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Abstract: Co-author: Marc Pinsonneault

Stellar rotation is a strong function of age and evolutionary state, and varies by orders of magnitude across the Hertzsprung-Russell diagram. We have shown that the dichotomy that exists between hot ($T > 6250$ K), rapidly rotating stars, and cool, slowly rotating stars on the main sequence persists on the subgiant branch, where rotation rate increases with stellar mass. As such, measurements of stellar rotation, such as those extracted from the spot modulation in Kepler light curves, can be used as a means to constrain underlying stellar parameters such as age, mass, and the radius (on the subgiant branch), particularly in regions of the HR diagram where these quantities are difficult to infer. We provide examples in which the addition of rotation information to the existing data sharpens our understanding of the underlying stellar (and therefore planetary) distribution substantially.