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Title: Orbital Stability Analysis of GJ 581

Type: Poster

Session: Earth Analogues and Super-Earths

Abstract: N-body models show that the 4 planet model of the GJ 581 system is made unstable by the eccentricity of the innermost planet E, but can be brought into stability by decreasing the value of the eccentricity of planet E below 0.2. A reduced chi-squared analysis of Keplerian models of this system show no significant difference in the ability of a 4 planet model with eccentricity below 0.4 and above 0.2 to fit the radial velocity data using an F-test with an alpha-level of .05. Additionally, Monte-Carlo Markov Chain analysis of this system will be presented both to determine the likelihood function of the eccentricity of planet E, and the likelihood functions of all system parameters under the condition of the eccentricity of E being less than 0.2.