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# Caracterize stellar magnetic activity by counting spots on stars

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Stellar magnetism still remains poorly understood : there is a huge variety of topology and magnetic phenomena which need to be characterized regarding the different stellar physical parameters such as the Rossby number.
The resulting magnetic activity is here use as a observable to improve our understanding of spot characteristics (area, lifetime...) and link these properties to the dynamo effect which rules all these phenomena.

We propose to characterize this activity using the signature of spots in the light curves of the Kepler mission, seen in the Fourier domain. For this, we revisit the model of Harvey et al. (1985) in order to take into account all the components present in the power spectra.
This method allows having access to two proxy of the activity : the mean spot coverage and the lifetime.
After validating this model with simulated light curves, we present the results from thousands of Kepler light curves of main sequence stars used by McQuillan (2014) and Santos (2022).

The results show the emergence of three different regimes of activity related to different value of Rossby number. These activity types are also linked to different stars population which are distinguished by their rotation period, mass, Rossby number, ect...
The gyrochronology allows seeing an evolution between these different types during the star evolution and give information about the development of the stellar magnetic field thought different phase.

## Astrophysics Field

Solar & Stellar Physics

## Day constraints

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