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Prospects for studying temperature-anisotropy-driven instabilities in a high-beta laboratory plasma T.A. CARTER, S. DORFMAN, L. BARDOCZI, Dept. of Physics and Astronomy, UCLA, A. GERALDINI, Oxford University, J. ROBERTSON, G. ROSSI, S. TANG, S. TRIPATHI, S. VINCENA, W. GEKELMAN, Dept. of Physics and Astronomy, UCLA — The mirror and firehose instabilities are driven unstable in magnetized, high-beta plasmas with anisotropic ion distribution functions. Evidence for the action of these instabilities has been found in space plasmas, in particular solar wind observations [1], and they are thought to be important in a number of astrophysical plasmas (e.g. accretion disks). Studying these important instabilities in the lab requires a high-beta, magnetized plasma and the creation of sufficient temperature anisotropy. We will discuss prospects for laboratory experiments making use of the Enormous Toroidal Plasma Device (ETPD) at UCLA. Firehose-unstable ion distributions might be driven in plasmas flowing into an expanding magnetic field (similar to the solar wind). Enhanced anisotropy could be provided by the formation of a double layer in the expanding plasma, which leads to the production of ion beams in expanding laboratory plasmas [2]. We will report on: initial experiments in LAPD studying expanding plasmas, measurements of plasma parameters in ETPD and on theoretical projections for acheivable anisotropy and instability thresholds in ETPD.

[1] S.D. Bale, et al., PRL 103, 211101 (2009).
[2] C. Charles, et al., PoP 11, 1706 (2004).

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