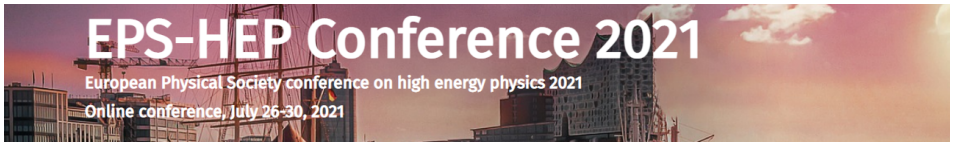

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The HighNESS Project and Future Free Neutron Oscillations Searches at the ESS

Thursday 29 July 2021 11:15 (15 minutes)

The European Spallation Source ESS, presently under construction, in Lund, Sweden, is a multi-disciplinary international laboratory. It will operate the world's most powerful pulsed neutron source. Taking advantage of the unique potential of the ESS, the NNBAR collaboration proposed a two-stage program of experiments to perform high precision searches for neutron conversion in a range of baryon number violation (BNV) channels culminating in an ultimate sensitivity increase for $n \to \bar{n}$ oscillations of three orders of magnitude over the previously attained limit obtained at the Institut Laue-Langevin ILL.
The first stage of this program HIBEAM (High Intensity Baryon Extraction and Measurement) will employ the fundamental physics beamline during the first phase of the ESS operation. This stage focuses principally on searches for neutron conversion to sterile neutrons n' that would belong to a "dark" sector.
The second stage, NNBAR, will exploit a large beam port, specifically designed in the ESS target station monolith for this experiment, to deliver the maximum possible neutron flux and search directly for $n \to \bar{n}$ oscillations.
Supported by a 3 MEuro Research and Innovation Action within the EU Horizon 2020 program, a design study (HighNESS) is now underway for the design of the ESS second neutron source which will be optimized in order to boost the performance of the NNBAR experiment.
This talk will focus on the HighNESS program and the ongoing developments in the NNBAR collaboration.

Collaboration / Activity

NNBAR/HIBEAM Collaboration

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