[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-P09]Optimization of the hydrogen absorption cell dedicated for ultra-small missions

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Hydrogen absorption cell measurement is an efficient technique for remote sensing for the density and temperature distributions of the planetary hydrogen coronas. The temperature distribution gives scientists crucial information to estimate quantitatively the escape rate of hydrogen atoms from the present planetary atmosphere. In addition, the absorption cell technique has some advantages over others from the point of view of geometrical size, weight, simplicity, and durability. Thus, the technique could be suitable for future missions with small size satellites. An absorption cell photometer was mounted on the first Japanese Mars mission, NOZOMI, but no data could be obtained because NOZOMI’s orbit insertion was unsuccessful. The parameter optimization (i.e., filament shape, applied power, gas pressure, and so on) for the absorption cells installed in NOZOMI was insufficient due to the limited development time. Since the absorption performance is strongly dependent on these parameters, further optimization and study would be required for future space missions. We have developed new cells and evaluated dependences of the performances of them on 1) filament shape, 2)

filament temperature, 3) hydrogen gas pressure, and 4) path length in the cell. In this presentation, we will present the current status of the optimization.