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## The ESS based neutrino Super Beam Experiment (ESS $\nu$ SB)

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In the search for the CP-violation in the leptonic sector, crucial information has been obtained from neutrino experiments. The measurement of the third neutrino mixing angle,  $\theta_{13}$ , opened the possibility of discovering the Dirac leptonic CP violating angle,  $\delta_{CP}$  with intense “super” neutrino beam experiments. In the light of these new findings, an urgent need has arisen to improve the detection sensitivity of the current long-baseline detectors, considering proton driver at MW scale with a MegaTon scale detector, with a key modification to place the far detectors at the second, rather than the first, oscillation maximum.

The European Spallation Source neutrino Super Beam (ESS $\nu$ SB) aims to benefit from the high power of the European Spallation Source (ESS) LINAC in Lund-Sweden, to produce the world’s most intense second-generation neutrino beam in order to search and measure, with precision, the CP-violation in the leptonic sector, at 5 $\sigma$  significance level in more than 60% of the  $\delta_{CP}$  range.

Here I will shed light on the current design study programs running within the collaboration and the physics potential of the experiment.

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