R009-06
Zoom meeting D ：11/1 AM2 (10:45-12:30)
10:45〜11:00

太陽系天体の宇宙風化再現実験に向けた汎用プラズマ照射装置の開発・評価の現状

#木村 智樹[1)], 大槻 美沙子[1)], 北野 智大[1)], 星野 亮[1)], 仲内 悠祐[2)], 木村 淳[3)], 村上 豪[2)], 寺田 直樹[4)], 臼井 英之[5)], 西野 真木[6)], 横田 勝一郎[7)], 三宅 洋平[8)]
([1]Tokyo University of Science,[2]ISAS/JAXA,[3]阪大・理・宇宙地球,[4]東北大・理・地物,[5]神戸大・システム情報,[6]JAXA,[7]大阪大,[8]神戸大学

Generic Plasma Irradiation System for Modeling of Space Weathering at Solar System Bodies: Current Status of Commissioning

#Tomoki Kimura[1)],Ostuki Misako[1)],Tomohiro Kitano[1)],Ryo Hoshino[1)],Yusuke Nakauchi[2)],Jun Kimura[3)],Go Murakami[2)],Naoki Terada[4)],Hideyuki Usui[5)],Masaki N Nishino[6)],Shoichiro Yokota[7)],Yohei Miyake[8)]
([1]Tokyo University of Science,[2]ISAS/JAXA,[3]Earth & Space Science, Osaka Univ.,[4]Dept. Geophys., Grad. Sch. Sci., Tohoku Univ.,[5]System informatics, Kobe Univ,[6]JAXA,[7]Osaka Univ.,[8]Kobe Univ.

Surface and atmosphere of solar system bodies are continuously irradiated with the space plasma, solar photon, cosmic ray, and micrometeorite, which are responsible for long-term alteration of the planetary surface and atmospheric materials on timescales up to the geological scale (Giga years). This is known as the 'space weathering'. The space weathering accompanies physical and chemical changes in the materials (see e.g., Johnson et al., in Jupiter textbook, 2004). For example, organic compounds like tholins are likely created and destroyed via the space weathering at Titan's upper atmosphere and icy moon's surfaces at Jupiter and Saturn (e.g., Waite et al., 2007; Lopez-Puertas et al. 2013). This suggests that the newly created/destroyed compounds are accumulated on the surface over the geological time scale. These are likely essential energy and material sources for the surface, atmosphere, and possibly interior. However, the physical and chemical changes by the geological timescale weathering is still not unveiled because they have not been exactly reproduced by any experimental methods. Here we develop a new laboratory experiment system that reproduces the geological timescale weathering driven by the space plasma irradiation. We successfully completed the irradiation system with the world-highest fluence (<1e+22 particles/cm2) of ions and electrons at 1-30 keV. This corresponds to e.g., the irradiation time of 100s Mega years at Jupiter's icy moons. In this talk, we report the current status of irradiation system commissioning and the upcoming experiment plans.