Name of research institute or organization:

Department of Physics, University of Rome La Sapienza

Title of project:

An orientable time of flight detector for cosmic rays

Project leader and team:

Prof. Maurizio Iori, Dr. Antonino Sergi and Dr. Fabio Ferrarotto

Project description:

During the 2007 we have done several tests on a detector prototype that will be used in a project named TAUWER that involves European and US Institutions [1] .
The prototype working at the research station Jungfraujoch is capable to measure large zenith angle cosmic rays as well as an element of an orientable surface array of detectors to measure signature of Ultra High energy tau neutrinos using the Earth skimming strategy.
In particular it is designed to study the shower front structure and the muon electron component as well discriminate the direction of the particles by time of flight; this is done by using a sampling ADC based on MATACQ, 2.5 μs at 1GS/s [1] that can be used also at trigger level to define the direction of the track.
The tests made last year were related manly to test the new board MATACQ and measurement of cosmic ray flux between 80-90 degrees.
The performances of these measurements were presented at the RICAP'07 Conferences and submitted for publication to Nuclear Instruments and Methods [3] .

Key words:

Cosmic rays, tau neutrino

Collaborating partners/networks:

University of Carnegie Mellon Pittsburgh USA

Scientific publications and public outreach 2007:

Refereed journal articles

[1] M. Iori et al. arXiv:astro-ph/0602108.
[2] E. Delagnes, D. Breton, Echantilonneur analogique rapide grandeprofondeurmemoire,Frenchpatentn01-05607April26th 201. US patent 6,859,375 Feb 2nd 205: fast analog sampler with great memory depth.
[3] M. Iori and A. Sergi astro-ph 0712.2445v1

Conference papers

M. Iori and A. Sergi, An orientable time of flight detector for cosmic rays
Proceedings RICAP'07 Conference, 20-22 Jun 2007 Submitted to Nucl.Instrum.Meth

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