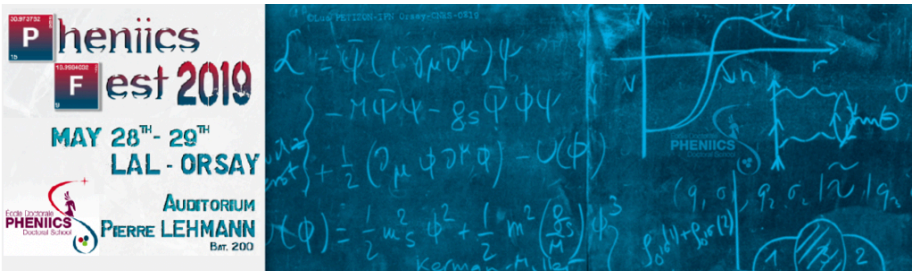

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Search for neutrinoless double-beta events in a high pressure Xenon TPC with Micromegas detection at the PandaX-III experiment

Tuesday 28 May 2019 11:30 (20 minutes)

The PandaX-III experiment aims to search for the rare neutrinoless double beta decay in Xenon 136. To achieve this goal, it is mandatory to select carefully the main detectors that have to achieve a very good energy resolution (at the level of 1% at 2.5MeV) and a good spatial resolution for the discrimination between double beta events and external gammas coming from radioactive isotopes. It seems then compelling to choose microbulk Micromegas that displays a better energy resolutionand a good radio-purity with a 20x20 cm area. The gain and the energy resolution of theses detector will be assessed alongside the challenges that come with the manufacturing of large area Microbulk detectors. It is important to reduce at the maximum small defects that can cause leakage current, or a dead strip inside the active area. As these detectors will be used in array, the detector homogeneity will be emphasized. Our recent measurements on a 20x20cm large Microbulk prototype show large unexpected gain inhomogeneities up to 25% from one spot to the other on the detector surface. It is possible to improve the energy resolution of individual detectors by taking theses inhomogeneity of gain into account and correct them through a good 2D calibration. I will discuss the performances of the microbulk Micromegas compared to a bulk micromegas with the same design. Through a comparison of the gain and its homogeneity, the energy resolution and the radiopurity of each detector, I will present a study in order to find the better design of micromegas for the search for the double beta decay in Xenon 136.

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