Contribution ID: **247** Type: **not specified**

An accumulator ring for the 5 MW beam for the ESSnuSB

Tuesday 7 September 2021 16:20 (20 minutes)

The commissioning of the European Spallation Source (ESS) linac has started and that marks another important step towards the completion of the most powerful proton driver in the world with 5 MW of average beam power on target. Such impressive beam power could also be used for particle physics experiments at the intensity frontier. In particular, the ESS based super-beam project ESSnuSB plans to use the ESS linac as a driver for a long baseline neutrino oscillation experiment to measure, with precision, the charge-parity violation phase.

In order not to interfere with the neutron production, the ESSnuSB will increase the beam duty cycle of the linac from 4% to 8% by accelerating pulses of H^- ions interleaved with the proton pulses used for neutron production. Each H^- pulse will be extracted at the end of the linac in four batches, transported to a 384 m circumference storage ring, where the batches will be accumulated over 600 turns and then extracted in a single turn. In this way, we form highly compressed 1.2 μs pulses carrying almost 90 kJ each. On average, another 5 MW of beam power will be used for producing the neutrino super beam.

We present the design and expected performance of the accumulator ring with details on the charge-exchange injection, the fast extraction, the two-stage collimation and the RF systems.

Working group

WG3

Authors: OLVEGAARD, Maja; ZOU, Ye (Uppsala University (SE))

Presenter: OLVEGAARD, Maja

Session Classification: WG 3