



Theory of a new cyclotron maser instability with application to planetary radio emission

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Conservation of the magnetic moment results in the formation of a crescent, or horse shoe shaped velocity distribution when a beam of electrons move into an increasing magnetic field. The resultant horseshoe shaped velocity distribution has been shown to be unstable with respect to a cyclotron-maser type instability. This instability has been postulated as the mechanism responsible for auroral kilometric radiation and also non-thermal radiation from other astrophysical bodies. In this paper the previous theory, that assumed an infinite uniform plasma, is extended to apply to a bounded cylindrical geometry. This more exact theory in bounded cylindrical geometry is also directly relevant to a laboratory experiment currently being carried out.