

Calculating $V\sin(i)$ of Planet-hosting Young Stars

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Constraining the spin-orbit alignment of close-in planets in young systems can provide insight on their migratory history. We can combine $V\sin(i)$ with measurements of the stellar rotation period and radius to determine the star's orbital inclination, which we can compare to that of the planet as determined from the transit. $V\sin(i)$ is determined from the rotational broadening on the star's spectral lines, so it is ideal to work with young, fast-rotating stars where broadening is more easily measured. We measure $V\sin(i)$ of seven planet-hosting stars within the Praesepe star cluster by using high-resolution spectra from the Immersion Grating Infrared Spectrometer (IGRINS) in the K and H band. We develop a program to fit the model onto each order of the spectra using a set of optimized parameters which takes into account complicating factors such as instrumental broadening, stellar motion, and atmospheric turbulence. For our final result, we find that all planet hosts are spin-orbit aligned within measurement errors.