Origin of the Intense Terrestrial Hectometric Radiation Observed by Akebono (EXOS-D) Satellite

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In the spectra of THR, intense discrete components have been identified in two frequency bands, from 1.3MHz to 2.1MHz(1.7MHz band) and from 2.6MHz to 4.2MHz (3.4MHz band) forming a harmonic relation in the frequency.

The fundamental band emission and the second hamonics show the nature of the L-O mode wave and the R-X mode wave, respectively. The origin of fundamental band emissions can be attributed to the the strong wave particle interactions of UHR mode waves at the frequency which is very close to twice the local electron cyclotron frequency. The generation process of the second harmonics includes non-linear processes in the mode conversion from electrostatic plasma waves into R-X mode electromagnetic waves.

By PWS onboard the Akebono (EXOS-D) satellite, it has been clarified

that THR is one of the typical radio emissions from the earth covering the frequency range from 1.0MHz to 5.5MHz. In the spectra of THR, intense discrete components have been identified in two

frequency bands, from 1.3MHz to 2.1MHz(1.7MHz band) and from 2.6MHz to 4.2MHz (3.4MHz band) forming a harmonic relation in the frequency. The fundamental band emission and the second hamonics show the nature of the L-O mode wave and the R-X mode wave, respectively. The origin of fundamental band emissions can be attributed to the the strong wave particle interactions of UHR mode waves at the frequency which is very close to twice the local electron cyclotron frequency. The generation process of the second harmonics includes non-linear processes in the mode conversion from electrostatic plasma waves into R-X mode electromagnetic waves.