Abstract Submitted
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The Levitated Dipole Experiment: Experiment and Theory[1] J. KESNER, R.M. BERGMANN, A.C. BOXER, J.L. ELLSWORTH, P. WOSKOV, MIT PSFC, D.T. GARNIER, M.E. MAUEL, Columbia University — A closed field line confinement system such as a levitated dipole is shear-free and the plasma compressibility provides stability. Theoretical considerations of thermal plasma driven instability indicate the possibility of MHD-like behavior of the background plasma, including convective cell formation and drift frequency, interchange-like (entropy mode) fluctuations. In recent experiments in LDX the floating coil was fully levitated and we expect the density and pressure to be constant along field lines and all losses to be cross field. During levitated operation lower fueling rates are required. We create a non-thermal plasma in which a substantial fraction of energy is contained in an energetic electron species that is embedded in a cooler background plasma. Under some circumstances we observe a "self-organization" in which the density tends to a profile with a constant number of particles per unit flux. We observe low frequency fluctuations (drift and MHD) in the kHz range that presumably are driven by the thermal species [Garnier et al., J Pl Phys (2008)] and the fluctuation amplitude is reduced in the self-organized state, consistent with theoretical predictions.

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