

Mass measurements with the Pierre Auger Observatory

Monday 11 May 2015 16:20 (30 minutes)

The Pierre Auger Observatory is the largest ultra-high energy cosmic ray experiment built so far. It is a hybrid detector, since it measures both the fluorescence light emitted while the air-showers develop in the atmosphere and the particles reaching the ground. We present the results related to the mass composition of ultra-high energy cosmic rays as obtained from both types of measurements. The depth at which the maximum of the electromagnetic development takes places and its fluctuations are the most sensitive parameters to infer the nature of the cosmic rays. The surface detector gives complementary variables as the depth at which the production of muons is maximal, the signal rise times and their asymmetries. We address the evolution of these parameters with energy, their systematic uncertainties and how they can also be used to constrain models of hadronic interactions at energies larger than those reached at LHC.

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Track Classification: STARS2015