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The Equilibrium of Pure Electron Plasmas Confined on Magnetic Surfaces REMI G. LEFRANCOIS, THOMAS SUNN PEDERSEN, ALLEN H. BOOZER, JASON P. KREMER, QUINN R. MARKSTEINER, Columbia University — The first pure electron plasmas to be confined on magnetic surfaces have recently been produced in the Columbia Non-Neutral Torus (CNT). These low temperature plasmas (<15eV) are created by heating biased filaments placed inside the confinement region. A confinement time of approximately 20ms has been achieved, roughly two orders of magnitude longer than predicted for a $\nabla\mathbf{B}\times\mathbf{B}$ drift out of the confining volume; an equilibrium has been established. A fully three-dimensional code has been developed to solve the equilibrium equation, and has been applied to the CNT configuration. The numerically calculated density varies significantly on magnetic surfaces for short Debye length plasmas, by as much as a factor of five along the magnetic axis and even more on outer surfaces. These and other numerical predictions will be presented and compared directly to measurements from CNT. This material is based upon work supported by the National Science Foundation under Grant No. 0317359.

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