

A small Air Shower Particle Detector Array dedicated to UHE neutrinos

We have developed a self powered stand-alone particle detector array dedicated to the observation of horizontal tau air showers induced by high energy neutrinos interacting in mountain rock. Air shower particle detection reach a 100% duty cycle and is free of background when compared to Cerenkov light or radio techniques, then better suited for rare neutrino event search. A specific topological mountain to valley configuration was found and the first array is under deployment on an inclined slope at an altitude of 1500 m facing at south to alps mountain near the city of Grenoble (France). A full simulation has been performed. A detailed cartography and elevation map allowed to extract a neutrino energy dependent mountain tomography chart. Together with a decaying tau air shower simulation the array acceptance was evaluated between 100 TeV and 100 EeV; The effective surface is determined from the shower lateral extension at array location, then much greater than the physical array surface. The single array exposure will be 1014 cm².sr.y at 100 PeV.

The array is made with only five detectors and all the embedded electronics, HV supply and communication system are powered locally via a 2m² solar power station.

Several independant arrays can be deployed on the same site, and some other sites are already under study. At last, special care is dedicated to the pedagogical and outreach aspects of such a cosmic ray detector .

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