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The NEXT experiment: a high-pressure xenon gas (HPGXe) TPC for the search of neutrinoless double-beta decay.

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Though Neutrino oscillation experiments have shown that neutrinos have finite rest mass, 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 neutrinoless double beta decay experiments. Very good energy resolutions and ultra-low background levels are the two main experimental requirements for a successful experiment.

The NEXT collaboration projects to build a 100 kg high-pressure Xe gas TPC enriched with ^{136}Xe for the search of the two modes of double-beta decay. This detector will be installed in the new LSC (Canfranc Underground Laboratory) in the Spanish Pyrenees. Two are the features which will made this experiment very competitive in the field: an excellent energy resolution offered by high pressure Xe gas TPC; and the possibility of pattern recognition to reject background events thanks to the electron tracks recorded by a photosensor array (SiPMs, APDs or PMTs) or a Micromegas plane. Here we will present the experiment and results of the first generation of prototypes studying both the electroluminescence signal, and the charge amplification signal with Micromegas in pure HPGXe.

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