

Study of ultra-high energy cosmic rays from the radio signal at the Pierre Auger Observatory

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Deployed at the end of 2010 at the Pierre Auger Observatory, the first stage of the Auger Engineering Radio Array, AERA24, consists of 24 radio stations covering an area of 0.5 km². AERA measures the radio emission from cosmic-ray induced air showers. This electric field is used to constrain the characteristics of the primary particle: arrival direction, energy and nature. These studies are possible thanks to an instrumentation development allowing self-triggered together with externally-triggered measurements in the MHz domain and an improved understanding of the radio emission processes.

Since May 2013, 136 new stations are installed and cover an area of 12 km², for a total of 160 stations. AERA160 will provide a higher statistics and will enhance both the estimation of the nature of the primary cosmic ray and the energy resolution using additional detectors such as the Auger fluorescence telescopes and particle detectors, above 10¹⁷ eV.

After a brief description of the physics of air showers, we will present the main results obtained with AERA24 and discuss the new stage's expectations.

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