Dr. Ismet Siral

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Research Interests

- Detector R&D focusing on data acquisition as well as overall detector architectures for silicon pixel detectors and diamond detectors.
- Design and conceptualisation of software infrastructure for readout-systems.
- Experimental particle physics focusing on long-lived particles, Standard Model electroweak physics and Super Symmetric models with more than eleven years of experience in data analysis.

Work Experience

EPFL	*Postdoctoral Researcher*	Switzerland	As of 04.2025
LHCb Experiment	*User at LHCb Collaboration*	Switzerland	As of 04.2025
CERN	*Fellow*	Switzerland	2022 – 2025
ATLAS Experiment	*User at ATLAS Collaboration*	Switzerland	2011 – 2025
University Of Oregon	*Postdoctoral Researcher*	USA	2019 – 2022
University Of Michigan	*Grad. Student Research Ass.*	USA	2014 – 2019
DESY	*Summer Student*	Germany	2012
Toshiba Medical Systems	*Internship*	Turkey	2011
TUBITAK Space Tech. Res. Inst.	*Internship*	Turkey	2011

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
University of Surrey	*Erasmus*	UK	2011 – 2012

Appointed Positions and Roles

ATLAS Slow Moving Particles Ed. Board Member	2024 – 2025
CERN Staff Assoc. Turkish Ambassador	2024 – 2025
ATLAS SUSY dE/dx Analysis Contact	2023 – 2025
ATLAS ITk FELIX Liaison	2023 – 2025
ATLAS SUSY Derivation Contact	2021 – 2024
ATLAS WZ + Heavy Flavor Ed. Board Member	2021 – 2023
Manager of the Turkish Forum at CERN	2015 – 2019

Skills

Technical	Data Analysis, Leadership, Soldering, Basic CAD Design, PCB Design
Comp. Languages	Bash, C, C++, HTML, Latex, PHP, Prolog, Python, R, Root, SageMath, SQL, VHDL
Programs	Emacs, Keras, MadGraph, MS Office, OpenScad, Pythia8, TMVA, Xilinx ISE Design Suite, KiCad, Altium
Spoken Languages	Turkish (Native), English(C2), French(A2-B1), German(A1)

Research Experience

May 2022 - March 2025

BCM' luminosity detector's TDAQ design

Supervisor: Carlos Solans Sanchez

I have played an integral role in conceptualizing and engineering the readout structure for the BCM' detector. BCM' is a luminosity detector that will be situated inside the ITk (ATLAS Inner Tracker). The detector is composed of a small team of three institutes, hence I have taken on various active roles:

- Responsible for TDAQ architecture design
- Contributed to the design of the readout PCB's and the mechanical design
- Designed the software, firmware and hardware of the readout system from scratch
- Became and expert in fiber optical readout and FELIX systems.
- Contributed to the readout of diamond detectors and communication of readout FE's

June 2019 – March 2025

ITk pixel DAQ software development and testing.

Supervisor: Carlos Solans Sanchez Past Supervisor: Laura Jeanty

Since June 2019, I have been working hands-on with the ITk pixel readout prototype, contributing to the development of the DAQ software for the ITk pixel detector, and testing the existing DAQ hardware.

- One of the few FELIX readout system expert of ITk
- Working on building the demonstrator in SR1
- Providing support to other scientific labs on ITk readout
- Actively building the system to be integrated with ATLAS TDAQ system.
- Debugging the firmware and providing feedback to the FELIX team
- Providing detailed documentation

January 2020 – February 2025

Search for long lived particles with large ionization energy loss

Analysis Contact (April 2022 – February 2025)

This project is an analysis of the data collected by ATLAS detector to identify long-lived particles. We are using mass reconstruction through the ionization energy method to identify the long-lived particles that do not leave large energy deposits inside the ATLAS calorimeters. My active roles in this project were:

- Coordinated the team (30+ people) conducting the analysis
- Optimised dedicated signal regions
- Handled majority of the systematic uncertainties
- Introduced new derivation formats
- Generated new triggers
- Contributed to the limit setting

January 2020 – March 2025

Isolated high momentum track-based trigger for ATLAS

Supervisor: Laura Jeanty

In this project we have developed a new ATLAS trigger (HLT). This trigger aims to identify such events only using the tracks reconstructed inside the inner detector, which are isolated and have high momentum. This trigger is currently active in ATLAS.

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 / Adviser: Junjie Zhu
13 TeV: PhD Thesis at University of Michigan and published in Phys. Let. B

Quartic gauge boson interactions are a fundamental piece of SM that needs further investigations. In this project, we analyzed the ATLAS data-set and we found the first evidence of the tri-boson WWW production. This analysis covers both fully leptonic ($WWW \to \ell\nu\ell\nu\ell\nu$) and semi-leptonic channels ($WWW \to \ell\nu\ell\nu jj$), and I was involved in the semi-leptonic channel where we are searching for two same-sign leptons coming from two same-sign W's and two jets.

- Found the first evidence of WWW production
- Worked on it as my Ph.D. thesis
- Was the main analyser in the WWW channel at 13 TeV and built the analysis from scratch including analysis framework
- Provided major contributions to the 8 TeV analysis
- Main decision maker of the analysis strategy for 13 TeV version
- The ATLAS briefing of the analysis 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 / Adviser: Junjie Zhu

WW/WZ resonance production provides us with an excellent tool to test beyond the SM physics, and we were able to set upper limits on *Heavy Vector Triplet*, *RS Graviton*, and *Narrow Width Higgs* models. I worked in the W/Z decay channels for this analysis for the 36.1 fb^{-1} version of this analysis. My main contributions were:

- Contributed to the decay channel where W/Z decays into a large radius jet

- Maintained, ran, and improved the data analysis framework for multiple analysis groups (CxAOD-Framework)
- Designed some of the systematic uncertainties
- Left the analysis group to focus on my thesis

JUNE 2015 – MAY 2019

Design and maintenance of the New Small Wheel's electronics database
ATLAS qualification task / Adviser: Junjie Zhu / In collaboration with: Kim Heidegger

At the newly designed New Small Wheel (NSW) of the ATLAS detector, new electronics needed to be tested and tracked. For this reason, we designed a variety of databases, software, and webpage solutions. Until May 2019, I maintained the database and handed it over to another PhD student when I finished my PhD.

SEPTEMBER 2011 – SEPTEMBER 2014

Heavy Quarks that Decays via the H,Z channel in 8 TeV ATLAS Data
Masters Thesis at Bogazici University / Advisers: Erkcan Ozcan, Gokhan Unel

For my master's thesis, I conducted a search on E6 Iso-Singlet quarks proposed by Feza Gursey using the $ZH \rightarrow lljj + 2jets$ decay channel where we set 95% confidence limits for the productions of the Iso-singlet quarks in $8\,TeV$ ATLAS data.
- This was my first large project at the ATLAS collaboration and my master thesis
- I designed the whole analysis from scratch

PAPERS AND CONFERENCE PROCEEDINGS

Paper
FEB. 2025 **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**
arXiv:2502.06694

Paper
APR. 2025 **Measuring the ATLAS ITk Pixel Detector Material via Multiple Scattering of Positrons at the CERN PS**
Eur. Phys. J. C 85, 381 (2025)

Pub. Note
MAY. 2024 **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**
ATL-PHYS-PUB-2024-009

Paper
JAN. 2024 **Performance of the ATLAS Trigger System in 2022**
JINST 19 P06029

Proceeding
MAR. 2023 **Development of the BCM' System for Beam Abort and Luminosity Monitoring at the HL-LHC**
Pixel2022 (2023) 040

Conference Note
AUG. 2023 **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**
ATLAS-CONF-2023-044

Paper
JUNE. 2023 **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**
JHEP 06 (2023) 158

Paper
NOV. 2019 **Evidence for the production of three massive vector bosons with the ATLAS detector.**
Phys. Let. B 798 (2019) 134913

Ph.D. Thesis
MAY, 2019 **Evidence for the WWW production in pp collisions with the ATLAS detector.**
Deep Blue 2027.42/151603

Paper
MARCH 2018 **Search for WW/WZ resonance production in $\ell\nu qq$ final states in pp collisions at 13 TeV with the ATLAS detector**
JHEP03 (2018) 042

Paper
MARCH 2017 **Search for triboson $W^{\pm}W^{\pm}W^{\mp}$ production at 8 TeV with the ATLAS detector.**
Eur. Phys. J. C (2017) 77: 141 Cover of EPJC March 2017 issue.

Conference Note
JULY 2017 **Search for WW/WZ resonance production in $\ell\nu qq$ final states at $\sqrt{s} = 13$ TeV with the ATLAS detector**
ATLAS-CONF-2017-051

Conference Note
AUG. 2016 **Search for WW/WZ resonance production in $\ell\nu qq$ final states at $\sqrt{s} = 13$ TeV with the ATLAS detector at LHC**
ATLAS-CONF-2016-062

Master Thesis
JULY 2014 **Search for E6 iso-singlet quarks in atlas, through the $HjZj$ decay channel**
YOK Tez No: 387400

CONFERENCES AND IMPORTANT TALKS

OCTOBER 2024 **dE/dX and disappearing tracks: Learnings from Run-2 and ideas for Run-3**
ATLAS Exotics Workshop 2024, Bologna

JUNE 2024 **Recent results on LLPs in ATLAS**
LHCP 2024, Boston

SEPTEMBER 2023 **RPVLL Critical Review**
ATLAS SUSY Workshop 2023, Oslo

MAY 2023 **ITk Common Electronics**
ATLAS Upgrade Week Plenary, CERN

SEPT 2022 **dE/dx Searches for LLPs**
Collider Cross Talks, CERN

JULY 2022 **The new ATLAS triggers for LLPs that leave unconventional signatures in the tracking detectors**
Poster @ ICHEP 2022, Bologna

MAY 2022 **Interview with the Nature Magazine**
Nature Article

MARCH 2022 **Search for new charged long-lived particles using the ATLAS detector**
La Thuile 2022, La Thuile

JANUARY 2020 **Precision measurements of electroweak theory**
Epiphany 2020, Krakow

AUGUST 2017 **Measurements of vector boson fusion with the ATLAS detector**
QCD@LHC 2017, Debrecen

MAY 2016 **The search for tri-boson WWW production**
APS April Meeting 2016, Salt Lake City

TEACHING EXPERIENCE

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

I have mentored three Ph.D., one Master, and three summer students
Under my supervision one of my Masters students received the ITk Masters thesis award.

SCHOOLS AND WORKSHOPS

Exotics Workshop 2024		October 2024
Altium Designer Essentials Training		March 2024
SUSY Workshop 2023		Sep 2023
The thirteenth LLP Community workshop	LLP13	June 2023
ITk DAQ Workshop		May 2019
AVA School on Low Energy Anti-Matter Physics		June 2018
European High Energy School of Physics 2016	ESHEP 2016	July 2016
Multi-Boson Interactions Workshop 2015	MBI 2015	September 2015
Multi-Boson Interactions Workshop 2014	MBI 2014	October 2014
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