Contribution ID: **224** Type: **not specified**

Status of the NEXT experiment for neutrinoless double beta decay searches

Wednesday 8 September 2021 16:00 (18 minutes)

NEXT (Neutrino Experiment with a Xenon TPC) is a neutrinoless double beta decay experiment located at the Laboratorio Subterráneo de Canfranc (LSC, Spain). Its aim is to demonstrate that the neutrino is a Majorana particle by detecting the neutrinoless double beta decay process in xenon gas enriched in the ^{136}Xe isotope. The detector technology used in NEXT is that of radiopure high pressure time projection chambers with electroluminescence amplification, which provide excellent energy resolution better than 1% FWHM in the energy region of interest, topological reconstruction that allows rejecting single-electron background events and a strong potential for "in situ"tagging of the barium daughter ion. The experiment has been developing in phases.

The NEXT-White detector is currently running at the LSC and contains approximately an active Xe mass of 5 kg. Its purpose is to demonstrate the excellent energy resolution, to validate the reconstruction algorithms and the background model, and to make a measurement of the two-neutrino double beta decay of ^{136}Xe.

The 100 kg NEXT-100 detector is under construction and is scheduled to be installed and assembled by the end of 2021. The predicted 90% CL sensitivity to the neutrinoless double beta decay half-life will reach 10^{26} years for an exposure of about 400 kg·year.

A vigorous program towards the development of ton-scale detectors is also under way, including extensive R&D towards the realization of in-situ Ba^{2+} tagging as means to achieve virtually zero-background detection. A first module with a mass of at least 500 kg may be operating as early as 2026 at the Canfranc Underground Laboratory.

In this talk, I will report on recent results obtained with the NEXT-White detector, on the NEXT-100 construction status and on the prospects of future NEXT detectors.

Working group

WG6

Primary author: Mrs ROMO-LUQUE, Carmen (IFIC)

Presenter: Mrs ROMO-LUQUE, Carmen (IFIC)

Session Classification: WG6