

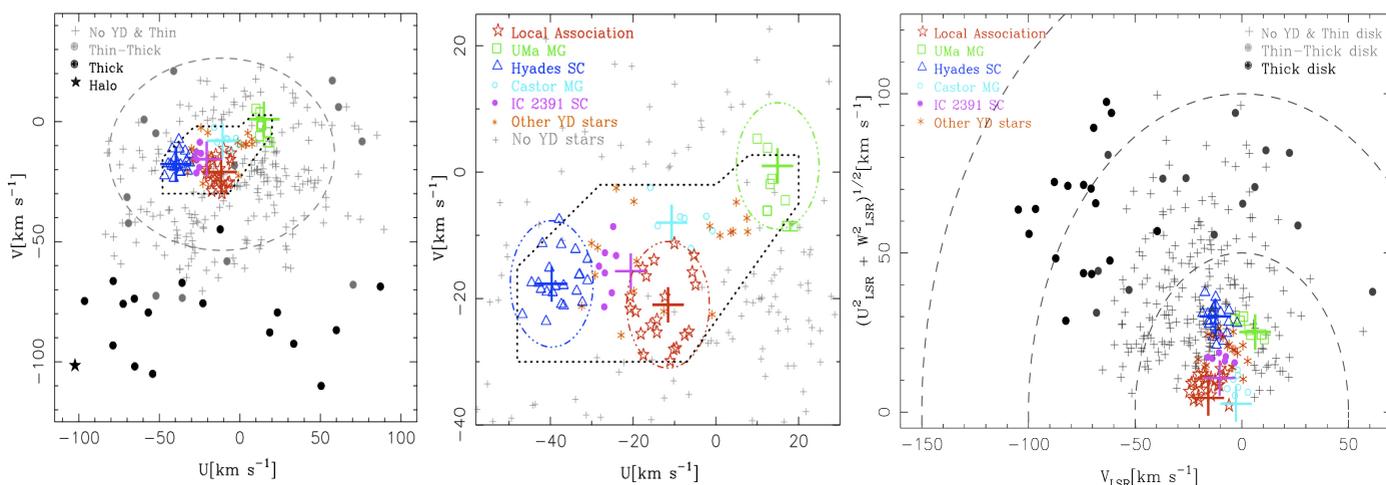
# Kinematics of exoplanet host stars: membership in moving groups, associations and the thin/thick disc

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• **Context.** Young exoplanetary systems with ages  $\tau \leq 600$  Ma (i.e. Hyades-like or younger) provide constraints on the **time scale and mechanism of planet formation** and on the **planet evolution** (orbital migration, late heavy bombardment...). Apart from the very young “planet” candidates found by **direct imaging** (around e.g. HR 8799, 2M1207-39 or AB Pic), some young planet candidates have been found with the **radial velocity** method, such as **HD 70573b** (Setiawan et al. 2007) in the Hercules-Lyra subgroup of the Local Association or the controversial **TW Hya b** and **BD+20 1790b** (Setiawan et al. 2008; Hernán-Obispo et al. 2010). On the other hand, there may be **old** exoplanetary systems, whose stars belong to the **thick disc** or even the **Galactic halo** (**CD-36 1052b**, Setiawan et al. 2010).

• **Aims.** We search for bright **Hipparcos** stars with **radial-velocity planets** that are **member candidates in young moving groups** (Montes et al. 2001), such as the **Hyades**, **IC 2391**, **Ursa Majoris** and **Castor** superclusters and the **Local Association** ( $\tau = 100$ -600 Ma), and very young moving groups like  $\beta$  Pictoris or TW Hydrae ( $\tau < 100$  Ma). Generally, these stars are **discarded** from accurate **radial-velocity searches** based on **activity indicators**, but there might be young stars that passed the rejection filter (e.g. HD 81040,  $\tau \sim 700$  Ma; Sozzetti et al. 2006). We also look for old exoplanet host stars in the **Galactic thick disc and the thin-thick transition**.



• **Methods.** On 2012 Feb 29, the **Extrasolar Planets Encyclopaedia** ([exoplanet.eu](http://exoplanet.eu)) tabulated 699 planet candidates in **558 planetary systems** detected by radial velocity (93 multiple planet systems). Of them, over 300 have **Hipparcos** stars as host stars. We have computed **Galactocentric space velocities UVW** for **327 planetary systems**, derived from star coordinates, proper motions, **parallactic distances** (from van Leeuwen 2007), and **systemic radial velocities**,  $V_r$  ( $\gamma$ ), from a number of works, especially the planet discovery papers. We plot the computed UVW velocities onto **UV**, **WV** and  **$V(U^2+W^2)^{1/2}$**  planes. [Top: Böttinger diagrams, zoom of UV plane, and Toomre diagram].

• **Results.** A total of **83 planet host stars satisfy the Eggen criterion** for the young disc population in the UV plane (i.e. are **young star candidates**) [Top: inside or at the boundaries defined by the dotted line]. They are currently subject of a dedicated data compilation, including published values of effective temperature  $T_{\text{eff}}$ , lithium abundance  $\log \epsilon(\text{Li})$ , rotational velocities  $v \sin(i)$ , activity indicators (**X-rays**,  $\log R'_{\text{HK}}$ ) and **membership in a moving group**. In particular, we identify **7 candidate members in Castor**, **7 in IC 2391**, **8 in Ursa Majoris**, **21 in the Local Association** and **22 in the Hyades Supercluster**. Interestingly, a relatively large number of stars have been tabulated as probable nearby young stars. Most of them are candidate and confirmed members in the **Hyades Supercluster**, such as  $\iota$  Hor, HD 50554, HD 108147 or  $\tau$  Boo, but there also candidate stars in the **IC 2391** (94 Cet, HD 168746) or **Castor** (HD 217107) Superclusters and the **Local Association** (HD 130322, V376 Peg – the transiting star HD 209458). On the other hand, we also identify **one halo star** (CD-36 1052), **19 thick-disc stars**, and **14 stars in the transition thin-thick disc**. The data compilation will finish soon, and we will check if stellar kinematics is consistent with the other (spectroscopic) age indicators.



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