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

[P-CG23]Planetary Magnetosphere, Ionosphere, and Atmosphere

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Exploration of Moon, Venus, Mars, Mercury, Jupiter, Saturn, and beyond together with rapid developments of numerical simulations provides us new view of planetary environment. This session collects general contributions of new findings about planetary magnetosphere, ionosphere, and atmosphere. New methodology and technology development studies for future explorations are also welcome. In order to put the common knowledge at different planets into perspective, this session aims to facilitate discussions on comparative planetary environments.

[PCG23-P04]Planetary and exoplanetary observations with the Haleakala telescopes and future 1.8-m off-axis telescope PLANETS

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We report the current status of the T40 and T60 telescope activities including the onboard instruments as well as the updates of 1.8-m aperture telescope PLANETS project at Haleakala dedicated to planetary and exoplanetary observations. Continuous monitoring is essential to understand the planetary atmospheric phenomena, and therefore, own facilities with even small- and medium sized telescopes and instruments are important. The location of our telescopes, the Haleakala High Altitude Observatories at the summit of Mt. Haleakala is sufficiently high (3050m), and one of the best sites with clear sky, good seeing, and low humidity conditions.

On the summit, our group is now operating a 40 cm Schmidt-Cassegrain (T40) and 60 cm Cassegrain (T60) telescopes. T40 telescope is mainly observing faint atmospheric features such as Io torus, Mercury, and so on. It has uniquely provided long-term Io torus activities for more than ten years. T60 is now observing planetary atmospheres in visible and infrared range: MIRAHI is a newly developed mid-infrared heterodyne spectrometer. Vispec is a visible spectrometer with coronagraph to observe the Io's sulfur ion torus, Io's sodium cloud, and Enceladus torus. Further, the polarization imager DIPOL-2 is installed to measure the weak polarization of exoplanetary light. These activities are open to any possible collaborators. Our and guest investigators' observations are also linked to Mercury, Venus (Akatsuki), Mars (Mars Express, MAVEN) and Jupiter (Juno) missions.

In addition, we are carrying out a 1.8-m off-axis telescope project PLANETS at Haleakala, Hawaii. This project is managed by the PLANETS Foundation (www.planets.life) is an international collaboration of several institutes from Japan, USA, Germany, Brazil, and France. This off-axis optical system enables very low-stray light contamination and high-contrast in data, i.e., 'high dynamic range'. It will achieve unrivaled scientific capabilities on coronagraphy and polarimetry, aimed at detecting exoplanet reflected light and tenuous planetary exoatmospheres in the Solar system. It will have a Gregoian focus with a FOV of 6' (Fno=13) and a Coude focus with a FOV of 20'' (Fno=49). The main mirror is Clearceram Z-HS with a diameter of 1850 mm, which is now on the final polishing process. We have completed the telescope design and wind analysis of the mechanical support and tracking. The offaxis design is most efficiently contained in a 'splitring' mount. The mount is very stiff and has a first vibration mode above 50 Hz. The PLANETS telescope mechanical design should allow operation without a dome and external wind shielding up to windspeeds of 5m/s. The servo control on both axes will not require high gain and should result in image jitter of less than 0.4'' at frequencies less than 25 Hz during light to moderate winds (windspeeds less than15mi/hr). A bode plot of the proposed control system illustrates that unity gain is achieved beyond about 30 Hz.