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The ESS neutrino super beam optimization design studies

The European Spallation Source (ESS) neutrino super beam has the prospective to become the world's most intense neutrino beam facility and has possibly the best physics potential for the discovery of leptonic CP-violation and neutrino mass hierarchy. The adaptation of the secondary-beam elements of CERN's SPL (Superconductive Proton Linac) neutrino super beam to ESS requirements is discussed in this presentation. Due to the higher power and lower energy of ESS linac compared to CERN's SPL, studies are performed to optimize the design of the target station including the target in order to achieve maximal pion yield, horn's inner conductor shape to best focus charged pions within the useful momentum range and shielding to reduce the amount of irradiation as well as the decay tunnel geometry. These studies are performed in order to examine the technical feasibility and assure the maximal physics potential for the ESS neutrino super beam.

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