

Rotation of solar-type stars in the PLATO era: combining asteroseismology and active-region diagnostics

Past and current space-based photometric surveys as CoRoT, *Kepler/K2* or TESS have already suggested that combining asteroseismic inference and diagnostics obtained from active-region-related variability represents an extremely powerful probe of the dynamics of main-sequence solar-type stars. However, the size of the sample where these strategies could be applied remained limited due to the relatively small number of main-sequence solar-type stars with detected pulsations. Focused on the study of this population of stars, the PLATO mission will therefore bring the possibility of such combined analysis to another dimension.

The PLATO standard stellar analysis pipeline will combine several techniques (Lomb-Scargle periodogram, auto-correlation function, random forest classifiers) to extract rotational surface modulations to extract surface rotation period from the flux rotational modulation in solar-type stars. I will show how these techniques can be combined with independent measurements obtained from asteroseismology to be used as priors for starspot modelling. In particular, the latitudinal-differential-rotation shear provided by asteroseismology allows us to put additional constraints on the starspots map reconstructed through the modelling process, which is key to reach a better understanding of processes such as flux emergence and angular momentum loss through magnetised wind.