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Ion Backflow Studies for the sPHENIX TPC

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A Time Projection Chamber is the main tracking system for the proposed sPHENIX experiment at RHIC. It will measure space points of charged tracks, which provide the needed momentum resolution to separate the Upsilon states in decays to electrons and positrons.
The strong magnetic field of the solenoid previously used in the BaBAR experiment, a Neon-based fast gas mixture, and an electric field providing a high drift velocity will mostly compensate for E-field distortions due to ion backflow in the current sPHENIX TPC design. A quadruple GEM stack with special hole patterns or a MicroMegas based amplification is expected to further reduce the ion backflow.
A series of simulations and measurements have been performed to find an optimal configuration and working point for the sPHENIX TPC. In this presentation, we discuss the outcome of this study.

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