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## Mitigation of Space Charge Effects Using Electron Column at IOTA Ring

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We investigate a novel method to mitigate space charge effects of high intensity proton beams propagating in circular accelerators by means of trapping and controlling electrons generated from beam-induced residual gas ionization. This compensation method uses Coulomb repulsion force between a proton beam and electrons to mitigate self-space charge effects of the beam if it passes through a plasma column. The transverse electron-proton (e-p) instability in the plasma column is well controlled by the longitudinal magnetic field of a solenoid magnet and the bias voltages on electrodes. In this report, we will show simulation results how to control distributions of electrons and ions as well as that of the proton beam inside the column. We will also present updates on the status of multi-pass simulation results at Fermilab IOTA Ring using the Synergia-Warp hybrid code.

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