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Equilibrium limits in the LDX experiment[1] LUCA GUAZZOTTO, JEFFREY FREIDBERG, JAY KESNER, MIT — The Levitated Dipole Experiment (LDX) is an experiment based on an innovative magnetic confinement concept, which allows the confinement of high beta (1) plasmas. A critical figure of merit for such an experiment is the maximum beta that can be achieved during operation. In general, both equilibrium and stability limits must be determined. The present work focuses on the former limit. If toroidal effects are neglected, it is possible to determine the equilibrium beta limit analytically. LDX plasma has however a tight aspect ratio and toroidal curvature must therefore be considered. In the present work, equilibrium calculations obtained with the code FLOW [1] are presented. The code allows for arbitrary geometry, and has the additional properties of allowing toroidal flow and anisotropy to be included in the problem. Both properties are relevant to LDX, since LDX plasmas are expected to have macroscopic toroidal flow and finite anisotropy, due to the heating process. Numerical and analytical results are presented and discussed. [1] L. Guazzotto, R. Betti, J. Manickam and S. Kaye, Phys. Plasmas 11, 604 (2004)

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