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Mass composition and shower physics studies with the data of the Surface Detector of the Pierre Auger Observatory

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The Pierre Auger Observatory is the largest detector ever built. With an area covering over 3000 km², it was designed for the detection of ultra high energy cosmic rays. Using an original hybrid technique the Observatory can measure both the longitudinal profile in the atmosphere and the lateral distribution of particles at the ground, which allows the study of the extensive air showers in two complementary ways. We present here the last results related to mass composition inferences and air shower physics obtained with observables measured by the surface detector (SD). For mass studies, we are focused on the muon production depth in the atmosphere and the azimuthal asymmetry of the risetime. We also discuss how those observables together with the measurement of the muon number at the ground can be used to constrain hadronic interaction models.

Summary

Primary author: Mrs SANCHEZ-LUCAS, Patricia (University of Granada)

Presenter: Mrs SANCHEZ-LUCAS, Patricia (University of Granada)

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