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First results from the Lawrence Non-neutral Torus II: a toroidal electron plasma device¹ J.P. MARLER, J.O. HECTOR, S.K. CURRY, BAO HA, M.R. STONEKING, Lawrence University — Progress towards studying the dynamics of long-lived (~ 1 s) non-neutral plasmas in toroidal geometry will be presented. Achieving trapping times on the order of 1 second will permit study of higher order mode dynamics and inherently toroidal transport physics [1]. This poster presents the first results from the newly constructed Lawrence Non-Neutral Torus (LNT) II apparatus. The LNT II features an improved toroidal magnetic field magnitude (~ 0.5 kG) and base vacuum pressure ($< 10^{-9}$ Torr). A segmented Au-plated Al electrode shell contributes to the reduction in field asymmetries and enables enhanced diagnostics. Additionally, the electron source is located on a retractable bellows for study of confinement dynamics in a complete torus. Confinement times on the order of 1 second would represent more than an order of magnitude improvement over measurements made with the previous apparatus [2].

[1] S.M. Crooks and T. M. O'Neil, *Phys. Plasmas* **3**, 2533 (1996)

[2] M.R. Stoneking *et al. Phys. Rev. Lett.* **92**, 095003 (2004)

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