

Columbia University Department of Physics

Particle Seminar Series



“Measurement of the spectrum and composition of cosmic rays with IceTop and IceCube”

The IceCube Neutrino Observatory and its associated surface array, IceTop, form a fully-integrated three-dimensional cosmic ray detector. IceTop, located on the surface of the South Polar ice sheet at 3000 m above sea level, is sensitive to the electromagnetic component of cosmic ray air showers, while IceCube, buried 1400 m below the surface, is sensitive to deeply penetrating high-energy muons. By combining information from the two detectors, it is possible to reconstruct both the energy and mass of primary cosmic rays. In combination, the detectors are sensitive to cosmic rays with energies between 1 and 100 PeV, a transition region in the cosmic ray spectrum known as the "knee." In this talk I will present an unfolding technique used to determine the average energy-dependent mass composition of cosmic rays in this energy range. The measurement of cosmic ray composition may shed light on the origin of cosmic rays in the knee region.

Jonathan Eisch,
University of Wisconsin

