

# Exoplanet host stars in young moving groups: preliminary results. II

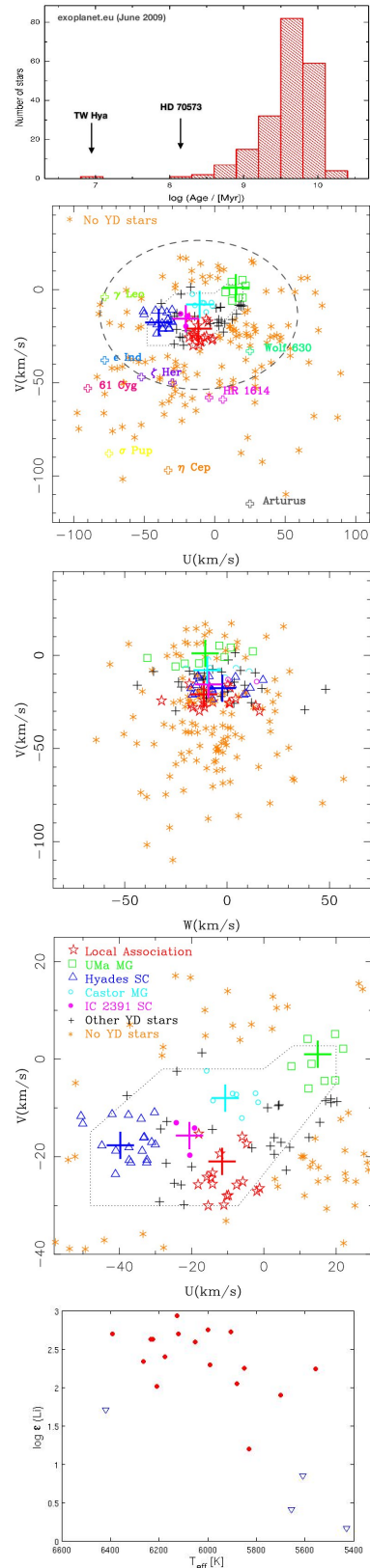
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• **Context.** Young exoplanetary systems with ages  $\tau \leq 600$  Ma (i.e. Hyades-like or younger) can provide constraints on the **time scale and mechanism of planet formation**, and on the **planet evolution** (orbital migration, late heavy bombardment...). 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** (Setiawan et al. 2008). [left, top: histogram of planet ages, from Joergens (2009, ASTROCAM school)]

• **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).

• **Methods.** On 2009 Sep 1, the **Extrasolar Planets Encyclopaedia** (exoplanet.eu) tabulated 346 planet candidates in **295 planetary systems** detected by radial velocity (35 multiple planet systems). Of them, **228 have Hipparcos stars** as host stars. We have computed **Galactocentric space velocities UVW** derived from star coordinates, proper motions, and **parallactic distances** (from van Leeuwen 2007), and **systemic radial velocities**,  $V_r$  ( $\gamma$ ), from a number of works, including Nordström et al. (2004), Famaey et al. (2005) and planet discovery papers. To date, we have collected **UVW velocities for 215 planetary systems** (94%). The UVW derivation for the other 13 planetary systems is on-going. We plot the compiled UVW velocities onto **UV and WV planes**. [left: Böttlinger diagrams and a zoom of UV plane]

• **Results.** A total of **69 planet host stars satisfy the Eggen criterion** for the young disc population in the UV plane (i.e. are **young star candidates**) [left: inside or at the boundaries defined by the dotted line]. **Five** of them have too large values of vertical Galactocentric space velocity,  $W$ . The remaining **64 stars** are the 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 ( $\log R'_{\text{HK}}$ ) and **membership in a moving group**. 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). To ascertain the true young nature of the stars, we study the lithium abundance as a function of effective temperature [left:  $\log \epsilon(\text{Li})$  vs.  $T_{\text{eff}}$ ; upper values marked with down triangles]. Some stars have clear **lithium overabundance**, such as the **Hyades Supercluster** star **HD 1237** ( $T_{\text{eff}} = 5555$  K,  $\log \epsilon(\text{Li}) = 2.24$ ).

• **Future work.** The data compilation will finish soon, and we will check if stellar kinematics is consistent with the other spectroscopic age indicators.