

Conceptual Design of the CN2PY secondary beam line

A design study for a long baseline neutrino oscillation experiment (LBNO) with a new conventional neutrino beam line facility (CN2PY) at CERN was initiated in September 2011, in the framework of the LAGUNA/LBNO EU/FP7 design study. The new beam and associated infrastructure will service a next generation deep-underground neutrino observatory located at the Pyhäsalmi (Finland) mine at a distance of 2300 km.

The present paper will review the main elements of the secondary beam line conceptual design, currently conducted at CERN with the FLUKA Monte Carlo simulation package. The simulation studies are employed at each stage of the secondary beam line design, from the early optimization of the focusing elements to compute the neutrino beam flux at the LAGUNA far detector, to the complete description of the facility for engineering driven studies and radio protection related issues. The baseline primary beam configuration foresees a first stage driven by an upgraded SPS running at 400 GeV/c - 750 kW beam power and a second stage driven by a new HP-PS machine, capable of delivering 50 GeV/c at 2 MW of beam power.

The challenges that this MW-class facility will have to face to provide a neutrino beam spectrum matching the experimental requirements for neutrino flavour oscillations and CP-violation will be explained. And finally, an outlook to the layout of the whole installation including the perspectives and design parameters for the high-power PS (HP-PS) machine will be discussed.

Primary author: Mr VELTEN, Philippe (CERN EN-STI)

Presenter: Mr VELTEN, Philippe (CERN EN-STI)