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A New Search for Neutron-Anti-Neutron Oscillations

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Neutral particle oscillations have proven to be extremely valuable probes of fundamental physics. Kaon oscillations provided us with our first insight into CP-violation, fast B oscillations provided the first indication that the top quark is extremely heavy, B oscillations form the most fertile ground for the continued study of CP-violation, and neutrino oscillations suggest the existence of a new, important energy scale well below the GUT scale. An open question is whether neutrons oscillate to anti-neutrons, violating baryon number conservation. The construction of the European Spallation Source in Lund, with first beam expected in 2019, together with modern neutron guiding techniques, should make it possible to build an experiment with approximately three orders of magnitude improvement in sensitivity to the neutron oscillation probability. This exciting possibility will be described.

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