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Non-axisymmetric Perturbations of the LDX Laboratory Magnetosphere by Lithium Pellet Injection[1] D. GARNIER, M. MAUEL, Columbia University, J. KESNER, MIT PSFC — In most toroidal magnetic plasma confinement systems, transport within helical flux surfaces serve to symmetrize the plasma temperature and density. In contrast, a plasma torus confined by a dipole field lacks a rotational transform and therefore the confined plasma is not necessarily axisymmetric. The plasma, however, self organizes into a time-averaged symmetric state through particle drifts and turbulent transport. Recent experiments in the LDX laboratory magnetosphere have been conducted to study large non axisymmetric perturbations of the dipole confined plasma. A high speed gas gun was used to inject lithium pellets tangentially through the peak of the plasma density profile. High speed video shows the pellet ablating as it traverses the bulk plasma. As the pellets approach the mid plane they encounter the deeply trapped energetic electron ring (formed during ECH) and absorb energy deeply into pellet. This causes a rapid ablation fracturing of the pellet into multiple droplets; the exploding pellets will vaporize and then ionize leading to a tripling of the line integrated density. Similar processes occur when objects enter the Van Allen belts. The high density plasma presents an improved target for ICRF heating. We will present recent experimental results.

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