

Harmonics of Auroral Kilometric Radiations observed by the Akebono Satellite

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Harmonic waves of Auroral Kilometric Radiation (AKR) are frequently observed by the Akebono satellite. The harmonic waves are identified as natural origin because many of harmonic waves have well weak intensity than the saturation level of the receiver and they show change of polarization between fundamental and second harmonic waves such as shown by Mellott et. al. [1986]; that is, fundamental and second harmonic AKR waves are right-handed X-mode and left-handed O-mode waves, respectively. In the first analysis, it was found that accurate harmonic relationship exist in the fine structure of AKR. The frequency and bandwidth of harmonic waves show close harmonic relationship. This relation between fundamental and second harmonic waves suggests that these AKR emissions are radiated from the same small source region.

By examining the characteristics of these harmonic AKR waves, we will be able to obtain a key for the verification of proposed two generation mechanism of the harmonic AKR, they are a cyclotron maser instability in the relatively dense plasma region (f_p/f_c is greater than 0.3) and a non-linear wave-wave interaction process.