



Optimization of neutrino fluxes for future long baseline neutrino oscillation experiment

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We present an optimization of the neutrino beam which could be produced at CERN and aimed to the newly proposed deep-underground neutrino observatory LAGUNA-LBNO located at distance of about 2300 km (Phyasalmi mine, Finland). Specific scenarios for the proton driver and the far detectors have been investigated. In particular, the flux predictions have been obtained by means of a full GEANT4 simulation of the primary proton beam interaction in the target, the secondary hadrons focusing system (e.g. horn-reflector layout) and the decay pipe. A dedicated algorithm has been then developed to search for the optimal configuration of the beam line by scanning the multidimensional space of the design parameters. The aim is to maximize the LAGUNA-LBNO physics performance in terms of the discovery potential for both the CP violation phase δ_{CP} and the mass hierarchy. For different CERN SPS proton beam energies sensitivity limits will be presented as a function of the beam exposure and the far detector fiducial mass.

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