Mohamed Elashri

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Education

University of Cincinnati — OH, US
Ph.D. in physics — 2020–current
- Thesis: "Work in progress"

University of Minnesota Duluth — MN, US
M.S. in physics — 2018–2020
- Thesis: "Search for Slow Magnetic Monopoles with the NOvA Far Detector"

University of Science and Technology, Zewail City — Cairo, Egypt
B.S. in physics. — 2013–2018
- Thesis: "Strip Hit Resolution of CMS Tracker Analysis"

Research Experience

University of Cincinnati — OH, US
Graduate Research Assistant — 2022— current
- LHCb Collaboration
- QCD, Electroweak, and Exotica Group member
- Long-lived particles SUSY search
- Allen trigger development
- IRIS-HEP
- Innovative algorithms development
- pv-finder algorithm development
- pv-finder LHC deployment

University of Minnesota, Duluth — MN, US
Graduate Research Assistant — 2018–2020
- NOνA Collaboration
- Worked on search for magnetic monopole in NOνA Far detector
- Exotics analyses group member
- Developed and maintained a general analysis package for exotics analyses

University of Science and Technology, Zewail City — Cairo, Egypt
Undergraduate Research Assistant — 2017–2018
- CMS Collaboration
- CMS Data analysis and Hardware training
- Worked on upgrading CMS tracker algorithm.

Publications

[1] LHCb Collaboration, "Measurement of the mass difference and relative production rate of the Ω_b^- and Ξ_b^- baryons", *arXiv preprint*, vol. arXiv:2305.15329v1, May 24, 2023.

[2] LHCb collaboration, "Associated production of prompt J/ψ and Υ mesons in pp collisions at $\sqrt{s} = 13\,TeV$", May 24, 2023.

[3] LHCb collaboration, "Precision measurement of cp violation in the penguin-mediated decay $B_s^0 \to \phi\phi$", Apr. 13, 2023.

[4] LHCb collaboration, "Search for $D^*(2007)^0 \to \mu^+\mu^-$ in $B^- \to \pi^-\mu^+\mu^-$ decays", Apr. 5, 2023. arXiv: 2304.01981 [hep-ex], preprint.

[5] LHCb collaboration, "Study of charmonium decays to $K_S^0 K\pi$ in the $B \to \left(K_S^0 K\pi\right) K$ channels", Apr. 28, 2023.

[6] LHCb collaboration, "Test of lepton flavour universality using $B^0 \to D^{*-}\tau^+\nu_\tau$ decays with hadronic τ channels", May 2, 2023.

[7] M. Elashri, "Search for Slow Magnetic Monopoles with the NOνA Far Detector", English, Fermi National Accelerator Lab. (FNAL), Batavia, IL (United States), Tech. Rep. FERMILAB-MASTERS-2020-01, Jan. 2020.

[8] N. Khaled and M. Elashri, "Magnetically charged black hole", en, *J. Phys.: Conf. Ser.*, vol. 1253, p. 012 008, Jun. 2019, ISSN: 1742-6596.

[9] M. Elashri, "Strip hit resolution of CMS Tracker analysis", Jun. 2017.

Teaching

University of Cincinnati — OH, US
Physics Teaching Assistant — 2020–current

- Teach introductory physics labs and promote students linking between theoretical development and nature facts.
- Helping conduct problem solving sessions and Physics tutoring center.
- Grading assignments and tests, documenting results and informing lead teacher about students performance.

University of Minnesota, Duluth — MN, US
Physics Teaching Assistant — 2018–2020

- Supported instructors with test administration, curriculum development, and assignment grading.
- Encouraging dynamic and pleasant educational environment by promoting both gentle discipline and Physics.
- Created and improved tutorials resources and training materials.
- Supported student learning objectives through personalized and small group assistance to support classroom instruction.
- Graded assignments and tests using answer key, documented results and informed lead teacher of students' performance.

Skills

- **Programming:** Python, Mathematica, C/C++, R, Julia, Rust
- **Machine Learning:** PyTorch, TensorFlow, Keras
- **Particle Physics:** Pythia, Geant4, MadGraph, IsaJet, HEPMC
- **Tools/Techs:** LaTeX, Git, Linux, Docker
- **Soft:** Leadership, Time management, Teamwork

Languages

- **English:** Proficient
- **Arabic:** Mother tongue, Native speaker

Projects

- **SUSY Mass Spectrum Plotter** (Physics, 2023)
  A plotting module for SUSY SLHA file Mass Spectrum.
- **2d Ising Model Monte-Carlo Simulation** (Physics, 2021)
  Apply the MC methods using Metropolis Algorithm to Ising model and extract physical parameters.
- **Experimenting Machine Learning Techniques on SUSY dataset** (Machine Learning, 2021)
  Experimenting with real Monte-Carlo data to get accurate classification using various Machine Learning Algorithms
- **Estimating the Age of universe using galaxies distance and velocity data** (Data Analysis, 2021)
  Calculating hubble constant and calculate age of universe using sklearn model from galaxies distances and velocities
- **Arxiv abstracts scraper python library** (Python, 2021)
  A python module for scraping arxiv abstracts for NLP testing purpose
- **Analysis of Earthquake Time Series Data using Machine Learning** (Machine learning, 2019)
  Applying different ML algorithms on time series dataset and implementing the new linear neural differential method
- **NOvA experiment DDTPrescale calculation package** (C++, 2019)
  Calculate the average prescale per SubRub for the data acquired by nova experiment, used by various exotics analyses.
- **Analysis of Type Ia supernovae data** (Data Analysis, 2019)
  Revisiting Supernovae 1999 data and reproduce the results

Conferences AND Workshops

- **SM@LHC 2023** (July, 2023)
  The SM@LHC workshop deals with the latest developments as well as future prospects in Standard Model phenomenology at th
- **IRIS-HEP Institute Retreat (Princeton University)** (October, 2022)
  Annul checkpoint the status of the IRIS-HEP efforts to date and specific plans and achievable goals for the next year .
- **SLAC Summer Institute 2022 - (SSI 2022)** (August, 2022)
  Annual event by SLAC aims to inform graduate students and post-docs about latest developments in the field.
- **Fourth Computational and Data Science school for HEP (CoDaS-HEP 2022)** (August, 2022)
  The CoDaS-HEP school aims to provide a broad introduction to these critical skills in Computational High Energy Physics.
- **Searching for Long-Lived Particles - Eleventh Workshop of the LLP Community** (June, 2022)
  The eleventh LLP Community workshop discussing current and future searches of LLPs.
- **Snowmass Rare and Precision Measurements Frontier Spring Meeting** (May, 2022)
  DESY offers students in physics the possibility to participate in the research activities through this program.
- **DESY Summer Student Programme 2021** (July-September, 2021)
  The meeting is part of snowmass process discussing highest prospects for uncovering New Physics over the next ten years.

- **CMS Open Data Workshop 2021** (July, 2021)
  The workshop aims to bridge the technical gap of a full analysis with CMS open data.
- **The 28th International Workshop on Weak Interactions and Neutrinos** (June, 2021)
  Assess the status of the field and to initiate collaborative efforts to address current physics questions.
- **Beyond Standard Model: From Theory to Experiment (BSM- 2021)** (March, 2021)
  Discuss latest developments in the physics beyond the standard models of particle physics, cosmology and gravitation.
- **Fast Machine Learning for Science Workshop** (Oct, 2020)
  Discuss emerging methods and scientific applications for deep learning and inference acceleration applications in HEP.
- **Gravitational-Wave Open Data Workshop #3** (May, 2020)
  Intended for scientists and students who wish to learn about using gravitational-wave data and software.

Talks and Presentations

Physics Seminar, University of Cincinnati (May –2021)
Talk: Thermodynamical Derivation of Einstein's Field Equations

Physics Seminar, University of Minnesota Duluth (Feb –2020)
Talk: Magnetically Charged Black Holes

Physics Seminar, University of Minnesota Duluth (Jan –2020)
Talk: Introduction to Magnetic Monopole

Physics Seminar, University of Minnesota Duluth (Feb –2019)
Talk: An Introduction to Magnetic Monopole

Physics Seminar, University of Minnesota Duluth (Mar –2019)
Talk: Dark Matter Search in NOνA Near Detector

Physics Seminar, University of Minnesota Duluth (Feb –2019)
Talk: Search for Magnetic Monopole using NOνA Far Detector

Physics Seminar, University of Minnesota Duluth (Feb –2019)
Talk: An Introduction to Magnetic Monopole

Physics Club meeting, Zewail City (Sep –2018)
Talk: Magnetic Monopoles, Dirac's Dream

Zewail University Seminar, Zewail City (Mar –2017)
Talk: Physics Program at Zewail City, Introduction for Prospective Students

Physics Club Meeting, Zewail City (April –2016) **Talk:** Parton Model

Volunteering & Mentoring

- **Student Mentor at UMD** 2019 –2020
  Member of the program aims to assist incoming international students with their transition to UMD.
- **Founder of Physics Club Zewail University** 2013–2018
  Founder and the president of physics club at Zewail City
- **ZC Physics Ambassador Representative Zewail University** 2013–2017
  Organized and staffed events for new or prospective students.

- **Student Major Representative Zewail University** 2013–2015
  Student representative of the ZC physics department