

Characteristics of pulsating aurora modulation observed from high-speed EMCCD camera

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Pulsating aurora (PsA) shows quasi-periodic intensity modulation with a 2 s to 30 s intervals as a main modulation. PsA is mainly observed from the post-midnight to the morning sectors during the recovery phase of substorms. PsA consists of not only main modulations but also internal modulation with a few Hz. We installed multi-EMCCD cameras in Tromso, Finland, Sodankyla, Kevo Finland and Alaska, US. The cameras with RG665 filters observe high-speed phenomena with 100 Hz sampling rate, while the cameras with different filters observe spectrum of PsA with 10 Hz sampling rate. In order to investigate spatio-temporal characteristics of the main modulations as well as internal modulations, we apply PCA (Principal Component Analysis) and FFT to all-sky images of PsA with 100 Hz sampling rate. PCA decomposes into different modes with periods of a few seconds, indicating that localized structure of the main modulation of PsA. The all-sky images at different frequency derived from FFT show that the spatial distribution of PsA depends on the frequency and the internal modulations with high frequency appear in a part of the main modulations. In this presentation, we will report statistical results on these spatio-temporal characteristics of PsA.

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