[연1-P01] Excitation Processes of the CH4 Aurorae of Jupiter and Saturn

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Recently, an analysis of 3-micron spectra of CH4 line emission from our Gemini/GNIRS observations of Jupiter's polar regions yielded an unexpected result: The homopause (~1 microbar pressure level) located directly above the long-lasting 8-micron CH4 north-polar hot spot (Great 8-micron Hot Spot: GHS) is cool compared with the temperatures of nearby auroral regions (Kim et al. 2017). Most of the 8-micron emission of the GHS originates from

CH4 at the ~1 mbar level (i.e., deeper in the stratosphere, where cooling time is several years), much longer than at the altitude of the homopause. We propose a mechanism to explain the temperature difference: locally-fixed and transient, but energetic auroral particles, which can penetrate to the 1 mbar level and deposit energy there creating and maintaining the GHS. For Saturn, thus far we have not detected distinctive 8-micron nor 3-micron CH4 hot spots in the polar regions. We will present a possible implication for this difference between Jupiter and Saturn. [Kim, S.J. et al., Icarus, 281, 281-285, 2017.]

[연1-P02] Experimental Apparatus for Opposition Effect at Seoul National University

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The Opposition Effect (OE) is an enhancement of the brightness of a reflecting light as the phase angle (the Sun-target-observer angle) approaches zero. The mechanisms have been studied both theoretically and experimentally and nowadays recognized that there are two major mechanisms, namely, coherent backscattering OE (CBOE) and shadow hiding OE (SHOE). From data analyses of an S-type asteroid Itokawa taken with the Hayabusa spacecraft onboard camera, it is suggested that the CBOE would be dominant at phase angle smaller than ~ 1.4 deg, while SHOE dominates at larger phase angles (M. Lee & M. Ishiguro, under review). The study on the physical parameters which affect the OE, such as size and composition, will lead us to find a way to disentangle each of them from observation. The experiments in lab, however, faces two major difficulties: (a) the detector blocks the incident light if phase angle is nearly zero and (b) incident and emission angles must be controlled with high angular resolution to prevent blurring of OEs at different phase angles in one measurement. In this presentation, we introduce a new apparatus which has been installed at Seoul National University to investigate the OE in our lab, and summarize the initial results. It will be a valuable starting point to establish infrastructure in Korea, and will shed light on the investigation of OE physics using laboratory simulants.

[연1-P03] Simulations of the Lunar Exosphere: Effects of Multiple Sodium Sources on Coma and Tail

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Since there are two-different observational constraints for the lunar exosphere data, it is interesting to find the best exospheric model that can account for the observed characteristics of the lunar coma and tail simultaneously (Lee & Kim, 2017).The characteristics of the lunar exosphere can be constrained by comparing simulated models with observational data of the coma and tail. In this work, considering effects of triple sodium sources (two dayside sources: a low- and a high-velocity component; and an Isotropic source component), we present time-dependent simulations showing initial conditions around the lunar coma and the final stage of the lunar tail. Based on an updated 3-D lunar exosphere model (Lee & Kim, 2017), we are presenting the simulated images of the lunar sodium coma and its correlation with lunar tail's physical parameters.

[Lee, D.W. & Kim, S.J. 2017. BAAS, 49, 417.18]

[연1-P04] UAV를 이용한 스발바르 걸리 지형의 측량과 화성 걸리와의 비교
Terrain surveying for gully in Svalbard using UAV and comparison with Mars

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북극 스발바르의 사면 지형에는 걸리가 발달되어 있다. 이러한 걸리는, 그 성인에는 여러 의견이 있으나, 화성에도 중고위도를 중심으로 다수 분포한다. 화성의 걸리는 2000년대에 들어 비로소 본격적으로 규명되고 있으나, 지