

# Tunka-Rex: energy reconstruction with a single antenna station

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The Tunka-Radio extension is a radio detector for air showers in Siberia. It currently consists of 44 antennas, distributed over 3 square kilometer, and co-located with Tunka-133, a non-imaging air-Cherenkov detector for air showers. From 2012 to 2014 on, Tunka-Rex operated exclusively together with its host experiment, Tunka-133, which provided a trigger, data acquisition and an independent air-shower reconstruction. It was shown that the air-shower energy can be reconstructed by Tunka-Rex with a precision of 15% for events with signal in at least 3 antennas, using the radio amplitude at a distance of 120m from the shower axis as an energy estimator. Using the reconstruction from the host experiment for the air-shower geometry (shower core and direction), the energy estimator can in principle already be obtained with measurements from a single antenna, close to the reference distance. We present a method for event selection and energy reconstruction, requiring only one antenna, and achieving a precision of about 20%. This method enables energy reconstruction with Tunka-Rex for three times more events than the standard reconstruction. The effective detector area is tripled for high energy events, vertical events are already observed at lower energies, and the energy threshold decreases to by about 40%.

**Authors:** SCHRÖDER, Frank (Karlsruhe Institute of Technology (KIT)); HILLER, Roman (KIT)

**Co-author:** TUNKA-REX, Collaboration (Tunka-Rex)

**Presenter:** HILLER, Roman (KIT)

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