

# Symposium on Planetary Science 2018 Program

2018.2.26

**Date:** February 27 – March 1, 2018  
**Location:** Aoba Science Hall, Science Complex C bldg. 2F, Tohoku University  
 (Poster session: Multi-purpose room, Science Complex C bldg. 2F)

**Organizer:** Planetary and Space Physics group, Tohoku University  
**Co-organizer:** Grant-in-Aid for Scientific Research on Innovative Areas "Aqua planetology"  
 Society of Geomagnetism and Earth, Planetary and Space Sciences (SGEPSS)  
 subcommittee on environment of airless bodies, moons, and spacecraft  
 Institute for Space-Earth Environmental Research, Nagoya University  
 "The 19th Symposium on Planetary Science"  
 Center for Planetary Science, Kobe University

**Information on oral presentation:**  
 25min: 20min talk + 5min discussion / 20min: 15min talk + 5min discussion  
 15min: 12min talk + 3min discussion

**Information on poster presentation:**  
 Board size: L180cm(available size L150cm) x W90cm

**Feb., 27 PM**

**13:00-14:45 Session by young researchers (Chair: T. Sakanoi and Y. Katoh (Tohoku Univ.))**

13:00-13:05		Opening address	T. Obara (Tohoku Univ.)
13:05-13:25	Invited	Hydrodynamic escape of stream atmospheres of terrestrial planets in the TRAPPIST-1 system, and its observability	K. Watanabe and K. Kuramoto (Hokkaido Univ.)
13:25-13:45	Invited	Long-term observation of planetary-scale waves in the Venus cloud top layer	M. Imai (Hokkaido Univ.), T. Kouyama (AIST), Y. Takahashi (Hokkaido Univ.), S. Watanabe (Hokkaido Inform. Univ.), A. Yamazaki (ISAS), M. Yamada (Chiba Inst. Tech.), M. Nakamura, T. Satoh (ISAS), T. Imamura (Univ. Tokyo), T. Nakaoka, M. Kawabata, M. Yamanaka and K. Kawabata (Hiroshima Univ.)
13:45-14:00	Invited	Study of the required Rayleigh number to sustain geodynamo with various inner core radius	Y. Nishida, Y. Katoh (Tohoku Univ.), H. Matsui (UC Davis) and A. Kumamoto (Tohoku Univ.)
14:00-14:15	Invited	Interaction between the thermosphere and the cloud level atmosphere of Venus inferred from simultaneous observations by HISAKI and Akatsuki	Y. Nara, T. Imamura, I. Yoshikawa, K. Yoshioka (Univ. Tokyo), K. Masunaga (Swedish Inst. Space Phys.), A. Yamazaki (ISAS), S. Watanabe (Hokkaido Inform. Univ.), M. Yamada (Chiba Inst. Tech.), Y. J. Lee (Univ. Tokyo), N. Terada (Tohoku Univ.) and K. Seki (Univ. Tokyo)
14:15-14:30	Invited	The effect of radiative cooling on the hydrodynamic escape of a Martian photo-atmosphere	T. Yoshida and K. Kuramoto (Hokkaido Univ.)
14:30-14:45	Invited	Research on source and escape processes of Io's atmosphere based on the Hisaki observations	R. Koga, F. Tsuchiya, M. Kagitani, T. Sakanoi (Tohoku Univ.), I. Yoshikawa, K. Yoshioka (Univ. Tokyo), G. Murakami, A. Yamazaki (ISAS) and T. Kimura (RIKEN)

14:45-15:00 break

**15:00-17:50 Planetary Meteorology (Chair: M. Takagi (Kyoto Sangyo Univ.) and H. Nakagawa (Tohoku Univ.))**

15:00-15:25	Keynote	Planetary meteorology: A Venusian perspective	M. Takagi (Kyoto Sangyo Univ.)
15:25-15:50	Keynote	Energy Budget and Climate of the Earth	T. Hayasaka (Tohoku Univ.)
15:50-16:10	Invited	Radiative transfer in planetary atmospheres	G. Hashimoto (Okayama Univ.)
16:10-16:30	Invited	Dynamics of surface flow on giant planets	Y. Sasaki and S. Takehiro (Kyoto Univ.)

16:30-16:45 break

16:45-17:05	Invited	Observation of Venus Cloud-top temperature by Akatsuki LIR	T. Fukuhara, M. Taguchi (Rikkyo Univ.), T. Imamura (Univ. Tokyo) and LIR team
17:05-17:30	Keynote	Data Assimilation: Current Situation and Future Perspective	N. Sugimoto (Keio Univ.)

17:30-17:50	Invited	Examining the superrotation maintenance mechanism in the Venusian atmosphere with Akatsuki	T. Horinouchi (Hokkaido Univ.), M. Takagi (Kyoto Sangyo Univ.), S. Murakami (ISAS), T. Kouyama (AIST), K. Ogohara (Shiga Pref. Univ.), S. Watanabe (Hokkaido Inform. Univ.), A. Yamazaki (ISAS), M. Yamada (Chiba Inst. Tech.), K. Nakajima (Kyushu Univ.), Y.-Y. Hayashi, H. Kashimura (Kobe Univ.), J. Peralta (ISAS), S. Limaye (UW-Madison), T. Imamura (Univ. Tokyo), T. Satoh and M. Nakamura (ISAS)
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**18:00-19:00 Poster Session - 1 (core-time for odd-numbered posters)**

**Feb. 28 AM**

**8:40-9:00 Planetary Meteorology (continued) (Chair: M. Takagi (Kyoto Sangyo Univ.) and H. Nakagawa (Tohoku Univ.))**

8:40-9:00	Invited	Ensemble Forecast Sensitivity to Observations in a Global Atmospheric Data Assimilation System	S. Kotsuki (RIKEN), K. Kurosawa (Kobe Univ.) and T. Miyoshi (RIKEN)
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**9:00-12:30 Giant Planets & Exoplanets (Chair: J. Kimura (Osaka Univ.) and H. Maezawa (Osaka Pref. Univ.))**

9:00-9:25	Keynote	Satellites in the outer Solar System: Current understanding and future prospects	J. Kimura (Osaka Univ.)
9:25-9:50	Keynote	Current Status and Future Perspective of Magnetospheres at Gas Giants	T. Kimura (RIKEN)
9:50-10:15	Keynote	Giant Planet Atmospheric Sciences: Review and Future Vision	K. M. Sayanagi (Hampton Univ.)
10:15-10:35	Invited	Deep convection in giant planets	Y. Sasaki and S. Takehiro (Kyoto Univ.)

10:35-10:50 break

10:50-11:10	Invited	Results from Cassini's Grand Finale (The RPWS observations)	M. Morooka, J.-E. Wahlund, L. Hadid (Swedish Inst. Space Phys., Uppsala), et al.
11:10-11:30	Invited	Exploration of internal structure of satellites by magnetic field observation	H. Shimizu (Univ. Tokyo)
11:30-11:50		Planetary Atmospheres Studied by Milli/Submillimeter-Wave Band Heterodyne Spectroscopy	H. Maezawa (Osaka Pref. Univ.)
11:50-12:10	Invited	Modeling and Numerical Experiments of Climates of Terrestrial Exoplanets	M. Ishiwatari (Hokkaido Univ.), Y. Kawai, K. Matsuda, Y. O. Takahashi (Kobe Univ.), K. Nakajima (Kyushu Univ.), G. L. Hashimoto (Okayama Univ.), K. Kuramoto (Hokkaido Univ.), K.-I. Sugiyama (Nat'l Inst. Tech., Matsue College), M. Odaka (Hokkaido Univ.) and Y.-Y. Hayashi (Kobe Univ.)
12:10-12:30	Invited	Ultraviolet Transit Observation of Exoplanetary Exospheres	G. Murakami (ISAS), S. Kameda (Rikkyo Univ.), M. Ikoma, N. Narita (Univ. Tokyo), K. Enya (ISAS), N. Terada (Tohoku Univ.), and T. Kodama (Univ. Tokyo)

**12:30-13:30 Lunch**

**Feb. 28 PM**

**13:30-14:30 Poster Session - 2 (core-time for even-numbered posters)**

**14:30-18:20 Aqua Planets (Chair: T. Usui (Tokyo Inst. Tech.) and N. Terada (Tohoku Univ.))**

14:30-14:35		Explanation of the aim of this session	Y. Sekine (Univ. Tokyo)
14:35-15:00	Keynote	Formation of Terrestrial Planets, and Origins of Their Atmospheres and Oceans	H. Genda (Tokyo Inst. Tech.)
15:00-15:25	Keynote	The review of degassing and evolutionary history of Mars	M. Koike (Univ. Tokyo)
15:25-15:45		A review of environmental and redox evolution of aquaplanets: Mars as an example	Y. Sekine (Univ. Tokyo)
15:45-16:05		A review of atmospheric escape from Mars and other terrestrial planets	N. Terada (Tohoku Univ.)

16:05-16:25	Invited	Modeling the evolution of Martian atmosphere: constraints from elemental and isotopic compositions	H. Kurokawa (Tokyo Inst. Tech.), K. Kurosawa (Chiba Inst. Tech.) and T. Usui (Tokyo Inst. Tech.)
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16:25-16:40 break

16:40-17:00	Invited	Development of D/H absorption cell and future applications for planetary science	K. Yoshioka, M. Kuwabara (Univ. Tokyo), M. Taguchi (Rikkyo Univ.), T. Kawahara (Shinshu Univ.), S. Kameda (Rikkyo Univ.) and I. Yoshikawa (Univ. Tokyo)
17:00-17:20	Invited	Current understanding of water and atmospheric escape from Mars based on MAVEN observations	K. Seki (Univ. Tokyo)
17:20-17:40	Invited	Review of the water cycle observations in the Martian atmosphere	S. Aoki (IASB-BIRA) and H. Nakagawa (Tohoku Univ.)
17:40-18:00		History and Inventory of Water on Mars	T. Usui (Tokyo Inst. Tech.)
18:00-18:20		Radar sounder for exploration of ices below the surface of the Mars and the Moon	A. Kumamoto (Tohoku Univ.), T. Usui, H. Kurokawa, R. Noguchi (Tokyo Inst. Tech.), S. Azuma (Kyushu Univ.), K. Ishiyama (ISAS), F. Tsuchiya, N. Terada (Tohoku Univ.), H. Miyamoto (Univ. Tokyo), T. Nishibori, T. Iwata (ISAS), M. Ozaki (Kanazawa Univ.), K. Seki (Univ. Tokyo), A. Yamazaki, M. Ohtake (ISAS)

18:20-18:35 break

**18:35-19:15 Future Visions (Chair: N. Terada (Tohoku Univ.))**

18:35-18:45		On the space science program in the coming 20 years	T. Imamura (Univ. Tokyo)
18:45-18:50		Report of the revision of the answers for RFI in the Japanese Society for Planetary Sciences	T. Usui (Tokyo Inst. Tech.)
18:50-18:55		Report of the revision of the answers for RFI in the STP field	N. Terada (Tohoku Univ.)
18:55-19:05		Linkage with Decadal Survey of USA	K. M. Sayanagi (Hampton Univ.)
19:05-19:15		Discussion	

**19:30-21:00 Banquet@ Restaurant AOSIS**

**March 1 AM**

**9:00-12:30 Moon and Earth (Chair: N. Namiki (NAO) and M. N. Nishino (Nagoya Univ.))**

9:00-9:25	Keynote	New era of Japanese lunar exploration	J. Haruyama (ISAS)
9:25-9:45	Invited	Lunar scientific exploration programmes in Europe	Y. Futaana (Swedish Inst. Space Phys.)
9:45-10:05	Invited	Water on Moon	K. Hashizume (Ibaraki Univ.)
10:05-10:25		Behavior of proton and hydrogen at the lunar surface	M. N. Nishino (Nagoya Univ.), Y. Saito (ISAS), S. Yokota (Osaka Univ.), Y. Futaana (Swedish Inst. Space Phys.) and Y. Miyake (Kobe Univ.)
10:25-10:45	Invited	Inner Structure of the Moon: Shallow Structure Inferred from Seismic Observation	T. Kawamura (NAO), K. Onodera, Y. Ishihara (ISAS), K. Ogawa (Kobe Univ.), T. Tsuji (Kyushu Univ.), T. Kobayashi (Ritsumeikan Univ.), A. Araya (Univ. Tokyo), Y. Nagata (Kyushu Univ.) and S. Tanaka (ISAS)

10:45-11:00 break

11:00-11:20	Invited	Lunar space weathering	T. Noguchi (Kyushu Univ.)
11:20-11:40		Space Weather in the vicinity of Moon and Mars	T. Obara (Tohoku Univ.)
11:40-12:00	Invited	Heliospheric Environment Research in PSTEP	D. Shiota (NICT, Nagoya Univ.)
12:00-12:25	Keynote	Future directions of magnetospheric physics	Y. Miyoshi (Nagoya Univ.)
12:25-12:30		Final words	T. Obara (Tohoku Univ.)

Posters (Core-time: Odd-numbered posters in 18:00-19:00 on Feb. 27, Even-numbered posters in 13:30-14:30 on Feb. 28)

P1(+oral)	Study of the required Rayleigh number to sustain geodynamo with various inner core radius	Y. Nishida, Y. Katoh (Tohoku Univ.), H. Matsui (UC Davis) and A. Kumamoto (Tohoku Univ.)
P2	Vacancy-rich interior model of the Moon and Mars by larger blocks mixing	Y. Miura (Yamaguchi Univ.)
P3	Mission to Mercury BepiColombo: Updated Status and Science Goals	G. Murakami, H. Hayakawa, M. Fujimoto (ISAS) and BepiColombo Science Working Group
P4	Particle Simulations of Space Plasma Interactions with Solar-System Small Solid Bodies	Y. Miyake, Y. Funaki (Kobe Univ.), M. N. Nishino (Nagoya Univ.) and H. Usui (Kobe Univ.)
P5	Sodium Ion Dynamics in the Magnetospheric Flanks of Mercury	S. Aizawa (Tohoku Univ., LPP-CNRS-UPMC), D. Delcourt (LPC2E-CNRS) and N. Terada (Tohoku Univ.)
P6	Full PIC simulation on the interaction between a weakly magnetized body and the solar wind	S. Oki, H. Usui (Kobe Univ.), N. Terada (Tohoku Univ.), K. Seki (Univ. Tokyo), Y. Miyake (Kobe Univ.), M. Yagi (RIKEN)
P7	Simulation Development of Planetary Magnetosphere toward Exascale Computing Era	K. Fukazawa (Kyoto Univ.), Y. Kato (Tohoku Univ.), Y. Miyake (Kobe Univ.) and T. Nanri (Kyushu Univ.)
P8	Does the Perpendicular Shock Reformation Really Exist in Space Plasma?	T. Umeda and Y. Daicho (Nagoya Univ.)
P9	Spatial and temporal variations of cloud opacity as inferred from Akatsuki/IR2 night-side images of Venus	T. Satoh (ISAS, SOKENDAI), T. M. Sato (ISAS), G. L. Hashimoto (Okayama Univ.), C. W. Vun (SOKENDAI) and T. Nakakushi (Wakayama Univ.)
P10	Cloud top altimetry with Akatsuki/IR2 dayside images	T. M. Sato, T. Satoh (ISAS), Y. J. Lee (Univ. Tokyo), K. Ogohara (Shiga Pref. Univ.), S. Murakami (ISAS) and Y. Kasaba (Tohoku Univ.)
P11(+oral)	Long-term observation of planetary-scale waves in the Venus cloud top layer	M. Imai (Hokkaido Univ.), T. Kouyama (AIST), Y. Takahashi (Hokkaido Univ.), S. Watanabe (Hokkaido Inform. Univ.), A. Yamazaki (ISAS), M. Yamada (Chiba Inst. Tech.), M. Nakamura, T. Satoh (ISAS), T. Imamura (Univ. Tokyo), T. Nakaoka, M. Kawabata, M. Yamanaka and K. Kawabata (Hiroshima Univ.)
P12	Stationary gravity waves at Venusian cloud top observed by Akatsuki UV Imager	T. Kitahara, T. Imamura (Univ. Tokyo), A. Yamazaki (ISAS), M. Yamada (Chiba Inst. Tech.), S. Watanabe (Hokkaido Inform. Univ.), T. Sato (ISAS), M. Taguchi, T. Fukuhara (Rikkyo Univ.), T. Kouyama (AIST) and L2/L3 team
P13(+oral)	Interaction between the thermosphere and the cloud level atmosphere of Venus inferred from simultaneous observations by HISAKI and Akatsuki	Y. Nara, T. Imamura, I. Yoshikawa, K. Yoshioka (Univ. Tokyo), K. Masunaga (Swedish Inst. Space Phys.), A. Yamazaki (ISAS), S. Watanabe (Hokkaido Inform. Univ.), M. Yamada (Chiba Inst. Tech.), Y. J. Lee (Univ. Tokyo), N. Terada (Tohoku Univ.) and K. Seki (Univ. Tokyo)
P14	Vertical Propagation of the Large Stationary Gravity Waves in the Venus Atmosphere	T. Yamada (Rikkyo Univ.), T. Imamura (Univ. Tokyo), T. Fukuhara and M. Taguchi (Rikkyo Univ.)
P15	Multiwavelength analysis of Venusian cloud by Correlation Coefficient Mapping	M. Narita and T. Imamura (Univ. Tokyo)
P16	Retrieval method of temperature and wind velocity in Venusian mesosphere by mid-infrared heterodyne spectroscopy	K. Takami, H. Nakagawa (Tohoku Univ.), H. Sagawa (Kyoto Sangyou Univ.), P. Krause (Cologne Univ.), I. Murata, Y. Kasaba (Tohoku Univ.) and S. Aoki (IASB-BIRA)

P17	Development of radiative transfer scheme interactive to the cloud time-variation on Venus General Circulation Model	T. Akiba (Tohoku Univ.), T. Kuroda (Tohoku Univ., NICT), K. Ikeda (NIES), M. Takahashi (Univ. Tokyo), Y. Kasaba and N. Terada (Tohoku Univ.)
P18	The effect of atmospheric gravity waves on the water upward transport on Mars	H. Nakagawa, N. Terada (Tohoku Univ.), S. Aoki ((IASB-BIRA), T. Kuroda (Tohoku Univ., NICT) and Y. Kasaba (Tohoku Univ.)
P19(+oral)	Hydrodynamic escape of stream atmospheres of terrestrial planets in the TRAPPIST-1 system, and its observability	K. Watanabe and K. Kuramoto (Hokkaido Univ.)
P20	A coupled atmosphere–hydrosphere global climate model of early Mars: “cool and wet” scenario for the formation of water channels	A. Kamada (Tohoku Univ.), T. Kuroda (Tohoku Univ., NICT), Y. Kasaba, N. Terada, H. Nakagawa and K. Toriumi (Tohoku Univ.)
P21(+oral)	The effect of radiative cooling on the hydrodynamic escape of a Martian photo-atmosphere	T. Yoshida and K. Kuramoto (Hokkaido Univ.)
P22	Effects of a weak intrinsic magnetic field on the atmospheric escape from Mars	S. Sakai, K. Seki (Univ. Tokyo), N. Terada (Tohoku Univ.), H. Shinagawa (NICT), T. Tanaka (NICT, Kyushu Univ.) and Y. Ebihara (Kyoto Univ.)
P23	Seasonal and latitudinal variations of the Martian homopause derived from MAVEN/IUVS observations	N. Yoshida, H. Nakagawa and N. Terada (Tohoku Univ.)
P24	Atmospheric Hydrogen Escape on Mars: Role of High-Altitude Water and Transport Processes in a Photochemical Model	A. Hubig, N. Terada, H. Nakagawa, and Y. Kasaba (Tohoku Univ.)
P25	Time variation of Jovian vortex detected using T60 at Heleakala	T. Asada (Kyushu Internat'l Univ.), T. Sakanoi and M. Kagitani (Tohoku Univ.)
P26	IR Pulsating Aurora in Jupiter's Polar Region Observed with SUBARU Adaptive Optic System	H. Watanabe, H. Kita, T. Sakanoi, M. Kagitani, Y. Kasaba (Tohoku Univ.) and C. Tao (NICT)
P27	Characteristics of solar wind control on Jovian UV auroral activity obtained from Hisaki EXCEED and ground-based observations	H. Kita (Tohoku Univ.), T. Kimura (RIKEN), C. Tao (NICT), F. Tsuchiya (Tohoku Univ.), A. Yamazaki, G. Murakami (ISAS), K. Yoshioka (Univ. Tokyo), R. W. Ebert (SwRI), R. J. Wilson (LASP), P. W. Valek (SwRI), G. Clark (JHU/APL), T. Sakanoi, Y. Kasaba (Tohoku Univ.), I. Yoshikawa (Univ. Tokyo), and M. Fujimoto (ISAS)
P28	Jupiter's aurora observed by Hisaki: intrinsic periodic variation	C. Tao (NICT), T. Kimura (RIKEN), F. Tsuchiya (Tohoku Univ.), G. Murakami, A. Yamazaki (ISAS), K. Yoshioka (Univ. Tokyo), H. Kita (Tohoku Univ.), I. Yoshikawa (Univ. Tokyo), Y. Kasaba (Tohoku Univ.) and M. Fujimoto (ISAS)
P29	Study of the Jovian Magnetosphere-Ionosphere coupling using an ionospheric potential solver: Contributions of H <sup>+</sup> and meteoric ions to ionospheric electron density	K. Terada (Tohoku Univ.), C. Tao (NICT), N. Terada, Y. Kasaba, H. Kita (Tohoku Univ.), A. Nakamizo (NICT), A. Yoshikawa (Kyushu Univ.), S. Ohtani (JHU/APL), F. Tsuchiya, M. Kagitani, T. Sakanoi (Tohoku Univ.), G. Murakami (ISAS), K. Yoshioka (Univ. Tokyo), T. Kimura (RIKEN), A. Yamazaki (ISAS), and I. Yoshikawa (Univ. Tokyo)
P30	The Jovian Magnetospheric Plasma Circulation controlled by the Satellite Io	F. Tsuchiya (Tohoku Univ.) and HISAKI Science team
P31(+oral)	Research on source and escape processes of Io's atmosphere based on the Hisaki observations	R. Koga, F. Tsuchiya, M. Kagitani, T. Sakanoi (Tohoku Univ.), I. Yoshikawa, K. Yoshioka (Univ. Tokyo), G. Murakami, A. Yamazaki (ISAS) and T. Kimura (RIKEN)
P32	Time variation in composition and temperature of plasmas in the Io plasma torus obtained by the EUV spectroscopic observations with Hisaki/EXCEED	R. Hikida, K. Yoshioka (Univ. Tokyo), G. Murakami (ISAS), T. Kimura (RIKEN), F. Tsuchiya (Tohoku Univ.) and I. Yoshikawa (Univ. Tokyo)

P33	Longitudinal variations of the sulfur ions in the Io plasma torus observed by the HISAKI/EXCEED	R. Arakawa, H. Misawa, F. Tsuchiya, M. Kagitani (Tohoku Univ.), K. Yoshioka, I. Yoshikawa (Univ. Tokyo), T. Kimura (RIKEN), G. Murakami and A. Yamazaki (ISAS)
P34	Identification of Jupiter's hectometric radiation associated with reconnection in the magnetotail	H. Misawa, F. Tsuchiya and T. Mizuguchi (Tohoku Univ.)
P35	Long-term variation of the North–South asymmetry in the intensity of Saturn Kilometric Radiation (SKR) in 2004-2017	Y. Nakamura, Y. Kasaba (Tohoku Univ.), T. Kimura (RIKEN), L. Lamy, B. Cecconi (LESIA/CNRS), G. Fischer (Austrian Academy Sci.), C. Tao (NICT) and A. Morioka (Tohoku Univ.)
P36	Numerical simulation of energetic electron (500eV-50keV) elastic collision by neutral H <sub>2</sub> O around Enceladus	H. Tadokoro (Musashino Univ.) and Y. Katoh (Tohoku Univ.)
P37	Planetary observation with Pirka telescope	S. Takagi, Y. Takahashi and M. Sato(Hokkaido Univ.)
P38	Planetary and exoplanetary atmospheric science revealed by the Haleakala telescopes and future PLANTES telescope	T. Sakanoi (Tohoku Univ., PLANETS foundation), M. Kagitani, H. Nakagawa, T. Obara Y. Kasaba, S. Okano (Tohoku Univ.), J. Kuhn(Univ. Hawaii, PLANETS foundation), S. Berdyugina (Kiepenhener Inst., PLANETS foundation), M. Emilio(Univ. Estadual de Ponta Grossa, PLANETS foundation), M. Akiyama (Tohoku Univ.), Gill Moretto(CNRS)
P39	Observation of Io plasma torus using a new coronagraph	M. Kagitani (Tohoku Univ.)