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An experimental investigation of the emission mechanisms of the auroral kilometric radiation ALAN D.R. PHELPS, KEVIN ROLAND, DAVID C. SPEIRS, ADRIAN CROSS, University of Strathclyde, ROBERT BINGHAM, Rutherford Appleton Laboratory, IRENE VOGUL, R.A. CAIRNS, University of St. Andrews, BARRY J. KELLETT, Rutherford Appleton Laboratory, COLIN G. WHYTE, CRAIG ROBERTSON, University of Strathclyde — When a beam of electrons encounters an increasing magnetic field along its vector of motion, conservation of the magnetic moment results in the formation of a crescent or horseshoe shaped velocity distribution. A scenario analogous to this occurs in the terrestrial auroral zone where particles are accelerated into the polar regions of the Earth's magnetic dipole and expand adiabatically in velocity space. The resultant horseshoe shaped velocity distribution has been shown to be unstable with respect to a cyclotron-maser type instability [1-3]. This instability has been postulated as the mechanism responsible for auroral kilometric radiation and thermal radiation from other astrophysical bodies [4]. In this paper we describe both theory and a laboratory experiment to investigate the generation of microwave radiation when an electron beam is magnetically compressed.

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