EPSC Abstracts,
Vol. 4, EPSC2009-755, 2009
European Planetary Science Congress,

The Current Understanding of AKR

R. E. Ergun

Department of Astrophysical and Planetary Sciences, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder

Abstract

I review the current state of knowledge of the generation and propagation of AKR. The review focuses on in-situ observations of the AKR source region made by the *Viking* and Fast Auroral SnapshoT (*FAST*) satellites. These observations confirmed many of the fundamental elements of the electron-cyclotron maser mechanism, but with a significant modification. The emissions do not draw their energy from a loss-cone instability, rather, the radiation results from an unstable "horseshoe" or "shell" distribution. The most far-reaching implication is that the electron-cyclotron maser is directly associated with a particular type of charged particle acceleration, a magnetic-field-aligned (parallel) electric field in a dipole magnetic field. These findings change several of the characteristics of the electron-cyclotron maser mechanism and may necessitate re-analysis of some astrophysical and planetary radio sources. Auroral kilometric radiation also displays highly modulated wave packets and discrete, drifting, frequency tones. A review of fine structure is presented. In addition, I review the types of the electron cyclotron maser that may be active at Jupiter. Recent research suggests that the anti-Jovian ring distribution created from impulsive acceleration and mirroring results in Jovian S-bursts. AKR and Jovian observations are compared.