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The European Spallation Source neutrino Super Beam plus Project

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The European Spallation Source neutrino Super Beam (ESSνSB) is a design study for a long-baseline neutrino experiment to measure the CP violation in the leptonic sector at the second neutrino oscillation maximum using a neutrino beam driven by the uniquely powerful ESS linear accelerator. The reduced impact of systematic errors on sensitivity at the second maximum allows for a very precise measurement of the CP violating parameter. The ESSνSB CDR showed that after 10 years of data taking, more than 70% of the possible CP-violating phase, $_{CP}$, range will be covered with 5σ C.L. to reject the no-CP-violation hypothesis. The expected value of $_{CP}$ precision is smaller than 8° for all $_{CP}$ values, making it the most precise proposed experiment in the field by a large margin. The recently started extension project, the ESSνSB+, aims in designing two new facilities, a Low Energy nuSTORM (LEnuSTORM) and a Low Energy Monitored Neutrino Beam (LEMNB) to use them to precisely measure the neutrino-nucleus cross-section (the dominant term of the systematic uncertainty) in the energy range of 0.2 −0.6 GeV. With the successful end of the previous design-study programme of the experiment, an overall status of the project will be presented together with the ESSνSB+ additions.

Submitted on behalf of a Collaboration?

Yes

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