

Digital Radio Arrays for Ultra-High-Energy Cosmic Particles

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Digital radio arrays have become an effective tool to measure air showers at energies around and above 100 PeV. Compared to optical techniques, the radio technique is not restricted to clear nights. Thanks to recent progress on computational analysis techniques, radio arrays can provide an equally accurate measurement of the energy and the depth of the shower maximum. Stand-alone radio arrays offer an economic way towards huge apertures, e.g., for the search for ultra-high-energy neutrinos, but still require technical demonstration on large scales. Hybrid arrays combining radio antennas and particle detectors have already started to contribute to cosmic-ray physics in the energy range of the presumed Galactic-to-extragalactic transition. In particular, the combination of radio and muon detectors can pave a path to unprecedented accuracy for the mass composition of cosmic rays. This talk reviews recent developments regarding the radio technique and highlights selected running and planned antenna arrays, such as GRAND, the SKA, the AugerPrime Upgrade of the Pierre Auger Observatory, and IceCube-Gen2.

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