Contribution ID: **45** Type: **not specified**

Impact of Dynamical Tides on Planetary System Stability: Evolution of Multi-Planet Systems

Friday 11 July 2025 15:15 (15 minutes)

Evolution models of planetary systems find that resonant chains of planets often arise from their formation within protoplanetary disks. However, the occurrence of observed resonant chains, such as the notable TRAPPIST-1 system, is relatively low. This suggests that most of these chains become destabilized after the dissipation of the protoplanetary disk. Stellar tides, particularly the wavelike dynamical tide, have been proposed as potential contributors to the destabilization of resonant chains. The dissipation of the dynamical tide, due to the frequency-dependent tidal excitation of stellar oscillation eigenmodes, potentially accelerates the migration of close-in planets and disrupts the fragile stability of resonant chains. In this study, we investigate the influence of the stellar dynamical tide on multi-planet systems, accounting for its dissipation within the N-body code Posidonius. Notably, this research represents the first exploration of the impact of frequency-dependent dynamical tides on multi-planet systems.

Presenter: KWOK, Leon Ka-Wang (Geneva Observatory)

Session Classification: Stability and dynamics of planetary systems