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## Status and Performance of TAROGE-4 for Radio Detection of Extensive Air Showers

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The Taiwan Astroparticle Radiowave Observatory for Geosynchrotron Emissions (TAROGE) is an antenna array located atop the high mountains along Taiwan's eastern coast, oriented toward the ocean. It is designed to detect near-horizon extensive air showers (EAS) induced by ultra-high-energy cosmic rays (UHE-CRs) and Earth-skimming ultra-high-energy tau neutrinos. The TAROGE array offers several advantages, including high effective live time, low unit cost, and scalability. From 2014 to 2019, four TAROGE stations were deployed, with each successive station incorporating instrumental improvements to enhance detection efficiency. The most recently deployed TAROGE-4 station, operational since 2019, consists of four dual-polarization log-periodic dipole antennas with a bandwidth of 180–350 MHz. This station is equipped with an upgraded trigger system that utilizes Surface Acoustic Wave (SAW) filters and a multi-band coincidence technique, significantly improving the ability to discriminate impulsive geo-synchrotron signals from anthropogenic background noise. In this paper, we provide an overview of the TAROGE project's detection concept and current status, detail the instrumentation and calibration procedures of TAROGE-4, present the results of the search for EAS candidates, and estimate cosmic ray fluxes based on the detection results.

### Collaboration(s)

TAROGE Collaboration

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