Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Observations of an Ion Driven Instability in Non-neutral Plasmas Confined on Magnetic Surfaces. Q. MARKSTEINER, T. PEDERSEN, J. BERKERY, J. MENDEZ, M. HAHN, P. ENNEVER, Columbia University, H. HIMURA, Kyoto Institute of Technology — The Columbia Non-neutral Torus (CNT) is a stellarator designed to confine non-neutral plasmas, including non-neutral ion-electron plasmas. When the ion density exceeds approximately 10% of the electron density in CNT, an instability is observed. The instability has a poloidal mode number of m = 1, despite the fact that CNT does not contain an m = 1 rational surface. The measured frequency of the instability decreases with increasing magnetic field strength, and increases with increasing radial electric field, suggesting that the instability is linked to the ExB flow of the plasma. The frequency does not, however, scale exactly as E/B, and it depends on the ion species that is introduced. These observations, along with the measured m = 1 poloidal mode number imply that the instability involves an interaction between ions, and electrons that are mirror trapped and therefore do not circulate toroidally. Results from a numerical code which follows the complex (and sometimes chaotic) motion of an ion in CNT are also presented.

Q. Marksteiner
Columbia University

Date submitted: 20 Jul 2007 Electronic form version 1.4