

CU Physics Department Particle Seminar

Wednesday, December 7, 2011 705 Pupin Hall 1:00 PM

Searching for New Phenomena at the Energy Frontier with Tau Leptons

The Large Hadron Collider brings a new energy frontier to particle physics with exciting opportunities for discovery. Tau leptons are prominent in The Large Hadron Collider (LHC) at CERN brings a new energy frontier to collider physics with exciting opportunities for discovery. Tau leptons, as members of the least-explored 3rd generation and as the most massive lepton, appear in many new physics searches at the LHC. For example, the discovery of the Standard Model higgs boson as well as the supersymmetric charged and neutral higgs bosons can depend primarily on decays involving taus in many possible scenarios due to enhanced couplings of the Higgs to taus. In addition, the ability to study the polarization, parity, and spin correlations of resonances decaying to taus make them powerful probes of the details of whatever new physics is uncovered. Experience with taus from Monte Carlo Simulation, the TeVatron and the LHC warn us of the difficulty of analyses with taus in the environment of a hadron collider while providing us with insights into overcoming the challenges. In this talk I will describe some current results from searches with taus from ATLAS and CMS as well as analysis techniques that allow us to separate physics with taus from the ubiquitous, and similar in signature, backgrounds.

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