Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Overview of the Levitated Dipole Experiment D.T. GARNIER, M. DAVIS, M.E. MAUEL, Columbia University, R.M. BERGMANN, J.L. ELLSWORTH, B. KARDON, J. KESNER, P.C. MICHAEL, P. WOSKOV, MIT PSFC — The Levitated Dipole Experiment (LDX) investigates plasmas confined in the closed field line dipole magnetic geometry where the plasma stability is provided by compressibility and where plasma convection leads to peaked profiles and may allow for $\tau_E > \tau_p$. In the past year, we have continued to investigate the improved energy and particle confinement when the supports are removed from the plasma. Of most significance, we observe that: 1) A large fraction of the stored energy in levitated plasmas is contained in the bulk electron population. 2) Eliminating plasma losses along field lines allows observations of a strong particle pinch leading to a density profile with near equal number of particles per flux tube. 3) The previously observed low frequency fluctuations are consistent with the required turbulent convection to drive the observed particle pinch. In future experiments, an optimal levitation control system will be implemented, reflectometer and soft x-ray spectrometer diagnostics will be added, and a higher frequency (28GHz) electron cyclotron heating source will be added to increase the density of LDX plasmas. In preparation for installing a 1MW ICRF transmitter, initial ion cyclotron heating experiments will also be performed.

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Date submitted: 24 Jul 2009 Electronic form version 1.4