[발표취소] Stable 5-body orbits in the Kepler-47 exoplanetary system: Predicting stable orbits of a possible third circumbinary planet

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Kepler-47 is the first multi-body circumbinary planetary system detected by the Kepler space telescope. The two planets were detected by the transit method. In the discovery paper the authors report about the presence of an additional transit-like signal in their dataset which cannot be explained by a four-body (binary + 2 planets) system. Therefore it is likely that the unexplained signal could be due to a third planet. In this talk I will present recent results from a dynamical investigation of the five-body system (binary + 3 planets). We have applied the MEGNO technique to detect regions of quasi- or near quasi-periodic orbits of a hypothetical third planet. Quasi-periodic regions exists for a third planet and the long-term stability has been tested. Although the existence of a third planet is most likely to be confirmed from transit photometry we calculate transit-timing variation (TTV) signals due to the third planet which also can be used to infer its presence.

[구ST-02] Effect of rotation on the evolution of Population III protostars

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To figure out the effect of rotation on the final mass of Pop III stars, 1D stellar evolution simulations of the evolution of mass-accreting protostars are performed, with zero metalicity and high constant mass accretion rates. The protostar reaches the Keplerian rotation very soon after the onset of mass accretion, but it may continue mass accretion via angular momentum transport induced by viscous stress or magnetic field. However, as the accreting star evolves, the envelope expands rapidly when the total mass reaches 5~6$M_{\odot}$ and the corresponding Eddington factor sharply increases. Strong radiative pressure with rotation imposes different criteria for breakup at the stellar surface, and the so-called 'critical rotation ($\Omega\Gamma$-limit)' is reached. As a result mass accretion rate has to be significantly lowered. This implies that characteristic masses of Pop III stars would be significantly lowered than the previous expectation.