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Characterization of a medium-size Xe-TPC instrumented with microbulk-Micromegas

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Microbulk-Micromegas is a new generation of Micromegas (MICRO MESH Gaseous Structure) used for the detection and tracking of particles. Its simplicity, inherited from its constituent element –a double copper-clad kapton foil–, enhances its radiopurity, making it particularly well suited for rare event searches. The energy resolution is amongst the best obtained in mpgd architectures, with potential for an extremely fine level of segmentation, at the 100 μ m scale or better. In particular, they have shown ability to cope with high pressure environments up to 10bar even when operated in pure Xenon. Within the R&D framework of the NEXT experiment, we have commissioned a medium-size 70-liter, 700cm²(readout) x 38cm(drift) TPC with an 0.8cm-pitch readout-segmentation (NEXT-MM). This constitutes the largest microbulk-instrumented system based on the largest single-piece wafers available to date. We will present a detailed characterization of this novel system as obtained under an optimized Xe-TMA mixture and various experimental conditions, stressing its strengths and weaknesses.

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