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Ultra-high-energy cosmic ray flux and energy measurement with ANITA

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The first flight of the Antarctic Impulse Transient Antenna (ANITA) experiment recorded 16 radio signals that were emitted by cosmic ray induced air showers. Recent developments in simulation packages made it possible to estimate the cosmic ray energy from these observations. In this talk we introduce a novel method to estimate the cosmic ray energy and apply it to the observations. We present, for the first time, a cosmic ray flux measurement from radio observations only and show that it is agreement with observations made elsewhere. In addition, we find good agreement between our observations and a full Monte Carlo simulation of the ANITA flight. The result of this study shows that observations in the 300-1000 MHz frequency band, which is an unique feature of ANITA, can be used to measure cosmic ray energy and they have the potential to provide accurate measurements of air shower properties in future applications.

Collaboration

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