Contribution ID: **7** Type: **not specified**

Measurements of Horizontal Air Showers with the Auger Engineering Radio Array

Tuesday, June 12, 2018 6:00 PM (20 minutes)

The Pierre Auger Observatory is the largest observatory for the detection of cosmic rays. With the Auger Engineering Radio Array (AERA) we measure the emitted radio signal of extensive air showers and reconstruct properties of the primary cosmic rays. For horizontal air showers (zenith angles larger than 60°) the signal is distributed over a larger area of more than several km². Therefore detection of air showers using a sparse radio antenna array, compatible with the 1500 m distance between the 1600 surface detector stations, is possible. The radio technique is sensitive to the electromagnetic component of air showers. Combining radio detection with particle information from the surface detector of the Pierre Auger Observatory, which mostly detects muons at large zenith angles, allows to study the cosmic ray composition for horizontal air showers.

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Session Classification: Experimental data