

Moh'd Hussein, Ph.D.

Experimental High Energy Physics

Department of Physics, University of Jordan

Amman 11942, Jordan

☎ +962 (77) 553 5620

☎ +962 (6) 535 5000

✉ m.hussein@ju.edu.jo

Associate professor of experimental high energy physics at the University of Jordan and a member of the CDF experiment at Fermilab. Expert C++ programmer and adept user of Python and ROOT with vast experience in developing, coding, validating and documenting large data sets and sophisticated statistical models. Teaching at both the graduate and undergraduate level with emphasis on the advanced electrodynamics, relativistic quantum mechanics and modern particle physics courses.

Education

- 2011 **Ph.D. Physics**, Michigan State University, East Lansing, MI, USA, [Advisor: Joey Huston].
- 2007 **M.S. Physics**, Michigan State University, East Lansing, MI, USA.
- 2001 **M.S. Physics**, University of Jordan, Amman, Jordan.
- 1998 **B.S. Physics**, University of Jordan, Amman, Jordan.

Skills

Software and Programming: C++, Python, ROOT, Fortran.

Data Modeling and Machine Learning: Monte Carlo Simulations, Maximum likelihood, Neural Networks algorithm.

Professional Experience

2006–
Present **Collaborator on the CDF experiment**, Fermi National Accelerator Laboratory, Batavia, Illinois, USA.

My colleagues and I perform experiments in the Top Physics Group to elucidate the production and decay mechanism, mass and other intrinsic properties for the top quark.

- 16-year experience collaborating with diverse in age, size, and ethnicity groups.
- Doctoral research work conducted as part of the CDF collaboration to measure, for the first time, the cross section of top quark pair with an additional hard jet using 4.1 fb^{-1} of data.
- Co-author of over 20 peer-reviewed publications (both experimental and phenomenology papers) in high-impact journals.

2019– **Associate professor of physics**, *University of Jordan*, Amman, Jordan.
Present [Assistant professor of physics (2011–2019), *University of Jordan*, Amman, Jordan.]
Taught the core physics courses at both the graduate and undergraduate level.

- Taught the graduate electrodynamics, quantum mechanics and classical mechanics courses.
- Designed and taught a special course in collider phenomenology for the graduate class.
- Taught quantum mechanics, modern particle physics, mathematical physics and modern physics for the senior and the junior classes, and several calculus-based introductory physics courses besides.
- Supervised the senior research projects.
- Proposed and secured funding from Michigan State University and University of Jordan.
- Served in academic, scientific and examination committees.

Selected Publications

- "High-precision measurement of the W boson mass with the CDF II detector", *Science* **376**, 170-176 (2022).
- "Measurement of the charge asymmetry of electrons from the decays of W bosons produced in $p\bar{p}$ collisions at $\sqrt{s}=1.96$ TeV", *Phys. Rev. D* **104**, 092002 (2021), arXiv:2107.04678 [hep-ex].
- "A Study of the role of the PDF uncertainty on the LHC W -boson mass measurement", *J. Phys. G: Nucl. Part. Phys.* **46**, 095002 (2019), arXiv:1905.00110 [hep-ph].
- "Combined Forward-Backward Asymmetry Measurements in Top-Antitop Quark Production at the Tevatron", *Phys. Rev. Lett.* **120**, 042001 (2018), arXiv:1709.04894 [hep-ex].
- "Measurement of the forward-backward asymmetry of top-quark and antiquark pairs using the full CDF Run II data set", *Phys. Rev. D* **93**, 112005 (2016), arXiv:1602.09015 [hep-ex].
- "Measurement of $B(t \rightarrow Wb)/B(t \rightarrow Wq)$ in Top-Quark-Pair Decays Using Dilepton Events and the Full CDF Run II Data Set", *Phys. Rev. Lett.* **112**, 221801 (2014), arXiv:1404.3392 [hep-ex].
- "Measurement of the top-quark pair-production cross section in events with two leptons and bottom-quark jets using the full CDF data set", *Phys. Rev. D* **88**, 091103(R) (2013), arXiv:1304.7961 [hep-ex].
- "Measurement of the top pair production cross section in the lepton+jets channel using a jet flavor discriminant", *Phys. Rev. D* **84**, 031101 (2011), arXiv:1103.4821 [hep-ex].
- "Evidence for a mass dependent forward-backward asymmetry in top quark pair production", *Phys. Rev. D* **83**, 112003 (2011), arXiv:1101.0034 [hep-ex].
- "First Measurement of the $t\bar{t}$ Differential Cross Section $d\sigma/dM_{t\bar{t}}$ in $p\bar{p}$ Collisions at $\sqrt{s}=1.96$ TeV", *Phys. Rev. Lett.* **102**, 222003 (2009), arXiv:0903.2850 [hep-ex].
- "Measurement of the $t\bar{t}$ production cross section in 2 fb^{-1} of $p\bar{p}$ collisions at $\sqrt{s}=1.96$ TeV using lepton plus jets events with soft muon b tagging", *Phys. Rev. D* **79**, 052007 (2009), arXiv:0901.4142 [hep-ex].

Awards

- Continuous Research Award - Fermi National Accelerator Laboratory.
- Continuous Research Award - Michigan State University.
- T. A. Kaplan Graduate Physics Award for the Best Ph.D. Seminar - Michigan State University.