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Post T Tauri stars in the solar neighborhood: isolated or members of young associations and moving groups.

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Abstract. Post T Tauri stars (PTTS) are late-type stars in the age range between 10 and 100 Myr filling the gap between T Tauri (TTS) and zero-age main sequence phases. This period of evolution remains ambiguous and until now different studies of young stars have failed to find the numbers of PTTS that are expected. In the last years, some PTTS have been identified among the X-ray detected pre-main sequence stars in some star-forming regions. More recently, additional PTTS have been identified in young associations and moving groups (β Pic, TW Hya, Tucana/Horologium, and the AB Dor). However, many isolated PTTS still remain undiscovered. In this contribution, we compiled the PTTS previously identified in the literature, and identified new candidates using the information provided by the high resolution spectra obtained during our surveys of late-type stars possible members to young moving groups, FGK stars in the solar neighborhood, and *RasTyc* sample. To identify PTTS we applied an age-oriented definition using relative age indicators (Li abundance, chromospheric and coronal emission and the kinematics) as well as color-magnitude diagrams and pre-main sequence isochrones.

Keywords: Stars: late-type – chromospheres – stellar activity – pre-main sequence

PACS: 97.10.-q, 95.85.Kr, 97.10.Ex, 97.10.Jb, 97.10.Ri, 97.10.Tk, 97.21.+a, 98.20.-d

SELECTION BY THE LITHIUM ABUNDANCE (*Age*)

The possible PTTS and young stars analysed in this contribution have been selected from our catalog of late-type stars (F to M) members of young stellar kinematic groups ([10]) and the *RasTyc* sample (cross-correlation of the ROSAT All-Sky Survey (RASS) with the TYCHO catalog, see [1]; [2]). A large number of these stars have been observed by us over the past few years with high resolution spectroscopy ([11]; [3]; [4]; [12]; [8]; [9]; [6]; [5]; [2]). Using the equivalent width of the Li I line at 6707.8 Å, $EW(\text{Li I})$, determined by us, plus additional values taken from the literature we have selected the stars with $EW(\text{Li I})$ above or very close to the upper envelope of the Pleiades open cluster (~ 78 Myr), see Figs. 1 and 2. The membership in young moving groups (MGs) like the Local Association, AB Dor, β Pic, and Tucana/Horologium (Tuc-Hor) is indicated in Fig. 2 with different symbols (see also the U, V diagram in Fig. 3). The PTTS of the sample (stars in the gap intermediate between the TTS and the young cluster stars, adopting the spectroscopic definition proposed by [7]) are listed in Table 1.

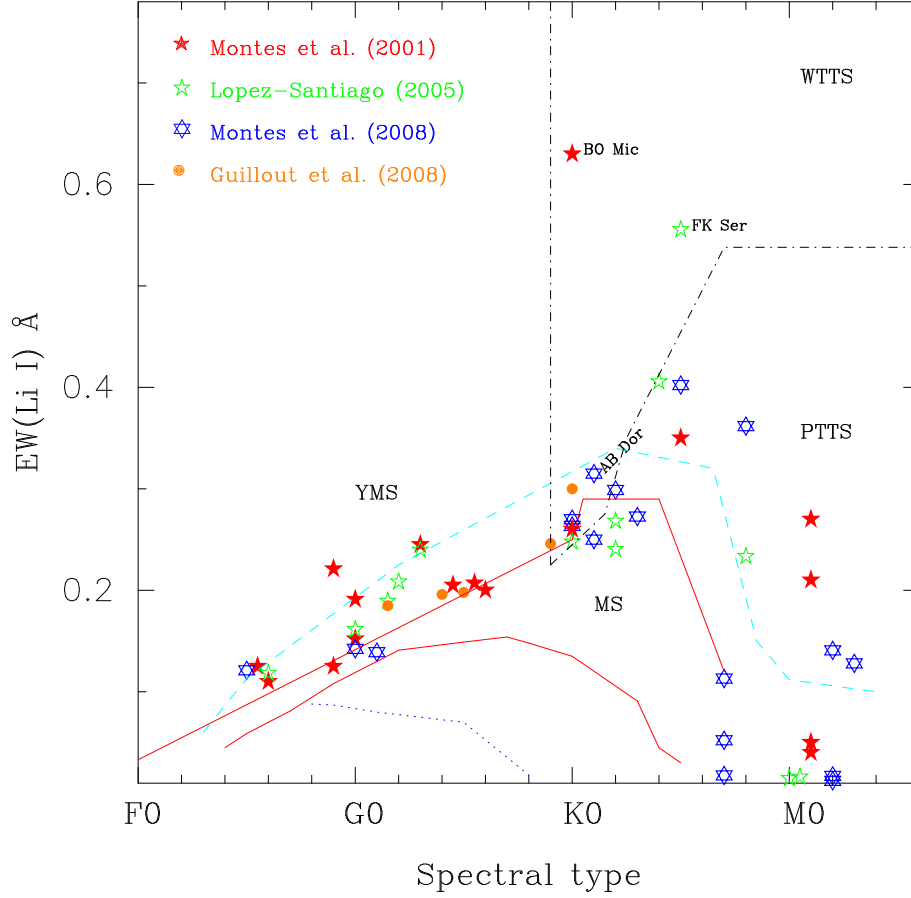


FIGURE 1. Equivalent width of the Li I line at 6707.8 Å (from [10]; [11]; [3]; [12]; [2]), as a function of spectral type for the selected stars, compared with the envelopes of well-known stellar clusters (ages from 10 to 600 Myr). The dot-dashed lines represent the T_{eff} cutoff at 5250 K and the Li isoabundance line for $\log N(\text{Li}) = 2.8$ (minimum abundance for TTS) used in the PTTS spectroscopic definition by [7].

KINEMATICS OF THE POSSIBLE PTTS

The kinematics (Galactic space velocity components, U , V , see Fig. 3) indicate that all the selected stars are in the region of the young disk stars and very close to the position of the Local Association and other very young stellar associations and moving groups like AB Dor, subgroup B4 of the Local Association, β Pic, Tuc-Hor, IC 2391, and Castor (see [10]; [13]; [4]).

ADDITIONAL FGK STARS ($d < 25 \text{ pc}$)

In our recent survey of FGK stars in the solar neighbourhood ($d < 25 \text{ pc}$), we have identified additional stars with ages between those of the Pleiades and the Hyades, but any new PTTS (see [8]; [9]; [6]).

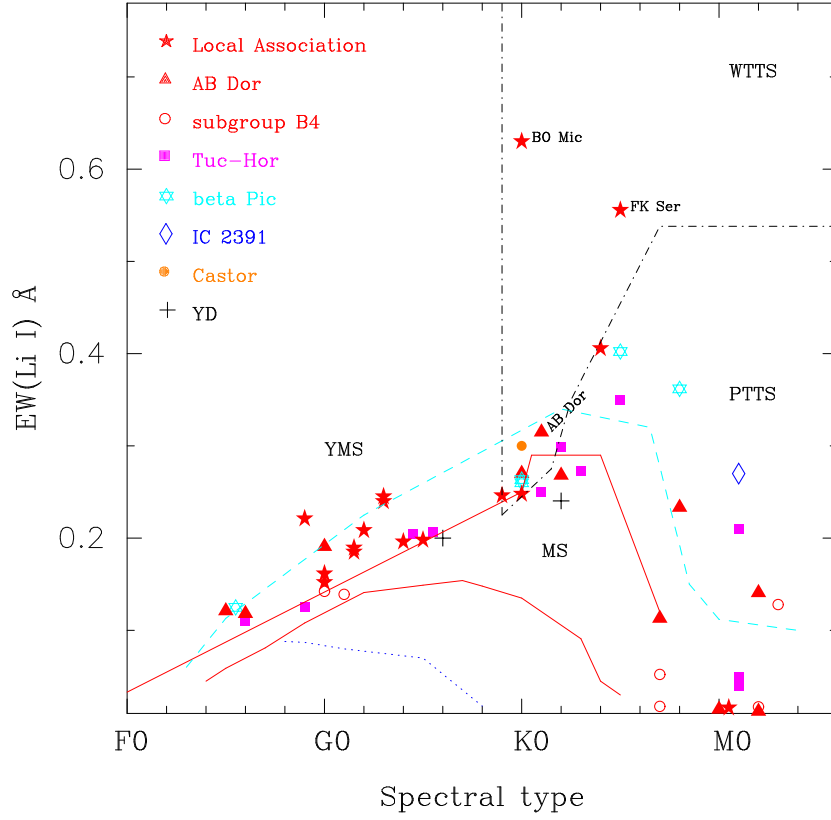


FIGURE 2. As Fig. 1 but in this case different symbols are used to identify the stars members of the Local Association, AB Dor moving group, and B4 subgroup (see [4]), IC2391 and Castor moving groups ([10]), and β Pic and Tuc-Hor associations ([13]).

TABLE 1. The PTTS of the sample

Name	SpT	$EW(\text{Li I})$ (mÅ)	MG
BD+45 598	K0	300	Castor
UY Pic	K0	270	AB Dor
PZ Tel	K0	260	β Pic
V343 Nor	K0	264	β Pic
BD+17 4799	K0	248	LA
AB Dor	K1	315	AB Dor
AB Pic	K2	299	Tuc-Hor
BD+17 232	K4	406	LA
AO Men	K5	402	β Pic
HD 3221	K5	350	Tuc-Hor
HD 139751	K7	113	AB Dor
HIP 23309	K8	362	β Pic
LO Peg	K8	233	AB Dor
HIP 1910	M0	210	Tuc-Hor
V1005 Ori	M1	270	IC2391
GSC8894-426	M2	141	AB Dor
HIP 17695	M3	128	B4

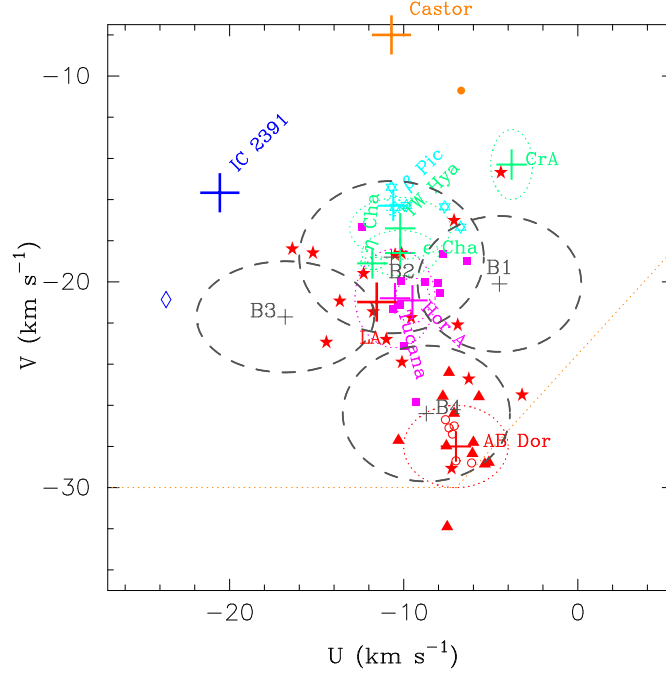


FIGURE 3. Position in the (U, V) -plane of the selected stars as possible PTTS. Symbols as in Fig. 2.

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