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Neutrinoless double-beta decay in a high pressure gaseous Xenon-136 TPC: the PandaX-III experiment

The PandaX-III (Particle And Astrophysical Xenon Experiment III) experiment aims to search for Neutrinoless Double Beta Decay (NLDBD) of 136Xe at the China Jinping underground Laboratory (CJPL, Province of Sichuan, China), in order to study the Majorana nature of the neutrino. PandaX-III exploits the tracking capability of high pressure gaseous time projection chamber (TPC) to effectively identify NLDBD events and suppress background. The TPC will contain 140 kg of enriched Xenon-136 at 10 bar. Fine pitch micro-pattern gas Micromegas detectors will be used to measure the ionization induced by NLDBD events, and reconstruct their energy end their track topology. They provide a good energy resolution and a millimeter level spatial resolution. A 20 kg scale prototype TPC with 7 Micromegas modules was built and commissioned in the SJTU laboratory at Shanghai. An overview of recent progresses of the PandaX-III experiment will be presented, including results from the prototype TPC, a view on the preparation of the data reconstruction and analysis, and a status of full TPC construction.

Author: NEYRET, Damien (CEA Saclay, Université Paris-Saclay (FR))

Orateur: NEYRET, Damien (CEA Saclay, Université Paris-Saclay (FR))

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