Contribution ID: **17** Type: **not specified**

Non-Neutral Plasmas in SMall Aspect Ratio Toroidal Electron plasma eXperiment - C

Stability, equilibrium and transport of electron plasmas in cylindrical traps have been comprehensively investigated owing to their exceptional confinement properties[1]. In recent times non-neutral plasmas in various toroidal configurations have also raised considerable interest ascribed to the capability of producing equal mass plasmas in such configurations[2], [3]. Investigations of equilibrium, confinement and toroidal effects on non-neutral plasmas are being carried out in several traps [4], [5]. While equilibrium and stability have been theoretically established, fundamental limitation to confinement in toroidal geometries has been predicted to be posed by magnetic pumping transport driven by electron-electron collisions[6]. Present work reports the successful confinement of toroidal electron plasmas for more than a second in SMARTEX-C[7], [8], a SMall Aspect Ratio Toroidal Electron plasma eXperiment in a C-shaped trap. Steady state confinement that outlives single particle toroidal drifts and most non-toroidal losses have now allowed transport studies. Besides, strong toroidal effects gives rise to interesting nonlinear collective dynamics which will be discussed in this paper.

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