

## Kaguya 衛星で観測された月周辺の狭帯域・広帯域ホイッスラーモード波動の関連性

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### Relationship between monochromatic and non-monochromatic whistler waves near the Moon detected by Kaguya

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We investigate the relationship between monochromatic and non-monochromatic whistler waves observed by the Lunar Magnetometer aboard the Kaguya spacecraft orbiting at 100 km altitude above the Moon. Monochromatic whistler waves are observed near the Moon as narrowband magnetic fluctuations with frequencies close to 1 Hz and are mostly left-hand polarized in the spacecraft frame [Halekas et al., 2006; Tsugawa et al., 2011]. On the other hand, non-monochromatic whistler waves are also observed near the Moon as broadband magnetic fluctuations with frequency range of 0.03-10 Hz in the spacecraft frame [Nakagawa et al., 2011].

Statistical analyses show that non-monochromatic whistler waves are observed closer to lunar crustal magnetic anomalies than monochromatic whistler waves. The correlations between these waves are suggested from the geometrical conditions for their observations and wave propagation properties. Cold plasma dispersion relation explains that broadband whistler-mode waves can be observed as narrowband waves in the spacecraft frame when the waves propagate against the solar wind and largely Doppler-shifted by the flow. This means that monochromatic whistler waves are originated from non-monochromatic whistler waves, which are generated by the solar wind interaction with lunar crustal magnetic anomalies.

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