

Colliding Worlds

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The astrophysical evidence for dark matter and the profound questions in particle physics that were highlighted by the discovery of the Higgs boson suggests that new fundamental particles and interactions are awaiting discovery. The Large Hadron Collider (LHC), the world's most energetic particle accelerator at the European Organization for Nuclear Research (CERN) in Switzerland, is providing a wealth of high energy collision data that makes it possible to search for evidence of new physics phenomena. Over the past few years, my group has used the data collected by the Compact Muon Solenoid detector to search for new particles by using top quarks and Higgs bosons. Through detector developments and machine learning techniques, we have severely constrained prevailing notions of how natural solutions to Higgs mass hierarchy and dark matter can manifest themselves experimentally. I will talk about my ongoing journey towards understanding the fundamental components of our universe and discuss opportunities for student involvement in our quest to find new physics phenomena.



Bio: Prof. Indara Suarez is an Assistant Professor at Boston University. Her research focuses on understanding the characteristics of the Higgs boson and the nature of dark matter using data collected by the Compact Muon Solenoid (CMS) Collaboration at the Large Hadron Collider (LHC). She is currently developing next-generation electronics and firmware for muon detectors and a new CMS precision timing detector capable of ultra-fast timing information to enhance the physics capabilities during the future high-luminosity era of the LHC. Her group has developed novel computational tools using artificial intelligence for data analysis and detector monitoring. Prof. Suarez is a former UC President's Postdoctoral Fellow at UCSB and an NSF Graduate Research Fellow at Texas A&M. She is also a strong supporter of efforts to increase the participation of traditionally under-represented groups and women in science. Her group promotes "diversity through research" by mentoring, teaching, and training students to create a pipeline for their success through their involvement in research.