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Detecting Radio Emission from Cosmic Rays with LOFAR

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LOFAR (the Low Frequency Array) is the largest radio telescope in the world for observing low frequency radio emission from 10 to 240 MHz. In addition to its use as an interferometric array, LOFAR is now routinely used to detect cosmic ray induced air showers by their radio emission.

The LOFAR core in the Netherlands has a higher density of antennas than any other dedicated cosmic ray experiment. On an area of nearly 5 km^2 about 1800 antennas are installed. They measure the radio emission from air showers with unprecedented precision and, therefore, give the perfect opportunity to disentangle the physical processes which cause the radio emission in air showers. In parallel to ongoing astronomical observations LOFAR is triggered by a particle detector (LORA) to record the time series containing the cosmic ray pulses.

Cosmic rays have been measured with LOFAR since June 2011. We will present the results of the first year of data. Special emphasis will be put on the reconstruction chain and the lateral signal distribution.

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