6 G-5 Generation and Suppression of Microwave Radiation in the Maryland ERA,* W.W. DESTLER, R. DIAS-BANDARANAIKE, D.W. HUDGINGS, S. KAWASAKI, M.P. REISER and M.J. RHEE, U. Maryland.--The conversion of hollow, rotating, relativistic electron beam energy into microwave radiation has been investigated under a variety of experimental conditions. A hollow, non-rotating relativistic beam is passed through the narrow magnetic cusp of the Maryland ERA experiment, and the resulting rotating beam propagates inside a cylindrical or coaxial vacuum drift chamber. In the experiment, beam energy and current in the region downstream of the cusp are 2.5 MeV and 1-8 kA, respectively. The mechanism for radiation production has been identified as a strong coupling between a beam cyclotron mode and the TE or TM waveguide modes of the vacuum drift chamber. The frequency spectrum of the radiated power has been obtained as a function of beam density and applied magnetic field and is in reasonable agreement with first order theoretical expectations. The introduction of small amounts of energy spread and angular scattering by passing the beam through thin scattering foils is sufficient to reduce radiated power by several orders of magnitude.

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