

# SLAC T-510: Accelerator measurements of radio emission from particle cascades in the presence of a magnetic field

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Cosmic ray induced particle cascades radiate in radio frequencies in the Earth's atmosphere. Geomagnetic and Askaryan emission provide an effective way to detect ultra-high energy cosmic rays. The SLAC T-510 experiment was the first to measure magnetically induced radiation from particle cascades in a controlled laboratory setting. An electron beam incident upon a dense dielectric target produced a particle cascade in the presence of a variable magnetic field. Antennas covering a band of 30-3000 MHz sampled RF emission in vertical and horizontal polarizations.

Results from T-510 are compared to particle-level RF-emission simulations which are critical for reconstructing the energy and composition of detected ultra-high energy cosmic ray air showers. We discuss the experimental set up, the data processing, the systematic errors and the main results of the experiment, which we found in a good agreement with the simulations.

## Summary

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