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The NEXT experiment in the new Canfranc Underground Laboratory

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Neutrinos are the least understood and the most elusive of the known fundamental particles in the Standard Model of particle physics, though they are the second most abundant in the universe. Neutrino oscillation experiments have shown that neutrinos have finite rest mass, but their absolute mass scale is still unknown. The exploration of the degenerate hierarchy, which corresponds to an effective neutrino mass up to 50 meV, is the goal of the next generation of neutrino-less double beta decay experiments. These experiments could also elucidate whether the neutrino is a Majorana or a Dirac particle.

The aim of NEXT collaboration is to build a 100 kg high-pressure Xe gas TPC enriched with 136Xe for the search of neutrinoless double-beta decay in the new LSC (Canfranc Underground Laboratory) in the Spanish Pyrenees. The high pressure TPC offers the excellent energy resolution and the background rejection power provided by the topological information of the electron tracks obtained by a photosensor array (SiPMs, APDs or PMTs) or a Micromegas plane. Here we will present the experiment and especially the results of the first generation of prototypes studying both the electroluminiscence signal and the charge amplification signal with Micromegas in pure HPGXe.

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