R006-12
B 会場 ： 11/26　PM3（16:40-18:25）
17:55〜18:10:00

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Pulsating aurora electrons observed by LAMP sounding rocket

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Pulsating aurora is a type of diffuse aurora characterized by quasi-periodic variations, typically with periods ranging from a few to a few tens of seconds. The over-darkening, a decrease in brightness by several tens of percent relative to the background, which often occurs immediately after an increase in brightness during the pulsation “ON” phase.

We investigated pulsating aurora and associated over-darkening phenomena using electron data from EPLAS and optical data from AIC, both onboard the LAMP sounding rocket, launched on March 5, 2022 from the Poker Flat Research Range, US. EPLAS measured electrons in the 5 eV-15 keV energy range, while AIC observed optical emissions in the 667-680 nm and 844-848 nm wavelength ranges. During the flight, multiple pulsating aurora and over-darkening events were observed. Near the rocket apex, the optical aurora emission at the magnetic footprint decreased from 3,000 Rayleigh to 1,300 Rayleigh. At the same time, EPLAS detected a ˜50% reduction in downward energy flux, particularly at energies above 5 keV. An energy dispersion of precipitating electrons was also detected during the darkening phase. The inverse energy dispersion at the lowest energy of precipitating electrons around 5 keV was found, which is consistent with Miyoshi-Saito model that considers the propagation effects of chorus waves. To better understand the mechanism, we performed numerical simulations of wave-particle interactions. In this presentation, we will show detailed variations of precipitating electron spectra and pitch-angle distributions during the over-darkening events and compare the observations with numerical simulations to discuss possible mechanisms responsible for the over-darkening.