

Banded Auroral Kilometric Radiation observed by GEOTAIL and POLAR Spacecraft and its Generation Mechanism

Kozo Hashimoto[1], Hiroshi Matsumoto[1], Roger, R. Anderson[2]

[1] RASC, Kyoto Univ., [2] Univ. of Iowa

<http://www.kurasc.kyoto-u.ac.jp/~kozo>

Geotail often observes Auroral Kilometric Radiation (AKR) in two bands. The lower bands extend down to a few 10's of kHz whereas the upper band extends from about 130 - 200 kHz. Such banded AKR is found to occur at low geomagnetic latitudes and at local times close to that of the source of AKR. Ray paths for both the R-X and L-O modes at these frequencies have been calculated in order to determine the reachable latitude as a function of frequency. The same AKR is observed by POLAR. Some simultaneous POLAR observations indicate that AKR is observed in a wide band without the banded structure. These facts support that the banded AKR is created by the propagation effects.

Geotail often observes Auroral Kilometric Radiation (AKR) in two bands. The lower bands extend down to a few 10's of kHz whereas the upper band extends from about 130 - 200 kHz. Such banded AKR is found to occur at low geomagnetic latitudes and at local times close to that of the source of AKR. Ray paths for both the R-X and L-O modes at these frequencies have been calculated in order to determine the reachable latitude as a function of frequency. At longitudes near the source meridian, R-X mode rays with frequencies lower than several 10's of kHz and L-O mode rays at more than about 170 kHz can reach the low latitude region at the distance of Geotail. The paths of the higher frequency component is affected by the plasmapause. At frequencies between these two, neither mode can reach this region. As the latitude difference from the source meridian increases, the frequency gap becomes narrower. Banded AKR can therefore be explained by the different wave propagation paths for the R-X and L-O wave modes. The same AKR is observed by POLAR. Some simultaneous POLAR observations indicate that AKR is observed in a wide band without the banded structure. This fact supports that the banded AKR is created by the propagation effects.