

Physics Colloquium

Tuesday, February 27th at 3:30 pm in SC234

Dr. Andrew Whitbeck

Fermilab

Searching for invisible particles at the Large Hadron Collider and beyond

Understanding the particle nature of dark matter, which makes up most of the matter in the universe, and whether there is any connection between the newly-discovered Higgs boson's mass and new physics are two of the most important questions being explored at the Large Hadron Collider (LHC). Searches for invisible particles, which evade being detected directly, play an important role in understanding both dark matter and why the Higgs boson is so light. I will discuss techniques used by the Compact Muon Solenoid experiment to identify invisible particles and some of my work on improving these techniques. I will discuss how theories which predict dark matter production at the LHC can be tested using such techniques. In the near future, upgrades to the LHC, which will provide higher rates of particle collisions, will present significant challenges to the continued success of invisible particle searches. I will discuss on-going development of a detector that will help meet the challenges presented by the LHC upgrades. I will conclude with a discussion of future prospects for dark matter searches at the LHC and a future electron fixed target experiment.

Refreshments at 3:00 pm in SC 103