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NEXT: Searching for the neutrino-less double beta decay at the LSC

Saturday, 2 September 2017 14:00 (25 minutes)

The goal of the NEXT (Neutrino Experiment with a Xenon TPC) collaboration is the sensitive search of the neutrino-less double beta decay ($\beta\beta0\nu$) of 136Xe at the Laboratorio Subterraneo de Canfranc (LSC). The observation of such a lepton-number-violation process would prove the Majorana nature of neutrinos, providing also handles for an eventual measurement of the neutrino absolute mass. After a successful R&D phase, a first large-scale prototype of a high-pressure gas-Xenon electroluminescent TPC (NEW) is being operated at LSC since 2016. NEW is a 10-kg radiopure detector meant to understand the relevant backgrounds for the $\beta\beta0\nu$ search and to perform a measurement of the two neutrino mode of the double beta decay ($\beta\beta2\nu$). The first phase of NEW physics program has consisted of the commissioning of the detector and the data taking with calibration sources (83Kr, 22Na and 56Co, which has allowed to understand the detector capabilities in terms of energy resolution (below 1% at 3 MeV) and event topology reconstruction. The operation of NEW is setting the grounds for the construction of the NEXT-100 detector: a TPC holding 100 kg of 136Xe and reaching a sensitivity to the $\beta\beta0\nu$ half-life of 6x1025y after 3 years of data taking. In this talk, the latest results of the NEW detector as well as the status of the NEXT-100 project will be presented.

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