

Abstract Submitted
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LDX and the Density Pinch¹ J. KESNER, P. MICHAEL, P. WOSKOV, MIT PSFC, M. DAVIS, D. GARNIER, M. MAUEL, Columbia University — We observe in LDX a strong, turbulence driven density² and the resulting stationary density profile. A turbulent pinch is predicted by both MHD and kinetic theory. A turbulent pinch is also observed in tokamaks³, but the effect is particularly strong in a dipole because the magnetic field falls strongly ($B \propto 1/R^3$), there is no rotational transform (and therefore no “passing” particles) and the turbulent modes are interchange-like. As a result, whereas for a tokamak the stationary density tends to fall as $\sim 1/q$ (i.e. a factor ~ 3), in LDX the peak can rise a factor of ~ 30 above the edge density. The stationary profiles are robust, as seen in experiments with a modulation of the heating power or of the edge fueling. Low frequency fluctuations are observed, both at the outer plasma edge and as core chordal measurements. Quasi-coherent fluctuations are also observed under the condition of low gas feed and in this circumstance the density can diverge from the stationary profile.

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²A. Boxer et al., Nature-Physics **6** (2010) 207.

³D. Baker, M. Rosenbluth, PoP **5** (1998) 2936.

J. Kesner
MIT PSFC

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