

次期月探査計画SELENE-2のための月面マクロ分光カメラ (LUMI) 科学目的と開発検討の現状

Lunar Macro Imager (LUMI) for the Next Japanese Lunar Mission SELENE-2: Science Objectives and Present Status

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A next Japanese lunar mission called as SELENE-2 is planned by Japan Aerospace Exploration Agency (JAXA). The SELENE-2 consists of an orbiter, a lander, and a rover, but a detailed plan such as landing sites, mission life is now under debated. We proposed an instrument to SELENE-2 as an investigation of spectral characteristics of a rock sample on the Moon. The objective of our observation is to identify a mineral species, which depends on an absorption depth with wavelength of light, consist of a rock sample at a landing site of SELENE-2 by in situ like operation. In addition to the identification of mineral species, we can measure a size of mineral texture which depends on thermal/pressure experiences when it was crystallizing. Especially, we focus on a PAN rock which is composed of pure anorthothite which is suggested as a rock crystallized from a magma ocean on the Moon. For an investigation of the thermal/pressure condition of the PAN, it is important to know a size distribution of mineral species within the rock. For these objectives, we decided characteristics of our instrument which can observe in the range between 500 nm and 2400 nm (visible detector: 500 ~ 1000 nm, near-infrared detector: 1000 ~ 2400 nm) with a light source of integrating sphere (size: 2 inch, power: 5 ~ 10 W). The homogeneous light through an AOTF from the integrating sphere is reflected at the polished lunar sample at an arbitrary wavelength, and the reflected light is observed at detectors. We aim to take images with 20 micro-m spatial resolution, and band widths of 5 nm in visible and 8 nm in near-infrared with a SNR more than 100. For evaluating our observation, we investigate a feasibility of a candidate visible detector at a high ambient temperature (337 K) and a candidate near infrared one at 170 K with Stirling cooler. As a result, we could show that these detectors can take images with a SNR more than 100. We would like to show a feasibility of our proposed observation in this meeting.

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