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Neutrino flavor sensitivity of large scintillator detectors

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Scintillator detectors are known for their good light yield, energy resolution, timing characteristics and pulse shape discrimination capabilities. These features make the next-generation liquid scintillation detector LENA (Low Energy Neutrino Astronomy) the optimal choice for a wide range of astroparticle topics including supernova-, solar-, and geo neutrinos. In addition to the excellent calorimetric and timing properties, large scintillators are also capable of rudimentary topology reconstruction sufficient to discriminate with adequate efficiency between electron and muon neutrino induced charge current events and neutral current events in the GeV energy range. This feature makes LENA a competitive tool for the determination of mass hierarchy with long baseline neutrino beams such as the proposed CN2PY beam (2300 km). This work, forming part of LAGUNA-LBNO project, summarizes the current status of track reconstruction schemes and discusses the sensitivity limits for mass hierarchy and CP violation measurements with LENA as a far detector.

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