サイクロトロンメーザー機構によるオーロラキロメトリック放射の生成と伝搬特性

今井 雅文 [1]; 町田 忍 [1]
[1] 京大・理・地惑

Characteristics of auroral kilometric radiation based on simulation of cyclotron maser mechanism

Masafumi Imai[1]; Shinobu Machida[1]
[1] Division of Earth and Planetary Sciences, Kyoto Univ.

It is widely believed that Earth's Auroral Kilometric Radiation (AKR) is generated in the right-hand extraordinary (R-X) mode via the cyclotron maser instability (CMI). On the contrary, AKR is observed in the frequency range from 50 to 700 kHz with primarily right-hand and secondarily left-hand polarization. Although a large number of theoretical studied were conducted concerning the problem of whether AKR of the left-hand ordinary (L-O) mode is mode-converted from that of R-X mode or whether it is purely generated directly by the CMI mechanism, it has not been settled yet. In order to address this issue, we have performed a 2-1/2D electromagnetic electron hybrid code in which we consider the cold electrons to be a fluid, the hot electrons to be finite-size relativistic particles, and the ions to be charge-neutralizing stationary components. Such velocity distributions as loss-cone, ring-shell and horseshoe, are assumed in the center of the simulation region, while denser cold plasma surrounds this region whose right and left boundaries are terminated by wave absorption regions. This vertical region, in which periodic boundary conditions are assumed, is along Earth magnetic field. We will report the result of this computation with regards to the generation process and the propagation behavior of AKR.