Ion cyclotron waves detected by Kaguya and Geotail in the Earth's plasma sheet boundary layer

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Nearly monochromatic, narrowband ion cyclotron waves found by Apollo 15 and 14 Lunar Surface Magnetometers (Chi et al., 2013) were detected in the magnetic field data obtained by GEOTAIL in the distant tail lobe as well as in the data obtained by Kaguya orbiting around the moon in the tail lobe of the Earth's magnetosphere. They have common characters such as the frequency range near the local proton cyclotron frequency, significant compressional components, and wave forms comprising discrete packets. They are also similar to the waves found by Cassini during its Earth swing-by (Bogdanov et al., 2003). Polarization of the narrowband ion cyclotron waves was predominantly left-handed at far downstream, while near the lunar orbit, both right-handed and left-handed polarization was detected.

Keywords: ion cyclotron wave, plasma sheet boundary layer, lobe, Kaguya, GEOTAIL, left-handed polarization

