Collective Effects Observed in the Passage of a Hollow, Relativistic Electron Beam Through a Narrow Magnetic Cusp.* W. W. DESTLER, D. W. HUDGINGS, P. K. MISRA, M. P. REISER, M. J. RHEE, and G. T. ZORN, U. of Maryland.--In the Maryland ERA experiment, a hollow, rotating electron beam is produced by passing a hollow, straight beam through a narrow magnetic cusp. Typical beam energy is in the range 1.5–2 MV and beam current is in the range 2–10 kA. The primary component of the downstream beam shows some basic features consistent with single particle behavior; however, as expected, one also observes significant collective effects. For instance, a second, non-rotating component of high energy electrons has been observed to propagate in the downstream region at magnetic field values significantly above the predicted single particle cutoff value. In addition, electrons with energies higher than the primary beam energy have been observed. Time resolved studies of the downstream beam energy and cross section have been conducted, and the results will be compared with simple theoretical models.

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