- Developed the fake track background prediction to estimate non-prompt backgrounds
- Estimated a large portion of the systematic uncertainties.
- Maintained, ran, and improved the data analysis framework for multiple analysis groups (CxAOD-Framework).

September 2011 – September 2014

Heavy Quarks that Decay via the H,Z channel in 8 TeV ATLAS Data

Master's Thesis at Bogazici University

Conducted a search for E6 iso-singlet quarks—proposed by Feza Gürsey—using the $ZH \to lljj + 2$ jets decay channel in 8 TeV ATLAS data. The analysis set 95% confidence limits on the production of these exotic quarks.

- Designed and maintained the analysis framework.
- Formed the analysis strategy and acted as the sole analyzer.

CONFERENCES AND IMPORTANT TALKS

1. **Geant4 Sim. of the SciFi Track. for Future Colliders**
   September 2026 – *CHEF Plenary Meeting 2026*
2. **R&D of Cryo. Cooling of Mighty SciFi Tracker @ LHCb**
   August 2026 – *Annual SPS Meeting 2026*
3. **Mighty-SciFi Status**
   June 2026 – *120th LHCb Week*
4. **Full Optical Geant4 Simulation of the SciFi Tracker for FUTURE Collider R&D**
   June 2026 – *FCC Week 2026, Helsinki [Best Poster Award]*
5. **Recent results on LLPs in ATLAS**
   June 2024 – *LHCP 2024, Boston*
6. **ITk Common Electronics**
   May 2023 – *ATLAS Upgrade Week Plenary, CERN*
7. **dE/dx Searches for LLPs**
   Sept 2022 – *Collider Cross Talks, CERN*
8. **The new ATLAS triggers for LLPs that leave unconventional signatures in the tracking detectors**
   July 2022 – *Poster @ ICHEP 2022, Bologna*
9. **Interview with the Nature Magazine**
   May 2022 – *Nature Article*
10. **Search for new charged long-lived particles using the ATLAS detector**
    March 2022 – *La Thuile 2022, La Thuile*
11. **Precision measurements of electroweak theory**
    January 2020 – *Epiphany 2020, Krakow*

12. **Measurements of vector boson fusion with the ATLAS detector**
    August 2017 – *QCD@LHC 2017, Debrecen*
13. **The search for tri-boson WWW production**
    May 2016 – *APS April Meeting 2016, Salt Lake City*

SERVICE & LEADERSHIP

ATLAS SUSY dE/dx Analysis Contact 2023 – 2025
ITk Data Format and Decoding Taskforce Coordinator 2024 – 2025
ATLAS ITk FELIX Liaison 2023 – 2025
ATLAS SUSY Derivation Contact 2021 – 2024
Physics Review Boards in ATLAS and LHCb, *(WZ+HF, Slow Moving Particles, $B^+ \to \pi^+\mu^\pm e^\mp$)* 2021 – 2026
Community Leadership, *(Turkish Forum Manager, Staff Assoc. Ambassador)* 2015 – 2025

TEACHING EXPERIENCE

Introduction to Modern Physics *Lab Assistant*, *University of Michigan* 2014 – 2015
Introduction to Modern Physics *Teaching Assistant*, *Bogazici University* 2013
Introduction to Computing *Teaching Assistant*, *Sabanci University* 2012
Introduction to Electronics *Teaching Assistant*, *Sabanci University* 2011 – 2012

SCHOOLS AND TRAININGS

Effective Teaching & Mentoring: An Immersive Programme April 2026
Altium Designer Essentials Training March 2024
AVA School on Low Energy Anti-Matter Physics June 2018
European High Energy School of Physics 2016, *ESHEP 2016* July 2016
Third Inter. School on Trigger and Data Acquisition 2012, *ISOTDAQ 2012* February 2012
School of Comp. App. in Accelerator and Part. Phys. 2012, *HPFBU 2012* February 2012