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Reconstruction efficiency and discovery potential of a Mediterranean neutrino telescope: A simulation study using the Hellenic Open University Simulation & Reconstruction (HOURS) package

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We report on the evaluation of the performance of a Mediterranean very large volume neutrino telescope. We present results of our studies concerning the capability of the telescope in detecting/discovering galactic (steady point sources) and extragalactic, transient (Gamma Ray Bursts) high energy neutrino sources as well as measuring ultra high energy diffuse neutrino fluxes. The neutrino effective area and angular resolution are presented as a function of the neutrino energy, and the background event rate (atmospheric neutrinos and muons) is estimated. The discovery potential of the neutrino telescope is evaluated and the experimental time required for a significant discovery of potential neutrino emitters (known from their gamma ray emission, assumedly produced by hadronic interactions) is estimated. For the simulation we use the HOU Reconstruction & Simulation (HOURS) software package.

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