

Abstract Submitted
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A New Cyclotron Radiation Mechanism in Astrophysics, Space and the Laboratory BARRY KELLETT, ROBERT BINGHAM, KEVIN RONALD, University of Strathclyde, DAVID C. SPEIRS, ALAN D.R. PHELPS, ADRIAN CROSS, University of Strathclyde, IRENE VORGUL, R.A. CAIRNS, St. Andrews University, C.G. WHYTE, CRAIG ROBERTSON, University of Strathclyde, JOHN TONGE, University of California — From the study of the radio and X-ray emission from stars, we discovered a new radiation emission mechanism produced by energetic electrons entering a region of increasing magnetic field. This cyclotron maser process was found to be extremely efficient at converting electron energy into radio frequency emission. When a beam of electrons enters a region of increasing magnetic field strength, conservation of magnetic moment leads to the electron beam forming a crescent or horse-shoe shaped distribution in velocity space. Such a distribution is unstable and leads to the generation of cyclotron maser type radiation.

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