

Conceptual Design Report for a Beta-Beam facility

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Abstract

The Beta-Beam project is a concept of large scale facility that aims at providing pure electronic neutrino and antineutrino beams for the measurement of $\nu_e \rightarrow \nu_\mu$ oscillations, offering unprecedented sensitivity for detection of the θ_{13} mixing angle and CP violating phase. In the scenario presented in different publications [1-3], a Beta-Beam facility could be advantageously placed at CERN making use of the PS and SPS for accelerating the beta-decaying, neutrino-emitting beams to a Lorentz gamma of 100. Intense beams of ${}^6\text{He}$ and ${}^{18}\text{Ne}$ would be produced using the so-called "isotope-separation on line" ISOL method in a facility of the scale of EURISOL. The synergy between the two projects was pointed out in [4]. The task 12 of the EURISOL design study aimed at producing a conceptual design report for the accelerator chain of a EURISOL/CERN-baseline Beta-Beam facility. This document summarizes the achievements made during the time of the study and constitutes the final conceptual report of the beta-beam facility.

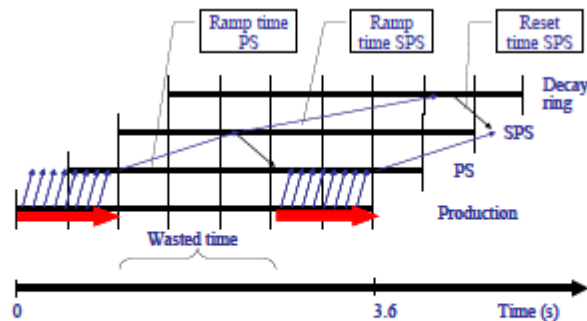


Figure 8 : A complete cycle for the baseline beta-beam complex consists of injection into the PS, storage of bunches at PS injection energy, acceleration in the PS and SPS and finally injection into the decay ring.