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The NEXT experiment: A high pressure xenon gas TPC for neutrinoless double beta decay searches

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Neutrinoless double beta decay is a hypothetical, very rare nuclear transition in which two neutrons undergo beta decay simultaneously and without the emission of neutrinos. The importance of this process goes beyond its intrinsic interest: an unambiguous observation would establish a Majorana nature for the neutrino and prove the violation of lepton number.

NEXT is a proposed 100-kg high-pressure xenon gas TPC that will search for neutrinoless double beta decay in Xe-136. Such a detector, thanks to its excellent energy resolution and its powerful background rejection provided by the distinct double beta decay topological signature, may become one of the leading experiments of the field. The project is proceeding through a fast R&D phase. The first prototypes, containing about 1 kg of pressurized xenon, are providing results already, as the demonstrations of tracking using PMTs and the measurement of the photoelectric peak of Cs-137 with 1% FWHM. This energy resolution extrapolates to 0.5% at the energies of Xe-136 decay.

The final detector, NEXT-100, is planned to run at the beginning of 2014 at the Laboratorio Subterráneo de Canfranc (LSC), Spain.

for the collaboration

NEXT

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