

理工工学コース・学長重点化経費「量子操作による光ナノ計測・情報通信の革新的イノベーション研究拠点」共催 談話会

## Snow Lines in Protoplanetary Disks and the Delivery of Volatiles to Terrestrial Planet Surfaces

日時：2018年6月22日（金） 10:30～11:30

場所：工学研究院総合研究棟W202

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**Abstract:** Compared to the Sun and to the gas+dust composition of the interstellar medium from which the solar system formed, the Carbon and Nitrogen content of the bulk silicate Earth (mantle+hydrosphere+atmosphere) is reduced by several orders of magnitude, relative to Silicon. Evidence from primitive bodies as a function of distance from the Sun suggests that at least part of this depletion must occur early in the process of planetesimal assembly. With pioneering infrared and (sub)mm observations such as those enabled by ground-based 8-10m class telescopes (and in future the James Webb Space Telescope) and the Atacama Large Millimeter Array (ALMA), we can now examine the principal CNO-reservoirs of gas rich disks as a function position within the disk and evolutionary state. Key to these studies is the concept of condensation fronts, or 'snow lines,' in disks - locations at which key volatiles such as water, carbon monoxide, or nitrogen first condense from the gas. This talk will review the observational characterization of snow lines in protoplanetary disks via both gas and dust tracers, especially recent ALMA observations, and highlight the laboratory astrophysics studies and theoretical investigations that are needed to tie the observational results to the delivery of volatiles to planetary surfaces in the habitable zones around Sun-like stars.

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