CSU PHYSICS COLLOQUIUM

“Exploring the Hottest Matter in the Universe with Ultra-Relativistic Heavy Ion Collisions”

Dennis Perepelitsa

University of Colorado Boulder

Monday, February 17th at 4:00pm
120 Engineering (Hammond Auditorium)

Abstract

The Relativistic Heavy Ion Collider (RHIC) in New York and the Large Hadron Collider (LHC) in Switzerland accelerate large, fully-ionized nuclei to very near the speed of light. When the nuclei are steered into a head-on collision, the energy density and temperature in the collision zone become so large that the fundamental quark and gluon particles are liberated from their confined state and form a new phase of matter called a Quark-Gluon Plasma (QGP). Although exotic to our everyday experience, QGP is the form which comprised all the matter in our universe during the first few microseconds after the Big Bang. The QGP manifests striking many-body, large-wavelength phenomena which are not obvious from the first-principles of Quantum Chromodynamics (QCD), the theory of the strong nuclear force. An experimentally fruitful way to understand the composition and behavior of the QGP over many length scales is to probe it with high-energy jets produced by rare scattering processes between the quarks and gluons themselves. In this colloquium, I will discuss my research program with the ATLAS detector at the LHC and the future sPHENIX detector at RHIC.

Biography

Dennis V. Perepelitsa is an Assistant Professor in the Physics Department at the University of Colorado Boulder. He studied physics as an undergraduate at MIT and completed his Ph.D. at Columbia University in 2014, winning both the CERN-ATLAS and RHIC thesis awards for his dissertation. He was a Goldhaber Distinguished Fellow at Brookhaven National Laboratory, where he received the MIT Laboratory for Nuclear Science Lee Grodzins award and was a Blavatnik Regional Awards finalist. Professor Perepelitsa moved to the University of Colorado in 2016. His work is funded by a Department of Energy Early Career Award and a Cottrell Scholar Award.