Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Exploring higher density regimes using diocotron modes in a toroidal electron plasma A.S. PATTERSON, M. PRICE, M.R. STONEKING, Department of Physics, Lawrence University, Appleton, WI 54911 — In the Lawrence Non-neutral Torus II (LNT II), a purely toroidal magnetic field (R_o=18 cm, B < 550 G) confines an electron plasma at number densities near $10^7/cm^3$. A recently modified filament design has permitted access to higher density regimes for plasma trapped in a 270° toroidal arc. Diocotron mode frequencies and damping rates are contrasted with those typical of cylindrical Penning-Malmberg traps. Exploration of these mode damping rates may provide insight into the relative significance of rotational and magnetic pumping transport mechanisms, an overarching goal of the experiment. We also present an improved computational model which will aid in the interpretation of mode damping measurement in LNT II. This work is supported by the National Science Foundation, Grant PHY-1202540.

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Date submitted: 16 Jul 2012 Electronic form version 1.4