

Spring 2022 Colloquium

Department of Physics & Astronomy, A&M-Commerce

April 14, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Particle Physics

Proton structure in the era of the Large Hadron Collider

Dr. Pavel Nadolsky

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Dr. Pavel Nadolsky earned a Ph.D. degree (2001) in Physics at Michigan State University. He worked as a post-doc at Southern Methodist University (SMU) in 2001 - 2004 and Argonne National Laboratory in 2004-2007. In 2008, he began his appointment as an assistant professor at SMU, where he is currently doing research on theory of elementary particles at hadron colliders, which explores physical objects at tiniest distances accessible to modern science. His research focuses on basic forces existing in nature and microscopic events that drive the evolution of the Universe. More information about Dr. Nadolsky and his research can be found at <https://pavelnadolsky.smu.edu/>

Abstract

An overwhelming number of theoretical predictions for hadron colliders requires parton distribution functions (PDFs) in the proton. Understanding of PDFs beyond the current level is critical for studies of the Higgs mechanism and new physics searches in the high-luminosity runs of the Large Hadron Collider. The ongoing revolution in computations of perturbative QCD demands comparably accurate nonperturbative PDFs. Determination of PDFs from the data combines continued advancements in quantum field theory, experimental measurements, and data science/machine learning. On the example of recent PDFs by the CTEQ-TEA (CT) and PDF4LHC groups, I review the progress in determination of PDFs and physics issues arising in their numerous applications.