

Status and first results of Tunka-Rex, an experiment for the radio detection of air showers

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Tunka-Rex is a new radio detector for extensive air showers from cosmic rays, built in 2012 as an extension to Tunka-133. The latter is a non-imaging air-Cherenkov detector, located near lake Baikal, Siberia. With its 25 radio antennas, Tunka-Rex extends over 1 km^2 with a spacing of 200 m and therefore is expected to be sensitive to a primary energy range of 10^{17} - 10^{18} eV. Using Trigger and DAQ from Tunka-133 this setup allows for a hybrid analysis with the air-Cherenkov and radio technique combined. The main goals of Tunka-Rex are to investigate the achievable precision in reconstruction of energy and composition of the primary cosmic rays by cross-calibrating to the well understood air-Cherenkov detector. While the focus in the first season was to understand the detector and develop frame conditions for future work, an early analysis already proves the detection of air-shower events with dependencies on energy and incoming direction as expected from a geomagnetic emission mechanism. Furthermore, in near future tests will be conducted for a joint operation of Tunka-Rex with Tunka-HiSCORE, a gamma ray observatory at the same site, and the upcoming scintillator extension of Tunka-133.

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