

Abstract Submitted  
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**Laboratory experiments to investigate auroral cyclotron emission processes** SANDRA MCCONVILLE, KEVIN RONALD, ALAN PHELPS, DAVID SPEIRS, KAREN GILLESPIE, ADRIAN CROSS, COLIN WHYTE, CRAIG ROBERTSON, University of Strathclyde, ROBERT BINGHAM, BARRY KELLETT, STFC, Rutherford Appleton Laboratory, IRENA VORGUL, ALAN CAIRNS, University of St Andrews — In the auroral regions of the Earth's magnetosphere, particles are accelerated downwards into an increasing magnetic field. Magnetic compression leads to the formation of a velocity distribution in the shape of a horseshoe due to conservation of the magnetic moment. Kilometric radiation is observed in association with this process, polarised in the X-mode. The RF output power has been estimated at  $10^7$ - $10^9$ W, corresponding to a beam-wave conversion efficiency of 1-2%. A cyclotron maser instability driven by the horseshoe distribution is thought to be the source of this **Auroral Kilometric Radiation (AKR)**. A scaled laboratory experiment was created, to simulate this naturally occurring phenomenon. Measurements of the radiation conversion efficiency, mode and spectral content were obtained and seen to be in close agreement with numerical predictions and also with satellite observations in the magnetosphere. The experiment is currently being modified by introducing a background plasma to give a better representation of the natural environment. The latest results of this modification shall be presented.

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