Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Passive Gating Grid Studies for a Time Projection Chamber PRAKHAR GARG, Stony Brook University — A Time Projection Chamber (TPC) is often the main tracking device in many experiments. A TPC measures space points of charged tracks to provide momentum resolution and particle identification for a variety of measurements. In high multiplicity environments, a TPC has to cope with the build-up of space charge in the drift volume form two main sources: primary ionization and Ion Back Flow (IBF) from an amplification device. One can only concentrate on combating IBF, which can be accomplished with appropriate voltages briefly grid to absorb all charges. However, this limits the operation to low readout rates. To overcome this problem, Micro-Pattern Gas Detectors (MPGD) will be implemented in future TPCs. MPGDs are inherently capable to reduce IBF, yet not to an optimum level. A passive or statically powered gating grid might enhance the IBF reduction. We have simulated woven wire meshes, different patterns of etched meshes, hexagonal micro-pattern meshes and static bi-polar wire gating grids. We have studied several options to achieve good electron transparency for the primary electrons and high blocking for the ions coming from the amplification stage. In this presentation, we will discuss our results and provide techniques for overcoming IBF.

Vladislav Zakharov
Stony Brook University

Date submitted: 23 Aug 2019 Electronic form version 1.4