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Abstract:
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Kepler planet candidates around rapidly rotating stars are not amenable to follow-up using radial velocity observations, as these stars' broad spectral lines prevent precision radial velocity measurements. An alternative method of validating these candidates is to use Doppler tomography. This technique relies upon the Rossiter-McLaughlin effect, where the planetary disk transiting across a rotating star causes a perturbation in the stellar spectral line shape. In Doppler tomography, we spectroscopically resolve this line profile distortion. The detection of the movement of the line profile perturbation during the transit is an effective discriminant between bona fide planets and false positives involving eclipsing binaries. In addition, it provides information on the spin-orbit misalignment of the planet, a powerful statistical probe of planet migration. Doppler tomography is particularly suited to observations of planets around massive, rapidly rotating stars, currently a poorly explored region of parameter space. We present our detection of the transit of Kepler-13 b, as well as other recent results. We also highlight the potential of Doppler tomography for validating planet candidates from the upcoming TESS mission.