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Water on Distant Worlds: Do H₂-rich atmospheres form oceans in small exoplanets?

Time: 15:00-15:45, 11 June (Tuesday), Shanghai time

Venue: N600 (TDLI)

Host: Masahiro Ogihara

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Meeting ID: 102676348

Abstract:

It has been suggested that some super-Earths and sub-Neptunes may harbor water oceans formed through oxidation reactions between their initial hydrogen-rich primordial atmosphere and magma oceans. Using Earth as a reference case, this suggestion is investigated through a comprehensive atmosphere-magma ocean model. If this process is indeed viable, it could revolutionize our understanding of planetary evolution and habitability. The existence of such water-rich worlds would profoundly expand the cosmic landscape for potential life, reshaping our search for extraterrestrial oases in the vast expanse of the universe.

Biography:

I am a theoretical exoplanetologist specializing in super-Earths, sub-Neptunes, and their interactions with their host stars. My research philosophy centers on connecting atmospheric, geologic, and astrophysical principles in the context of the available observational data. Some of the overarching questions I concern with are: What does the atmospheric composition of an exoplanet tell you about its interior?, What are the interior structures and compositions of super-Earths and sub-Neptunes?, and How does high-energy stellar irradiation influence the evolution of orbiting exoplanets?