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## Search for PeV-EeV Tau Neutrinos and Optical Transients with Ashra-1

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Ashra is a project to build an unconventional optical telescope complex that images a very wide field of view (FOV), covering 77% of the sky, yet with the angle resolution of a few arcmin, with the use of image intensifier and CMOS technology. The project primarily aims to observe Cherenkov and fluorescence light from air-shower developments. It can also be used to monitor optical transients in the wide FOV.

The Earth-skimming (ES) tau neutrino technique uses air-showers produced by tau lepton decays in the atmosphere. The taus, produced by tau neutrinos that interact with the Earth matter they traverse, emerge out of a mountain or the ground facing the detector, hence producing a large target mass. The detector has great sensitivity in the PeV-EeV region, and can be used to search for neutrinos originating from hadron acceleration in astronomical objects. Additional advantages are perfect shielding of cosmic ray secondaries, precision determination of arrival direction, and negligible atmospheric neutrino background. Ashra can take advantage of this promising method well.

The demonstration phase, Ashra-1, has been running at the Mauna Loa site (3300m a.s.l.) in Hawaii since 2008. It succeeded in the first search for ES tau neutrinos originating from a GRB in the commissioning run. Ashra-1 completes its 3rd observation period, the first dedicated to taking physics data for PeV-EeV tau neutrinos with the best instantaneous sensitivity and optical transients, in March 2013. From January 2012 until end of February 2013, more than 1720 hours of data have been taken out of 1860.6 hours possible due to light constraints. For optical transients, we have 3763 additional hours of data taken from 2008 until 2011.

We present the analysis of these data taken for the PeV-EeV tau neutrinos and optical transients from violent objects like GRBs as well as some physics interpretations.

### Collaboration

– not specified –

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