[EE] Evening Poster | P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS03]Small Bodies in the Solar System: Current Understanding and Future Prospects

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Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)
In this session, we welcome presentations regarding small bodies in the Solar System from a variety of approaches (i.e., laboratory experiments, observations, explorations, theoretical modeling, and sample analyses). Especially this year, the Hayabusa2 spacecraft is about to rendezvous with its mission target (Ryugu, C-type asteroid), and ready to make remote-sensing observations for acquiring detailed information of the primordial body. Taking account of the situation, we aim to organize our current understanding of these primordial bodies and further discussing future prospects in this research field.

[PPS03-P12]Observation Plans of Thermal Infrared Imager TIR onboard Hayabusa2 during the Asteroid Proximity Phase

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Thermal Infrared Imager (TIR) [1] is one of remote sensing instruments on Hayabusa2, the second asteroid sample return mission organized by Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA). TIR is basically the same design of Longwave Infrared Camera (LIR) [2] on Akatsuki (Venus Climate Orbiter), based on two-dimensional micro-bolometer array with 328 x 248 effective pixels, and its field of view is 16° x 12°, its IFOV is 0.05°/pixel (0.88 mrad/pixel), and the detection wavelength is from 8 to 12 μm. TIR aims at investigating thermo-physical properties of the surface of C-type asteroid 162173 Ryugu, and at assessing the safe landing for touchdown to the surface of the asteroid.

Hayabusa2 was launched in 2014, will arrive at the target asteroid Ryugu in 2018, and come back to Earth with the sample collected from the surface of the asteroid. The approach phase with optical navigation to reach the asteroid will start in the summer of 2018, where TIR will start observations of Ryugu from more than 2000 km distance. The asteroid Ryugu, with 0.88 km in diameter, 7.63 hours of rotation period, 0.05 in average geometrical albedo, and 200 to 300 of thermal inertia in SI unit. TIR will take images of Ryugu for one rotation period at the distance of 2000 km (a point source), 200 km (several pixels, and 20 km. TIR will observe the light-curves and the geologic features of the asteroid.

After checking the status, TIR will be mainly used for landing site selection with other remote

instruments from Home Position (20 km earthward from the asteroid), 5 km altitude from the asteroid (also on the Earth-Ryugu line). These observations will be planned before all the three touchdown operations. During the rehearsals for touchdown as well as the lander deployment operations, the Hayabusa2 spacecraft will descend to 40 m altitude and TIR will image the surface at higher spatial resolution. During the touchdown operations for sample collection, TIR will take images even at 7 m altitude, with the resolution of less than 10 mm per pixel. During the SCI (Small Carry-on Impactor) deployment operation, TIR will track the SCI every two second for one minute. During the escape operation of Hayabusa2 spacecraft to avoid damage from the SCI explosion, TIR will take images (for longer integration time) of the deep sky and possibly obtain dust clouds excavated by the SCI impact to the asteroid. Plans of TIR observations will be explained in more detail [3].

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