

Preparing the AugerPrime Radio Detector for Ultra-High Energy Cosmic Ray Detection via Radio Interferometry.

Friday, 8 November 2024 12:00 (20 minutes)

The Pierre Auger Observatory, the largest cosmic ray experiment in the world, spans 3,000 km² and employs multiple detection mechanisms for ultra-high energy cosmic rays (UHECRs). Currently, the observatory is undergoing an upgrade to AugerPrime, which introduces a Radio Detector (RD) that enhances detection capabilities within a zenith angle range of 60 to 85 degrees. The RD offers a 100% duty cycle, significantly improving statistics, sensitivity to primary cosmic ray composition, and precision in determining direction and energy. In my talk, I will explore the implementation of radio interferometry within the context of the AugerPrime experiment. This method requires accurate positioning of the radio antennas, which are spaced 1.5 km apart, to within 30 cm and time synchronization to within 1 ns. Ultimately, this technique will facilitate the characterization and tracking of extensive air showers as they traverse the atmosphere, further enhancing our understanding of UHECR particle composition through the RD of AugerPrime.

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