

Investigation of Planetary Properties in Multiplanetary Systems in Absence/Presence of Jupiter-Sized Planets

A thesis proposal by

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Since 1995, researchers have discovered more than 5000 exoplanets and characterized the types of planets that exist in the Universe. Space telescopes like Kepler and Transiting Exoplanet Survey Satellite (TESS) have been crucial in this task. Efforts are still being made to use this data from TESS and Kepler to discover, characterize and understand these exoplanets. Several trends in exoplanets have shown how different these exoplanets are from our solar system in terms of architecture and types of planets. Our current formation and evolution theories focus on explaining all the features of our own Solar System, but efforts have been made to use these theories to explain some of the exoplanet trends. Jupiter has a major role in these theories, being the most massive object after the Sun in our Solar system. It has a substantial amount of gravitational effect on the rest of the objects in our Solar system, like some of these theories describe. However, we don't understand completely how the exoplanets systems form and evolve and what role Jupiter-sized planets would have in those systems, because existence of a Jupiter sized planet is not necessary for a planet system to form, but it would have effect on the architecture of the system. This project is aimed at looking for influences of Jupiter-sized planets on the other planets in planetary systems and how would it affect habitability conditions in those systems. Data from TESS and Kepler can be used for this investigation, along with ground-based observations to further the results.