

Assessing Exomoon Detectability in TESS Light Curves: A Case Study of TOI-2010

Over the past decades, photometric methods have led to the discoveries of thousands of exoplanets. While similar techniques have been used to search for exomoons, none have been confirmed. We aim to survey potential exomoons using Transiting Exoplanet Survey Satellite (TESS) data and present a case study to illustrate our methodology. Based on previously proposed systems with exomoon candidates, we focus on systems with long orbital periods (>100 days). We study the TOI-2010 system, which hosts a Neptune-sized planet with a 141-day orbit. Considering reasonable sizes of exomoons on stable orbits, we generate synthetic light curves of one planet plus one moon cases. The synthetic light curves adopt the properties and noises of TESS light curves of TOI-2010. We then employ a standard procedure to examine exomoon detectabilities from synthetic light curves. With a huge amount of synthetic light curves derived from various exomoons, the detectability of exomoons from TESS data could be determined quantitatively.

Section

Solar System/Exoplanets

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