Determining stellar macroturbulence using asteroseismic rotational velocities from Kepler

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Abstract

The Rossiter-McLaughlin effect often requires prior knowledge of the stellar sky-projected equatorial rotational velocity (vsini). This is usually provided via spectroscopy, however this method has uncertainties as spectral lines are also broadened by photospheric velocity fields known as "macroturbulence." By measuring the rotational splitting frequencies for 28 Kepler stars via asteroseismology, we have determined accurate vsini values. These have been used to obtain a new calibration between macroturbulence, effective temperature and surface gravity. Therefore macroturbulence, and thus vsini, can now be determined with confidence for stars that do not have asteroseismic data available. We present new spectroscopic vsini values for the WASP planet host stars, using high resolution HARPS spectra.

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