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Hot Electron Instability in a Dipole Confined Plasma[1] J. KESNER, N. KRASHENINNIKOVA, P.J. CATTO, MIT PSFC, M.E. MAUEL, Columbia University — In plasma containing energetic electrons, two interacting collective modes, an MHD-like mode and a hot electron interchange (HEI) mode[2], may be present. The linear stability of interchange modes in a z-pinch at arbitrary beta, including a bulk and hot electron species was recently studied[3]. Using the dispersion relation derived in this reference we show that when necessary conditions are satisfied the two modes may be present or absent in a closed-field line magnetic confinement geometry such as a hard core z-pinch or a dipole. The HEI instability and the MHD-like centrifugally-driven mode have been studied previously[4], including a comparison between the measured mode structure and the predictions of a global low-beta simulation. The radial eigenmode is seen to effect the saturation level of the mode. In the Levitated Dipole Experiment electron cyclotron resonance heating produces high beta plasmas containing hot electrons, and instability observations will be discussed and compared with theoretical predictions.

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