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Overview on Neutrino Electromagnetic Properties and SATURNE Project on Coherent Elastic Neutrino-Atom Scattering

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After an introduction to the theory of neutrino electromagnetic properties [1,2,3] and a discussion of existing experimental constraints on the magnetic moments of neutrinos and other electromagnetic characteristics obtained in ground-based experiments (including the latest estimates from XENONnT [4] and LUX-ZEPELIN [5]) and results from astrophysical observations [6,7], we present the new SATURNE experiment, which is being implemented in the National Center for Physics and Mathematics in Sarov [8,9,10]. The goal of the SATURNE project is to detect for the first time the coherent elastic scattering of tritium antineutrinos on liquid helium target atoms in the superfluid state, which will allow to obtain new upper limits (or to measure) the value of the neutrino magnetic moment on the scales. At the first stage of the implementation of the SATURNE project, it is also planned to use a low-temperature scintillation and a cryogenic silicon antineutrino detectors.

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