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Propagation of cyclotron maser radiation in inhomogeneous magnetic fields. ROBERT BINGHAM, Rutherford Appleton Laboratory, ALAN CAIRNS, IRENA VORGUL, Univ. of St-Andrews, BARRY KELLETT, Rutherford Appleton Laboratory, ALAN PHELPS, KEVIN RONALD, DAVID SPEIRS, SANDRA MCCONVILLE, ADRIAN CROSS, CRAIG ROBERTSON, CRAIG WHYTE, Univ. of Strathclyde — Cyclotron masers are important laboratory devices and play a major role in planetary and stellar radio emission. Recently we have shown that a cyclotron maser instability driven by a horseshoe shaped distribution in velocity space may be responsible for the observations. A long standing problem though is how the radiation generated at frequencies below the upper hybrid resonance, gets onto the higher frequency branch of the dispersion curve that connects to the vacuum propagation branch. Here we consider some of the dispersion properties of waves in the presence of energetic particle populations in the shape of a horseshoe and ring distribution in velocity space. The analysis is carried out in a homogeneous and an inhomogeneous magnetic field and demonstrates that the extraordinary mode that is initially driven unstable by the energetic particles can couple to the vacuum regime and escape the region.

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