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Measurement of horizontal air showers with the Auger Engineering Radio Array

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The Auger Engineering Radio Array (AERA), located at the Pierre Auger Observatory in Argentina, measures the radio emission of extensive air showers in the 30-80 MHz frequency range. AERA consists of more than 150 antenna stations distributed over 17 kmˆ2. Together with the Auger surface detector, the fluorescence detector and the muon detector (AMIGA), AERA is able to measure cosmic rays with energies above 10ˆ17 eV in a hybrid detection mode. AERA is optimized for the detection of air showers up to 60° zenith angle, however, using the reconstruction of horizontal air showers with the Auger surface array, also very inclined showers are measured. In this contribution the analysis of the AERA data in the zenith angle range from 62° to 80° will be presented. CoREAS simulations predict radio emission footprints of several kmˆ2 for horizontal air showers, which are confirmed by AERA measurements. The first results on radio-based composition measurements of horizontal showers and an outlook of the radio detection of neutrino-induced showers will be given.

Summary

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