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Lithium in cool stars detected in EUV surveys

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Abstract. We selected a sample of active cool stars detected in the EUV band by the ROSAT WFC and performed spectroscopic and photometric observations. We inferred spectral type, luminosity class, distance, binary status, rotational velocity. Here we show the results of the Li abundances determination from the Li I 6707.8 Å spectral line.

1. Introduction

Large samples of stellar X-ray sources have been discovered serendipitously by the *Einstein*, EXOSAT and ROSAT Observatories. Optical follow-up studies have demonstrated that these samples are composed mainly of active stars like RS CVn and W UMa binaries, pre-main sequence and other very young stars, and BY Dra flare stars (Fleming et al. 1988; Tagliaferri et al. 1992, 1994; Favata et al. 1993; Pye et al. 1995; Jeffries 1995; Neuhäuser et al. 1997). The most interesting result of these surveys is that there seems to be an excess of young stars near ZAMS or even younger, with respect to what is predicted by the Galaxy models.

We defined a sample of active cool stars EUV–selected with the ROSAT WFC (Pye et al. 1995) and performed spectroscopic (Li I 6708Å, H_α and Ca II H&K lines) and photometric optical follow-up. Using these data and the information from the HIPPARCOS catalogs we derived accurate spectral type, rotational (vsini) and radial velocities and investigates the single or binary nature of these stars (see Cutispoto et al. 1999). Here we present the results from high–resolution spectra in the region of the Li I 6707.8 Å doublet.

2. Results

We compute Lithium abundances with n-LTE models and investigate the existence of correlations between the lithium abundances and other stellar parameters. We find that most of our single stars have very high Li abundances that

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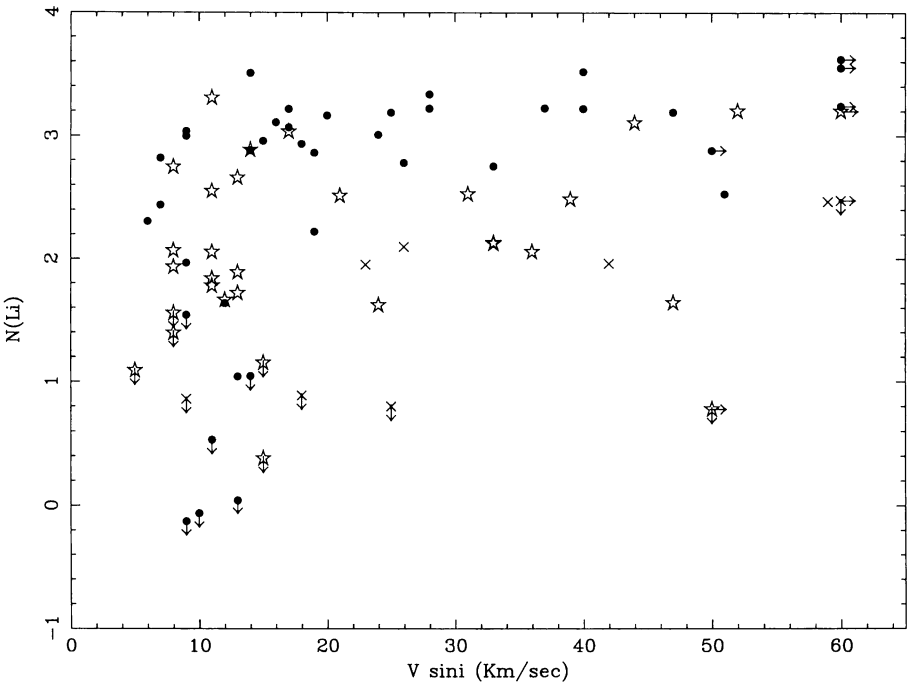

Figure 1. Li abundance vs vsini for our sample of stars. Dots are for single stars, stars are for binary systems and crosses are for binaries with an M star companion (the Li values are from the primary stars). Note that while for single stars with vsini smaller than $\sim 15 km\ s^{-1}$ the scatter in Li abundances is large, above this value they all have very high Li abundances. For binary stars this is not the case.

seems to correlate with EUV and X-ray emission and vsini (see Fig. 1). This is probably linked to the age of the stars, younger stars have higher Li abundances, higher rotation rate and so higher X-ray and EUV emission. For the binaries we see a larger scatter between these quantities. This can be explained with tidally locked effects, that imply higher rotation rate also for older stars.

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