Poster session 4 – Friday 8 July

P4.065 **Sensitivity of the NEXT100 detector to neutrinoless double beta decay**

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The NEXT experiment seeks to discover the neutrinoless double beta decay ($0\nu\beta\beta$) of ^{136}Xe using a high-pressure gas time projection chamber, filled with 100kg of enriched xenon, with electroluminesence gain and optical readout. This technology offers two features of great value in $0\nu\beta\beta$ decay searches: excellent energy resolution (<1% FWHM at the Q value of ^{136}Xe) and event topology reconstruction to identify signal and background events. Furthermore, this technology can be extrapolated to large source masses, thus allowing the full exploration of the inverted-hierarchy region of neutrino masses.

In this poster, we present the sensitivity of the NEXT100 detector to $0\nu\beta\beta$, using the results of the R&D phase on energy resolution and tracking performance, and the most recent measurements on material-screening to predict our background model. With the use of detailed Monte Carlo simulations, we predict a background rate of at most 4×10^{-4} counts/(KeV kg yr) which translates into a sensitivity to the $0\nu\beta\beta$-decay half-life of 6×10^{25} years after 3 years of effective running. The NEXT100 detector will start operations in 2018. However, a smaller replica called NEW which uses 10kg of source mass, is currently being commissioned at the Laboratorio Subterrneo de Canfranc (SPAIN). The NEW detector will provide measurements of the $0\nu\beta\beta$ background events that will allow to validate and refine our current NEXT100 background model. The strategy and plans for this validation are also described in this poster.