

Radio detection of air showers with LOFAR

Monday 27 August 2018 15:25 (17 minutes)

Air showers can be detected by the short radio pulses they emit. The LOFAR radio telescope contains a dense core region where 384 antennas are located within a circle of 320 m diameter. Here, the properties of radio emission from air showers have been measured in unprecedented detail. The complicated radiation patterns on the ground have been shown to agree with modern theory, including the full Stokes polarisation. The radio measurements are used to determine the atmospheric depth of the shower maximum with a precision of $\sim 20 \text{ g/cm}^2$, allowing for a cosmic-ray mass composition analysis around 10^{17} eV . We present the current status of the experiment and future extensions.

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Session Classification: Cosmic Rays

Track Classification: Cosmic Rays