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**ポスター 1 ：11/24　PM1/PM2 （13:15-18:15）**

# LAMP1 ロケット搭載カメラのオーロラ観測成果と LAMP2 ロケット搭載カメラ開発と地上観測初期報告

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# Results of the auroral camera on the LAMP1 rocket and development of the LAMP2 rocket camera

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We report the recent results of a multi-spectral auroral camera AIC on the NASA's LAMP rocket launched from Poker Flat at 11:27:30 UT on March 5, 2022. The purpose of LAMP rocket mission is to clarify the relationship between pulsating aurora and microbursts. AIC measured two auroral emissions in the E-region at 670 nm (N2 1PG) and mainly in the F-region at 845 nm (OI) using two CMOS cameras called AIC1 and AIC2. Two cameras took images simultaneously with a time resolution of ˜10 frame/s. The field-of-view (FOV) of AIC1 was 29 deg x 29 deg directed to the magnetic footprint covering 180 km x 180 km area with a resolution of 3 km x 3 km at the apex altitude (˜430 km altitude). FOV of AIC2 was 106 deg diameter circle covering the wide range from nadir to limb of the Earth.

The LAMP rocket was successfully launched into active pulsating auroral patches, and AIC and its despun platform worked satisfactorily throughout the flight. From AIC1 data, we compared auroral images with high- and low-energy electrons, and ground auroral images obtained at Venetie and Fort Yukon, and found good correspondence between them even for the sub-second variations.

From the AIC2 data, we estimated the altitude distribution of oxygen 845nm emission with the three methods and verified the peak altitude in association with precipitating electron energy obtained by the LAMP1 rocket. (1) Differential emission intensities in the direction of the magnetic footprint. (2) Emission intensities in the horizontal direction. (3) Auroral image in the limb direction around the apex attitude. From these analyses, we estimated the emission peaks in the altitude range from 160km to 330km. The estimated emission altitudes are consistent with the electron precipitation in the energy range of a few keV obtained by the rocket.

Although the LAMP1/AIC succeeded to observe pulsating auroral continuously, the sub-second (˜3Hz) modulation of pulsating aurora was not obvious. In addition, the sensitivity was not sufficient for the faint oxygen 845nm emission. In the next rocket project LAMP2, therefore, we plan to develop auroral cameras which have higher sensitivity and faster imaging capability. LAMP2 rocket mission is a NASA's project which is planned to be launched in the winter of 2026. We are now designing and developing new auroral cameras AIC2 with a sampling of 15 frame/s. We selected a larger-sized CMOS (ASI-432MM, 1.1", global shutter) which has higher sensitivity than LAMP/AIC (ASI-183MM, 1", rolling shutter). As established in the previous LAMP1 rocket, the single board computer NanoPiM4V2 is used for primary processing of camera. We developed an engineering model (EM) of AIC2 using the same objective lens as the flight model, filters (N2 670nm and oxygen 845nm), and CMOS sensors, and carried out the optical tests with blinking LED arrays. We verified the time accuracy even at 20 fps (50 ms exposure) image data. The AIC2 EM cameras are now installed at the Skibton station, and ready for the automatic operation during the winter period this year. The operation is scheduled to start in the end of this September and obtain the image data for 30 min around the midnight every day. The data and the instruments will be recovered by the next spring in 2024. In this presentation, we give the first result of image data obtained by AIC2 EM camera at Skibton.