# Stellar differential rotation from spot mapping via planetary transits

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**Abstract**

Just like the Sun, other stars also exhibit differential rotation. Currently, it is possible to estimate the rotation profile of a star that hosts at least one planet in an orbit that periodically eclipses the star. During one of these transits, a planet may occult a spot on the photosphere of the star, causing slight variations in its light curve. By detecting the same spot during a later transit, we can deduce the stellar rotation period at that latitude. In a multiplanetary system, each planet may occult different latitudes of the star. Therefore, spots can be observed in more than one latitude of the stellar disc. By observing these starspots in various latitudes, we can estimate the differential rotation profile of the star. In this study, we use the model described in Silva (2003) to characterize the starspots. We present the results of differential rotation for seven stars observed by the Kepler satellite, two of which have multiple orbiting planets. The results show that the differential rotation is highly correlated with the stellar mean rotation period and weakly linked to the stellar mass or effective temperature.

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