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Poster Session-Submission of Abstract

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Title of the Poster: Discovering neutrinoless double beta decay with NEXT-100.

Abstract Text:

The NEXT-100 time projection chamber, currently under construction, will search for neutrinoless double beta decay ($\beta\beta_{0\nu}$) using 100–150 kg of high-pressure xenon gas enriched in the ^{136}Xe isotope to $\sim 90\%$. The detector possesses two important features for $\beta\beta_{0\nu}$ searches: very good energy resolution (better than 1% FWHM at the Q value of ^{136}Xe) and event topological information for the distinction between signal and background. Furthermore, the technique can be extrapolated to the ton-scale, thus allowing the full exploration of the inverted hierarchy of neutrino masses.

First prototypes have been operating successfully in different laboratories. The detector concept has demonstrated an energy resolution of 0.8% at Q_{bb} using Na^{22} source with an energy of 511 keV. Also, a basic study of the event topology along the longitudinal coordinate allowed the identification of a blob in $\sim 98\%$ of the single-electron tracks analyzed.

Summary:

NEXT-DEMO prototype has been operating for 2 years and it has evolved according the collaboration necessities. Nowadays it is operating with the same configuration that will be used for NEXT-100: charge amplification with electroluminescence, energy measurement with PMTs and topology reconstruction with SiPMs. First results of that configuration are presented.

Keywords:

Neutrinoless double beta decay, TPC, neutrino, Xenon, energy resolution, topology.