

Search for two-neutrino double electron capture of Xe-124 with XENON1T

The XENON project pursues the direct detection of WIMPs. It is currently running in its third stage with the multi-ton xenon dual phase TPC XENON1T at LNGS. Probing cross-sections below 10^{-46} cm² it is the most-sensitive detector for spin-independent-WIMP-nucleon interactions. Its low background of less than 2×10^{-4} events/(kg x keV x day) below 100 keV is optimal for the search of double beta decay processes of Xe-124, which is predicted to undergo two-neutrino double electron capture (2νECEC) depositing an energy of about 64 keV. In absence of a detection the lower limit to the respective half-life is 2.1×10^{22} yr for the 2νECEC of Xe-124. With more than 240 days of blinded data from XENON1T a detection could be within reach. The first direct observation of this standard model process would provide information on nuclear matrix element (NME) calculations, which have large uncertainties. This work is supported by BMBF under contract number 05A14PM1 and DFG (GRK 2149).

Authorship annotation

Alexander Fieguth and Christian Wittweg for the XENON collaboration

Session and Location

Monday Session, Poster Wall #84 (Auditorium Gallery Left)

Poster included in proceedings:

no

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Track Classification: Poster (participating in poster prize competition)