

Detection and Dynamics of Exoplanets (DDE): Interplay between theory and observations



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A decade of transit photometry for K2-19: breaking the mass-eccentricity degeneracy

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K2-19 hosts a pair of Neptune-like planets inside the 3:2 resonance, with previously reported eccentricities of 0.2 raising questions about conditions at the time of formation. Moreover, in spite of the system's resonant status both resonance angles circulate at these high eccentricities, contrary to common understanding. Tripling the observing baseline reveals the full resonant evolution of the TTVs and elements, and constrains the eccentricity posterior to median values of 0.04 and 0.07 for the inner and outer planets. Planet masses are constrained to within 4% and are completely uncorrelated with the eccentricities. I will present these results as well as an intuitive new formalism for studying two-planet systems near a first-order commensurability, using it to describe the circumstances under which masses and eccentricities are decoupled in systems exhibiting transit timing variations, as well as to show that transit *duration* variations cannot be used to measure the true eccentricities.

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