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Towards the NNBAR Experiment at the European Spallation Source

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The European Spallation Source (ESS) in Lund, currently under construction, is designed to be the most powerful neutron source in the world. Taking advantage of the unique potential of the ESS, the NNBAR collaboration has proposed an experimental program to search for baryon number violation (BNV) due to neutron (n) –antineutron (\bar{n}) conversions. This process could explain the observed asymmetric abundances of matter and antimatter in our known universe after baryogenesis. The general aim for the planned experimental campaign at the ESS is to reach an increase in sensitivity of three orders of magnitude over the current limit, obtained at a previous attempt. The BNV process may occur as free neutrons propagate via ballistic motion to a detector, where the anti-neutrons will annihilate and be detected via their multi-pion decay signature. An overview on the present state of the work on the NNBAR experiment is given with special focus on the neutron optics and the detector system.

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Classification de Session: Experiments