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Abstract: Co-authors: David Nesvorny, Joel Hartman, Gaspar Bakos, Lars Buchhave, Allan Schmitt

During her four years of pioneering discoveries, Kepler has revealed dozens of interacting multi-planet systems, non-transiting worlds revealed by their perturbations on known transiters, hundreds of Earth and Super-Earth sized planets and even circumbinary exoplanets. Dynamically interacting, densely populated and even hierarchical systems of small rocky worlds are evidently common and so one might reasonably ask whether Kepler can achieve the formidable task of detecting of an extrasolar moon. The Hunt for Exomoons with Kepler (HEK) project has been analyzing Kepler planetary candidates for evidence of exomoons for over one year now, with centuries worth of computation time devoted to this challenge. Combining a photodynamical model for transiting planet-moon systems with Bayesian multimodal nested sampling, we seek not only to identify putative exomoons but also derive robust upper limits on their masses when no evidence for such an object is found. In this way, the HEK project will deliver the occurrence rate of large exomoons around viable planet hosts - a frequency we dub “eta-sub-moon”. In this talk, I will review the approach we have developed to tackle this unique observational challenge, discuss the current results from our project and finish with future prospects with both Kepler and planned missions.