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## High-precision measurements of extensive air showers with the SKA

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As of 2020, the Square Kilometre Array will constitute the world's largest radio telescope, offering unprecedented capabilities for a diverse science programme in radio astronomy. At the same time, the SKA will be ideally suited to detect extensive air showers initiated by cosmic rays in the Earth's atmosphere via their pulsed radio emission. With its very dense and uniform antenna spacing on an area of several km<sup>2</sup> and its large instantaneous bandwidth of 50-350 MHz, the low-frequency part of the SKA will provide very precise measurements of individual cosmic ray air showers. These precision measurements will allow detailed studies of the mass composition of cosmic rays in the region of transition from Galactic to extragalactic cosmic rays. Also, the SKA will facilitate three-dimensional "tomography" of the electromagnetic cascades of air showers, allowing us to study particle interactions at energies beyond the reach of the LHC with very high precision. Finally, studies of possible connections between air showers and lightning initiation can be taken to a new level with the SKA. We will report on the technical requirements for air shower detection with the SKA and discuss the science potential and project status.

### Collaboration

– not specified –

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