The theory of self-magnetic cusps in bunched annular electron beams[1] MARK HESS, Indiana University Cyclotron Facility, CHIPING CHEN, Massachusetts Institute of Technology — We show the existence of a self-magnetic cusp which can form within a fluid equilibrium model for bunched annular electron beams. The model self-consistently includes the effects of the electric and magnetic fields generated by the azimuthally symmetric beam, the external uniform magnetic focusing field, and the boundary conditions for a cylindrical conducting pipe. The formation of the self-magnetic cusp strongly depends upon the properties of the fast and slow rotation solutions of the beam, which in turn, depends upon the characteristic system parameters, such as the external magnetic focusing strength and the beam current. The formation of self-magnetic cusps may play an important role in high-current annular electron beam experiments.

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