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Stability and dynamics of electron plasma vortex under external strain N. C. HURST, J. R. DANIELSON, D. H. E. DUBIN, C. M. SURKO, University of California - San Diego — The behavior of two-dimensional vortex structures is of key interest in a number of important physical systems, including geophysical fluids[1] and strongly magnetized plasmas.[2] Studied here is the case of an initially axisymmetric vortex subjected to a simple strain flow. Experiments are performed using pure electron plasmas confined in a Penning-Malmberg trap to model the dynamics of an ideal two-dimensional fluid.[3] Vortex-In-Cell simulations are also conducted to complement the laboratory results. The dynamical behavior and stability threshold of the strained vortex are measured, showing good agreement with Kida's elliptical patch model for relatively flat vorticity profiles[4]. However, non-flat profiles feature a reduced stability threshold, apparently due to filamentation at the vortex periphery.

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