

## かぐやで観測されたオーロラキロメートル波の偏波観測とレイトレーシングによる解析

# 橋本 弘藏 [1]; 後藤 由貴 [2]; 笠原 禎也 [2]  
[1] 京都大学; [2] 金沢大

### Polarizations of auroral kilometric radiatin (AKR) observed by Kaguya and their ray tracing analyses

# Kozo Hashimoto[1]; Yoshitaka Goto[2]; Yoshiya Kasahara[2]  
[1] Kyoto Univ.; [2] Kanazawa Univ.

In KAGUYA (SELENE) LRS instrument[1], WFC-H[2] observes wave spectra in 1kHz-1,000kHz and various plasma waves like Auroral Kilometric Radiation (AKR), electron plasma waves, and broadband electrostatic waves have been observed. This system can observe wave polarizations by two pairs of dipole antennas. We have analyzed the AKR polarizations.

The polarization of AKR is defined with respect to the magnetic field from a view point of plasma waves. On the other hand, the polarization is observed with respect to the propagation direction. Both polarizations depend on the source hemisphere. Kaguya moves behind the Moon every rotation. The occultations of AKR radiated from the Earth occur. When only one hemisphere can be seen due to the occultation, the source hemisphere is identified and the polarization can be measured correctly. This result is also useful when both hemispheres are seen after the occultation. We will show some cases with a more reliable method mainly when the polarizations are identified and both polarizations are observed without occultation and their interpretation based on ray tracing.

#### References

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- [2] Y. Kasahara, Y. Goto, K. Hashimoto, T. Imachi, A. Kumamoto, T. Ono, and H. Matsumoto, Plasma Wave Observation Using Waveform Capture in the Lunar Radar Sounder on board the SELENE Spacecraft, Earth, Planets and Space, 60, 341-351, 2008.
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月周回衛星「かぐや (SELENE)」搭載 LRS[1] の WFC-H 波動観測装置 [2] では、1-1,000kHz の波動のスペクトルを観測でき、オーロラキロメートル波 (AKR)、電子プラズマ波、広帯域静電波などが観測され、周辺プラズマ環境のモニターにもなっている。本装置は二対のダイポールアンテナを用いた偏波観測が可能であり、AKR の偏波解析を行ってきた。

AKR の偏波観測を行っても、プラズマ波動で言う磁場方向に対する偏波と観測される進行方向に対する偏波の関係は、源の半球により逆転する。かぐやは地球からの電波である AKR の観測中に、周回ごとに月の背面に入るが、その間地球の一部が隠れる時間がある。掩蔽観測は、AKR が、片半球しか見えていない時間帯に受かっているかどうかで源の半球が特定でき、同時に偏波も観測できる。この情報は、両半球が見える状態になっても、解釈のあいまいさをなくすることができる点で有意義である。掩蔽を用いて偏波を特定でき、従来よりも偏波判定の確度を高めた方法により、両半球が見える状態で両偏波が観測された例を中心に、観測結果とレイトレーシングによる解釈を示す [3]。

#### References

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