

Abstract Submitted
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Measurement Results for Micropattern Gain Structures for Use in High Rate TPCs¹ CAITLIN BEATTIE, JOHN HARRIS, RICHARD MAJKA, NIKOLAI SMIRNOV, Yale University, SPHENIX TPC COLLABORATION COLLABORATION — Time Projection Chambers (TPC) are often the preferred choice for central tracking and particle identification in high luminosity colliding beam experiments. A major consideration in such an environment is minimization of back flow of positive ions from the gain element into the main drift volume. This ion back flow (IBF) can lead to space charge build up in the main drift volume that will distort the drift field and the resulting measured tracks. The traditional method of controlling IBF using a grid as a gate necessitates triggering the TPC which is inconsistent with modern physics goals requiring very large data sets. We present our investigation of IBF measurements for a variety of gas mixtures, electric fields, and micropattern structures (four gas electron multipliers (GEMs), and two GEMS plus micromegas) used as the amplification region.

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