

Particle physics at the Pierre Auger Observatory

Monday, 2 June 2014 12:00 (0:30)

Collaboration

Pierre Auger

Abstract content

The Pierre Auger Observatory is the largest detector of ultra-high energy cosmic rays (UHECR) in the world. These particles, presumably protons or heavier nuclei of energies up to 10^{20} eV initiate extensive air showers which can be detected by sampling the particles that arrive at ground level or observing the fluorescence light generated during the passage of showers through the atmosphere - the Pierre Auger Observatory employs both these techniques. As the center-of-mass energies of the first interactions in the showers can be several orders of magnitude beyond the reach of the LHC, the UHECR provide an unique opportunity to study hadronic interactions. While the uncertainty in modeling these interactions is somewhat degenerate with the unknown composition of the primary beam, interaction models can be tested using data such as the depths of the maxima of the longitudinal development of the showers or their muon content. Particular sensitivity to interaction models is achieved when several observables are combined. Moreover, using careful data selection, proton-air cross section at the c.m.s. energy of 57 TeV per nucleon-nucleon pair can be obtained.

Primary author(s) : EBR, Jan (Institute of Physics ASCR)

Presenter(s) : EBR, Jan (Institute of Physics ASCR)

Session Classification : Plenary Session