
Magnetic field in late-type single giants in the Solar vicinity: how common is magnetic activity on the giant branches?

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Abstract

We present our first results on a new sample containing all single G,K and M giants up to 40 pc and down to $V = 4$ mag in the Solar vicinity, suitable for spectropolarimetric (Stokes V) observations with Narval at TBL, France. For detection and measurement of the magnetic field the LSD method was applied (Donati et al. 1997) that in the present case enables detection of large-scale magnetic fields even weaker than the solar one (accuracy of 0.2-0.1 G). The evolutionary status of the stars is determined on the basis of the evolutionary tracks by Charbonnel & Lagarde (2010) and fundamental parameters given in Massarotti et al. (1998). Most of the stars appear to be in the mass range 1-3 Msun, situated at different evolutionary stages after the Main Sequence (MS), up to the Asymptotic Giant Branch (AGB).

The sample contains 48 stars. Up to now, 33 stars were observed on snapshot principle at least twice, that is about 70 percents of the sample. For 5 stars in the Hertzsprung gap, one is definitely Zeeman detected, but for two other stars there are evidences for spots in their Stokes I profiles. For 18 G and K giants observed, situated mainly at the base of the Red Giant Branch (RGB) and along it only 5 are Zeeman detected. Surprisingly, a lot of stars near the tip RGB and AGB are detected (8 of 13 observed stars up to now).

The relationships of the magnetic field on rotation and evolutionary status, as well the possible reasons for magnetic activity and inactivity are discussed.

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