Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Laboratory investigation of auroral cyclotron emission in the presence of background plasma SANDRA MCCONVILLE, DAVID C. SPEIRS, KEVIN RONALD, ALAN PHELPS, KAREN GILLESPIE, ADRIAN CROSS, ROBERT BINGHAM, CRAIG ROBERTSON, COLIN G. WHYTE, SUPA Department of Physics, University of Strathclyde, IRENA VORGUL, ALAN CAIRNS, University of St Andrews, BARRY KELLETT, Space Physics Division, CCLRC, Rutherford Appleton Laboratory — In the auroral regions of the Earth's magnetosphere, particles are accelerated downwards into an increasing magnetic field. Due to conservation of the magnetic moment, magnetic compression leads to the formation of a horseshoe velocity distribution. This process is associated with the emission of **A**uroral **K**ilometric **R**adiation (AKR), polarised in the X-mode. A cyclotron maser instability driven by the horseshoe distribution is thought to be the generation mechanism of **AKR**. To simulate this naturally occurring phenomenon, a scaled laboratory experiment was created. Measurements of radiation conversion efficiency, mode and spectral content previously obtained were seen to be in close agreement with numerical predictions and satellite observations in the magnetosphere. To further replicate the magnetospheric conditions, a Penning trap was constructed and inserted into the interaction region of the experiment to generate a background plasma. The latest results from this modification shall be presented including characteristics of the background plasma.

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Date submitted: 16 Jul 2009 Electronic form version 1.4