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Study of Ion Back Flow suppression with thick COBRA GEM

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Ion Back Flow (IBF) suppression is essential for limiting the space-charge distortions in the upgraded ALICE TPC, where continuous readout is foreseen. GEM technology is one possible solution to achieve small IBF and to keep good performance in terms of particle tracking and particle identification at high rates. The development of readout chambers for the ALICE TPC with single mask GEMs is therefore our baseline approach, and the performance evaluation of IBF with GEMs under different configurations is being extensively investigated. In parallel with this development, we are investigating in Japan the potential of Thick COBRA GEMs as an alternative option. Cobra GEM foils features a double electrode pattern in one of its sides, which allows one to decouple the functions of electron amplification and ion blocking. By applying different voltages between these two electrodes, ions can be efficiently absorbed [1]. Our first measurement, performed on 3x3 cm2 foils, shows that IBF improves by a factor of 10 in a stack configuration consisting of one COBRA GEM together with two standard GEMs, compared to a triple standard GEM stack. The basic properties of the COBRA GEM and the optimization for IBF suppression are being studied through both measurement and simulation.
In this presentation, we will report on the crrent status of the R&D of Thick COBRA GEM. [1] J.F.C.A. Veloso et al., Nucl. Instr. and Meth. A639 (2011) 134-136.

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