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ESSnuSB progress on the design of the near and far neutrino detectors and the simulation of the physics potential

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The 5 MW ESSnuSB proton beam represents an outstanding opportunity to create a sufficiently intense neutrino Super Beam to enable measurement of leptonic CP violation with a megaton water Cherenkov detector placed at the three time more distant second neutrino oscillation maximum, where the CP-violating term in the neutrino oscillation probability is significantly larger at the oscillation peak as compared to the first oscillation maximum peak. This is of decisive significance as the accuracy in the measurements of CP-violation phase is notoriously limited by the systematic errors. The main components of ESSnuSB Near Detector are a water Cherenkov detector, a Super Fine Grain Detector made of small plastic cubes and a Nuclear Emulsion detector and the Far Detector of two large water Cherenkov detectors of together 500 megaton fiducial volume. The progress on the design and simulations of these detectors will be reviewed as well as the physics potential of ESSnuSB, in particular for the discovery of CP violation and precision measurement of its phase angle helping to discriminate between different lepton flavour models.

Collaboration name

ESSnuSB

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