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Profile Consistency and Turbulent Particle Pinch in Dense Plasma[1] J. KESNER, MIT PSFC, M. DAVIS, D. GARNIER, M. MAUEL, Columbia University — In a plasma with central heating and edge fueling a turbulence-driven density pinch is often present. Turbulence tends to drive density inwards while enhancing outwards flow of energy and resulting in predictable, stationary density and pressure profiles. We observe in LDX a strong density pinch and the resulting stationary density profile.[2] The pinch is predicted by "turbulent equipartiton" theory and also by both MHD and kinetic theory. The effect is particularly strong in a dipole because the magnetic field falls strongly ($B \propto 1/R^3$) and the turbulent modes are interchange-like. A turbulent pinch is also observed in tokamaks which can result in a density inversion as observed in C-mod during LHCD.[3] In a tokamak the stationary density tends to fall as $\sim 1/q$ (i.e. a factor $\sim$3), whereas in a dipole the peak density can rise a factor of $\sim$30 above the edge value. In high density dipole plasmas the density is seen to remain inwardly peaked while the pressure peak can move outwards. Recent experiments with high density plasmas have been carried out in LDX and will be discussed.

[1]Supported by NSF-DoE Partnership in Plasma Science and Engineering.
[2]Boxer, Bergmann, Ellsworth, Garnier et al., Nature-Phys **6**, (2010) 207.
[3]Kesner, Ernst, Hughes, Mumgaard, Scott et al., PoP **19**, (2012) 122511.

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