[EE] Evening Poster | P (Space and Planetary Sciences) | P-CG Complex & General

[P-CG21]Future missions and instrumentation for space and planetary science

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Not only national space agencies but some universities and even companies in the world are now leading a number of space science and exploration missions and also energetically initiating new research activities for satellite and rocket developments and international collaborations in these days because the Earth observations from the space and the space explorations could be achieved much easier than a few decades ago. The deployment to the space, which itself is not purely a scientific purpose but one of methods for better sciences, is vigorously motivating the technical innovation and the educational development. For successful space missions, it is also crucial to research and develop aim-oriented on-board instruments, and the fundamental research and development of observational instrumentation with future perspectives could totally lead space missions in some case. Detailed investigation and evaluation on various on-board instruments are needed during their proposals, selections, and fabrications in order to promote the missions, and inevitably we have to make multi-sided arrangements and evolution at every process and aspect of any type of space missions, independently of their mission sizes. In this session, we focus on these comprehensive research activities in the space missions, including the mission integrations and the individual instrumental developments, and we also call many presentations showing the uniqueness and renovation regarding the mission strategy and methodology, and the status and latest results in the related state-of-the-art researches and developments, which would provide all of researchers and developers with invaluable opportunities for active discussion, information sharing, and collaboration toward the realization of more missions for more fruitful space sciences and explorations in nearer future.

[PCG21-P08]Design of a telephoto camera and development of a performance evaluation device for Martian Moon eXploration

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Mars has two satellites, Phobos and Deimos, and there are currently two hypotheses for the origin of these satellites. The first of these hypotheses is that the moons are captured primitive asteroids, and the second is that they formed as a consequence of a giant impact event on Mars. The Japan Aerospace Exploration Agency (JAXA) is planning the Martian Moon eXploration (MMX) mission, which is a sample-return mission for Phobos to determine which hypothesis is correct and reveal the origins of these two satellites.

The telescope camera(TL)that will be installed in MMX has the purpose of measuring the geographical features of Phobos to locate a suitable landing site less influenced by space weathering. To achieve this goal, the angular resolution of the TL was designed to be 5.79 μrad [Osada, 2017].However, stray light was not considered in this optical design. For TL, observation with an S/N ratio greater than 30 is

required, so we designed baffles to reduce stray light and to perform ray tracing to evaluate stray light. Internal reflection was also taken into consideration by setting the reflection properties of each optical element.

The performance of TL must be confirmed to be as designed after its manufacture. A collimated light is necessary in a ground experiment to obtain the point spread function. We succeeded to make a collimated light source with an angular width less than 11.6 μrad.

In this poster, we report the results of this research and the development of the performance evaluation device.