

Developments for an increased detection sensitivity of the neutrinoless double-beta decay ($0\nu\beta\beta$) mode in the NEXT experiment

Thursday 30 June 2022 09:00 (22 minutes)

The detection of the double-beta decay mode which would reveal the nature of the neutrino, Dirac or Majorana, is an extremely rare event where two emitted electrons share all the available energy of the decay and no neutrino is emitted. The current experiments in the search of such decay mode are far from a background-free condition, and the level of background achieved plays a crucial role in the limits of the sensitivity for the half-life of this decay mode. A method that allows discarding all the events except the ones produced via double-beta decay is the correlation of the events with the detection of the daughter nuclei of the decay, leaving only the two-neutrino double-beta decay the only background of the experiment. The different research lines within the NEXT collaboration in the pursuit of a background-free experiment in order to increase the half-life sensitivity for the neutrinoless double-beta decay, including the Barium tagging technique, will be presented.

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Session Classification: Nuclear Physics

Track Classification: Nuclear Physics