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Measuring transport in a toroidal electron plasma[1] J. SMONIEWSKI, M.R. STONEKING, F. CHOUDHURY, E. FRATER, Lawrence University — Global confinement times in excess of one second have been measured in the Lawrence Non-neutral Torus II using the frequency of the $m = 1$ diocotron mode as a diagnostic, coupled with modeling of the toroidal modifications of that mode. We now report measurements (and modeling) of the $m = 2$ mode frequency, which yields a measure of the average electron number density. The combined information provided using both modes permits the first measurements of transport rates in this experiment. Transport is initially faster than the previously reported global confinement times. We also report on initial experiments in which the plasma is allowed to expand from a 270° toroidal arc (in which all previous experiments were conducted in this device) into a fully toroidal (closed field line) trap.

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