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Expansion of the LOFAR Radboud Air Shower Array and Updated Calibration of the LOFAR Antennas

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The LOFAR radio telescope measures radio emission from air showers in great detail. Now, we seek to extend our data taking capabilities. In this contribution we discuss the expansion of the LOFAR Radboud Air Shower Array (LORA). LORA is a particle detector array located at the dense LOFAR core and is used to trigger the read-out of the LOFAR antennas. By doubling the size of the array, we increase its effective area, allowing us to trigger on higher energy cosmic rays which are more likely to produce a strong radio signal. In addition, the expansion reduces the composition bias inherent in detecting low energy showers. We also revisit the calibration of the LOFAR antennas in the range of 30-80 MHz. Using the galactic background and a detailed model of the LOFAR signal chain, we find a calibration that provides an absolute energy scale and allows us to study frequency dependent features in measured signals.

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