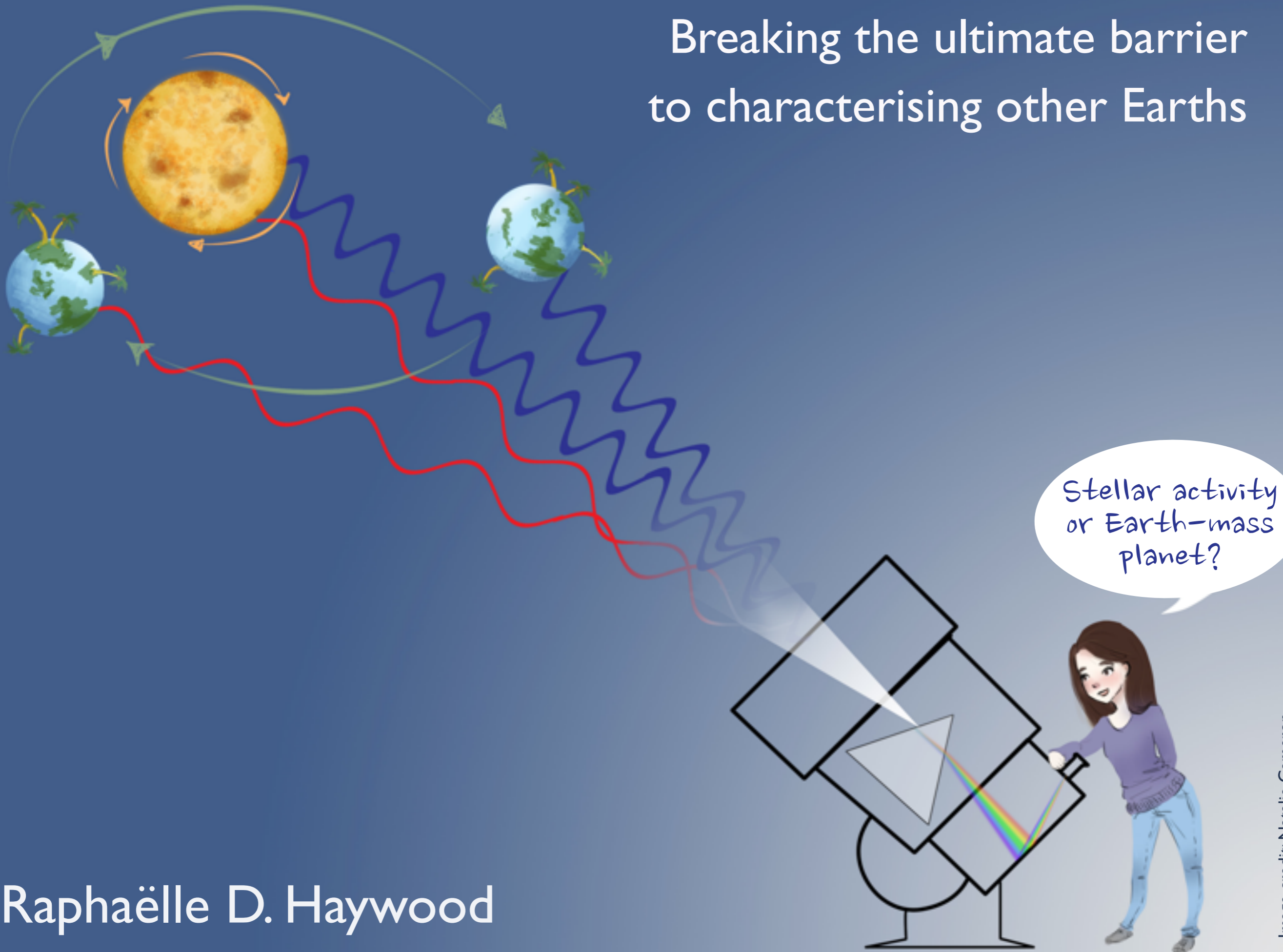
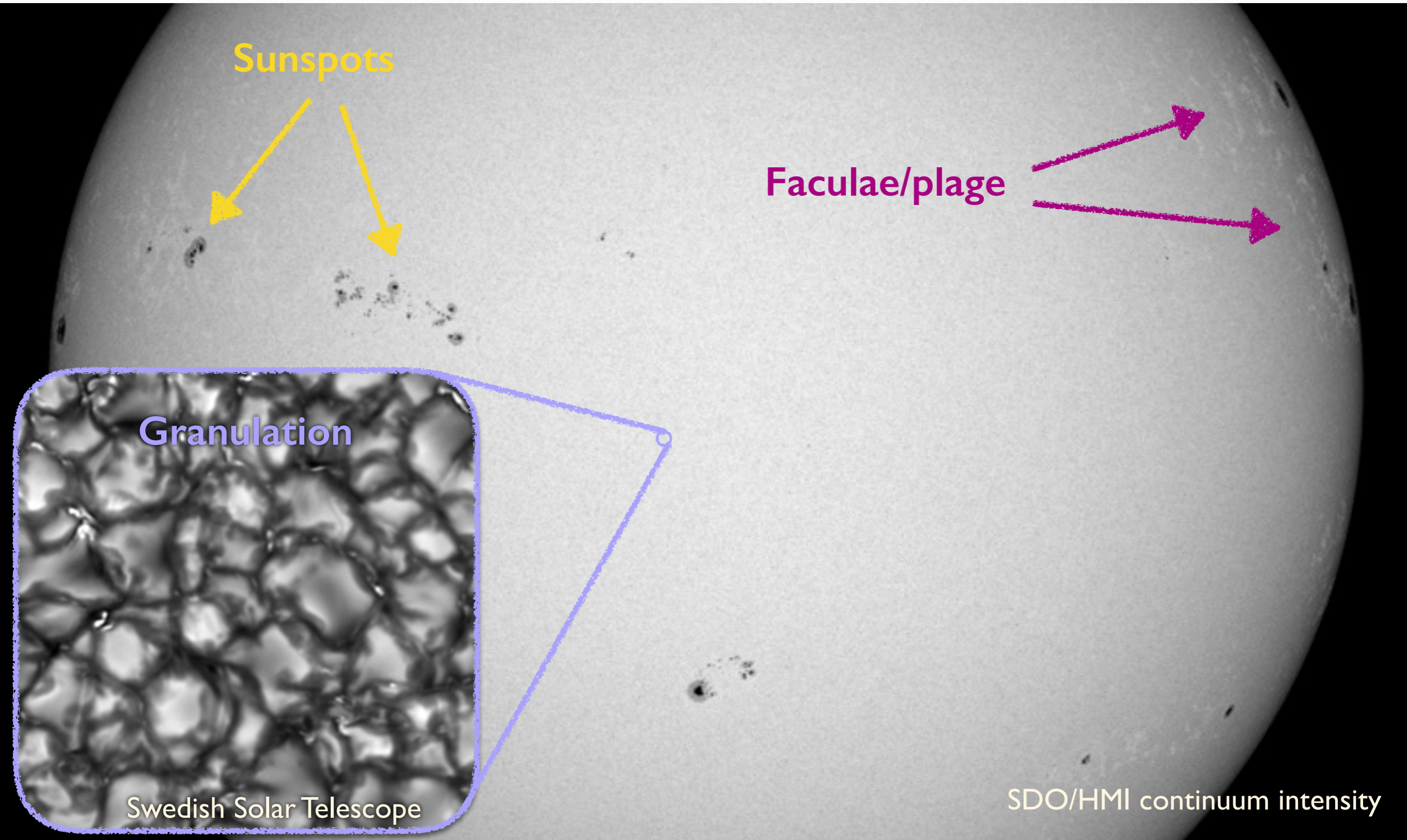


# Breaking the ultimate barrier to characterising other Earths



Raphaëlle D. Haywood

# The barrier: stars do not have static, uniform surfaces



The only way to break the activity barrier is by treating stellar magnetic variability as what it really is: a physically-driven, fully deterministic process, rather than simply “noise”!

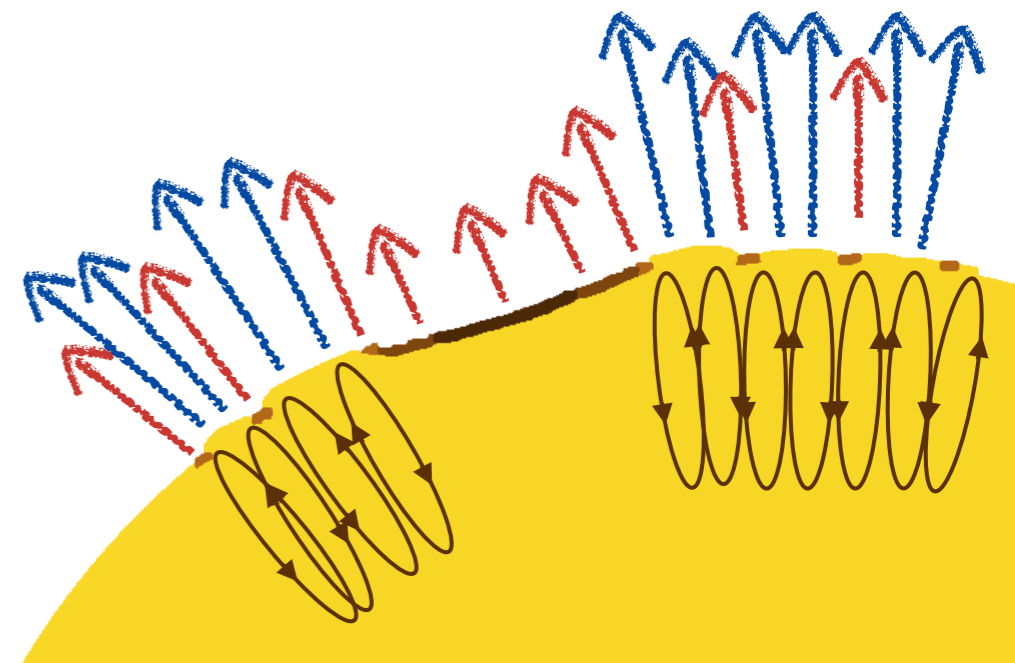
# Solar and stellar investigations with HARPS-North

We are now observing the Sun as a star continuously with HARPS-N (Dumusque et al., 2015; Phillips et al., 2016).



I will identify a direct proxy for faculae, which is the key to overcoming the stellar activity barrier in precise mass determinations.

In parallel, I will undertake a large-scale study of the activity patterns of other Sun-like stars on the stellar rotation timescale.



# A robust tool for planet mass determinations

I will incorporate the lessons learnt from my solar and stellar investigations into a robust and flexible framework based on Gaussian processes and Bayesian statistics (see Haywood et al., 2014; López-Morales, Haywood et al., 2016).

Determining precise and reliable planet masses is a necessary step to characterising the atmospheres and interiors of potentially habitable, Earth-like planets to be discovered in the coming years with the *TESS*, *CHEOPS* and *JWST* missions.

