

The TRISTAN detector. Cosmic ray survey between latitudes 38°N and 53°S along the Atlantic Ocean

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TRISTAN (TRasgo para InveSTigaciones ANtárticas) is a high granularity tracking detector of the Trasgo family. It was developed to complement the other detectors of the ORCA observatory that have been installed in one of the Spanish bases in Antarctica. TRISTAN is composed of three RPC planes (Resistive Plate Chambers) and offers, (i) a surface of 1.8 m², (ii) a high multiplicity tracking capability of charged particles, (iii) a position of resolution of around 30 cm, and (iv) an angular resolution near 0.2 sr. The detector was equipped with a 1 cm lead (Pb) plate in order to separate muons from the low energy electromagnetic radiation background.

Before being installed in the definitive location, we used the TRISTAN detector to collect data during three journeys through the Atlantic Ocean between latitudes 36°N and 52°S on board of the Sarmiento de Gamboa and BIO Hesperides oceanographic vessels. The trips took place between Nov. 2018 and Dec. 2019 with the main purpose of analysing the capability of a Trasgo detector to explore the geomagnetic field variations and the different atmospheric behaviours at both hemispheres and in the Equator region.

The main technical aspects of the detector and its performance (efficiency, resolutions, and acceptances) will be discussed and the preliminary results on the analysis of the correlations between the measured cosmic ray rates at different arrival angles with the geomagnetic field will be presented.

Keywords

Tracking detector, Resistive Plate Chambers, Secondary Cosmic Rays. Ground detector, Geomagnetic field, muons, electrons

Collaboration

other Collaboration

Subcategory

Experimental Results

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