

The EEE Project: an extended network of muon telescopes for the study of cosmic rays

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The EEE (Extreme Energy Event) Project

An **array** of more than 40 **muon telescopes** to study High Energy Extensive Air Showers

The stations are installed inside Italian high school buildings, INFN sections and at CERN, spread over an area of $3 \times 10^5 \text{ km}^2$



The EEE Telescope

- ❑ 3 Multi Resistive Plate Chambers (MRPC) for particle tracking – each with 24 readout strips
- ❑ A 6-fold coincidence of both strip ends of the 3 MRPCs generates the data acquisition Trigger
- ❑ GPS UNIT gets the event time stamp to synchronize informations from different telescopes
- ❑ VME BRIDGE. DAQ connected to a PC via USB
- ❑ ...

The **particle impact point is reconstructed** by the hit strip (x) and **by the difference of signal arrival times** at the strip ends (y) **measured by TDCs**

The EEE telescopes have been independently taking data since several years, and have been able to produce significant scientific outcomes:

search of coincidences, study of cosmic ray flux, ...

RUN 1

45 days RUN 1

23 February 2015 – 30 April 2015

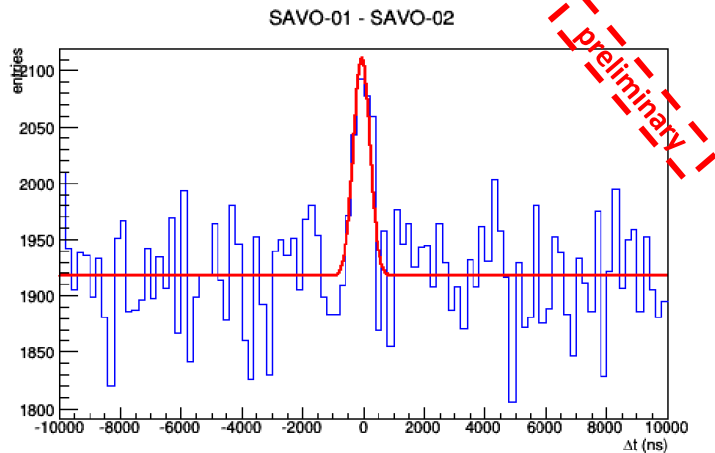
For the first time 35 telescopes have been contemporaneously taking data. Data are transferred and stored to CNAF where events and tracks are analyzed:

4×10^9 GOOD TRACKS have been collected

Additional info in the poster presented by F. Noferini (FEE Trigger DAQ Session)

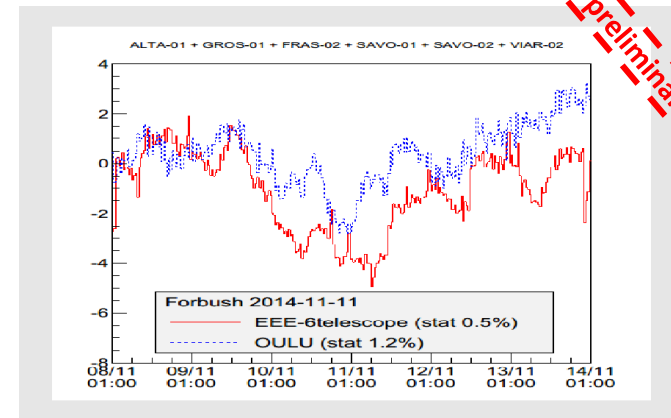
At the present, data transfer to CNAF, allowing a direct way to store and access all data, makes it easier to analyse contemporaneously all the EEE network results

Search for Coincidences



Extensive Atmospheric Shower (EAS) Detection: Muon coincidences detected ($5.4 \pm 1.0 \sigma$) by stations placed at 1.2 km distance

Study of cosmic rays flux

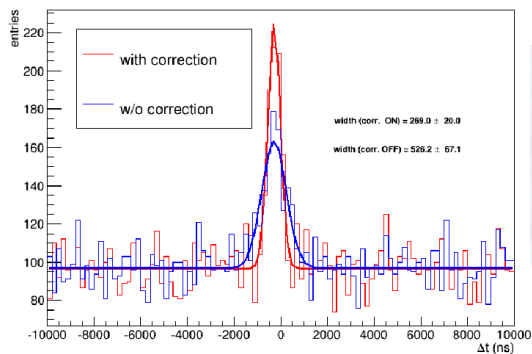


Forbush decrease observations: Muon rates averaged on 6 EEE telescopes (red), Neutron rates (blu)

Distance Correction

CAGL-01/02

correction assuming $\Delta\phi = 1.16$, $\Delta L = 475.0$ m



Distance correction reduces background due to accidental coincidences (S/N and σ) These corrections are important for High Energy EAS research among faraway telescopes (>2 km) since coincidences peak width is proportional to ΔL .

Upgoing tracks

Most of them might be electrons from μ -Decay

