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Type: Highlight talk

## Radio detection of Cosmic Rays with LOFAR

Saturday 1 August 2015 17:30 (30 minutes)

With LOFAR we measure the properties of the radio emission of extensive air showers with high precision in the frequency range 30 to 240 MHz. This allows us to establish key features, such as the lateral density distribution of the radio signals, the shape of the shower front, and the polarization of the radio signal. We obtained the first quantitative measurements in the frequency range 120-240 MHz. These findings are essential to understand the emission processes in the atmosphere. Two contributions dominate the radio emission: geomagnetic radiation and a charge excess component. The measurements indicate that the ratio between those two is a function of the distance to the shower axis and the zenith angle of the shower. The precision measurements are also used to verify the numerical simulation code for the emission. This code (CoReas) is in turn essential to measure the depth of the shower maximum with the radio technique . We analyze simultaneously measurements of the radio emission and the particle detectors at LOFAR, which allows us to determine the depth of the shower maximum with an accuracy, comparable to that of established techniques. We measure the properties of cosmic rays (arrival direction, energy, and particle type/mass) with the radio technique. Recent results will be presented.

## Registration number following "ICRC2015-I/"

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## Collaboration

- not specified -

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