
Magnetic fields of fully convective stars in the unsaturated regime

Colin Folsom^{*1}, Elodie Hébrard², and Victor See³

¹IRAP – Observatoire Midi-Pyrénées - OMP (FRANCE) – France

²York University – Canada

³Exeter University – United Kingdom

Abstract

Magnetic fields play an important role in stellar rotation evolution as well as in the definition of planetary habitability. Understanding the generation of magnetic fields is challenging, particularly in the case of fully convective stars. It has been widely accepted that, in partly convective stars, the boundary layer between the radiative core and the convective envelope plays a central role in the magnetic dynamo. Being fully convective, the dynamo of very low-mass stars is expected to behave differently. However recent X-ray observations (Wright & Drake, Nature 2016) show that partly and fully convective stars have similar X-ray activity as a function of Rossby number, thus they appear to have very similar magnetic dynamos. To further constrain this result, we observed a sample of slowly rotating fully convective stars with spectropolarimetry, to characterize their so-far unexplored large-scale magnetic field. Early results have detected magnetic fields in these stars, although with much lower strengths than in more rapidly rotating stars. Thus initial results suggest that the magnetic fields in these stars scale with rotation rate, despite being fully convective and not possessing a tachocline.

*Speaker