Drift-Wave Eigenmodes and Spectral Gaps in Tandem Mirrors

J. Pratt and W. Horton

University of Texas at Austin, IFS

Abstract

The GAMMA-10 tandem mirror system has achieved high energy confinement times ($70 - 90$ ms) as well as radial-loss times that dominate the Pastukhov end-loss time (> 100 ms). This high confinement regime establishes a proof of principle that the combination of electrostatic and mirror confinement can successfully insulate electrons from thermal end losses. GAMMA-10 experiments show that sheared radial electric field E_r suppresses low frequency drift wave fluctuations. Scaling laws derived in [J. Pratt and W. Horton, Phys. Plasmas (13), 2006] provide a key prediction that there is a qualitatively different drift wave motion in the tandem mirror geometry. With a discrete eigenmode solver we observe kinetic Alfvén waves in the modeled GAMMA-10 and in a multiple magnetic mirror array formed by the Large Plasma Device (LAPD). We analyze the possibility of spectral gaps in these machines.