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Collective Effects Observed in the Passage of a  
Hollow, Relativistic Electron Beam Through a Narrow  
Magnetic Cusp.\* W. W. DESTLER, D. W. HUDGINGS,  
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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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