

## **SP25.12: Searching for companion planets in hot Jupiter systems**

### **Overview**

The origin of hot Jupiters (giant planets on very short-period orbits around their host stars) remains an open question in exoplanet science. These objects are found around ~1% of stars, but likely could not have formed where they are observed. Instead, they may have migrated to their current orbits from formation locations much further from their host stars. This migration may require the presence of companion planets in these systems. In this project, an intern will use recent radial velocity data from the TESS-Keck Survey (TKS) to search for signs of these companion planets in hot and warm Jupiter systems. The intern will collate and analyze the available data from this survey, look for trends indicative of additional planets, and place their findings in the larger context of hot Jupiter migration. The intern's goal will be to learn how the scientific method manifests in astronomy research and, hopefully, meaningfully contribute to the growing body of evidence surrounding the migration of hot Jupiters.

### **What the student will DO and LEARN**

Over the course of this internship, the intern will learn to use python (or some other coding language) to analyze data, model planetary orbits, create scientific plots, and calculate statistical likelihoods. These skills will be transferable to future scientific research endeavors or STEM careers as they provide practice with critical, quantitative thinking, as well as practical data management techniques. Moreover, the intern will learn about how their work falls within the larger context of exoplanet science by reading related papers and having discussions with local and visiting astronomy faculty. By the end of the internship, the intern will be able to partake in modern scientific research techniques and communicate the extent and context of their science to their peers.

### **Additional benefits**

This internship will be beneficial to the student both academically and professionally. It will augment their STEM education with additional learning of both scientific methods and science content. It will also improve the intern's professional resumé, which will help them earn future research internships, scholarships, and jobs.

### **Time commitment**

6 hrs/week for 15 weeks