



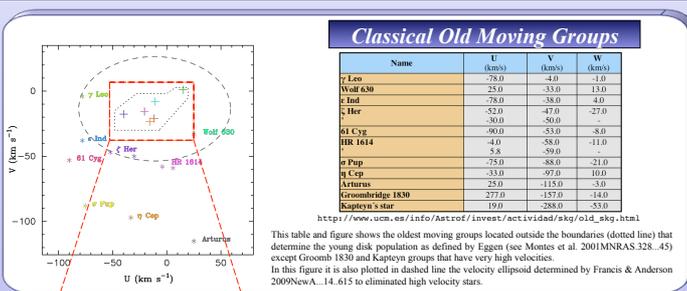
Stellar kinematic groups (stellar streams, moving groups, and associations): ongoing and future high resolution spectroscopic surveys of possible late-type stars members

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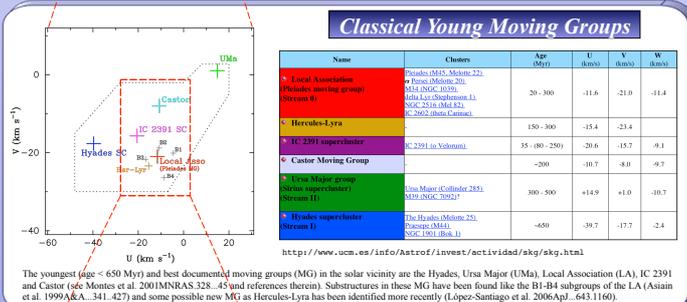
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Abstract

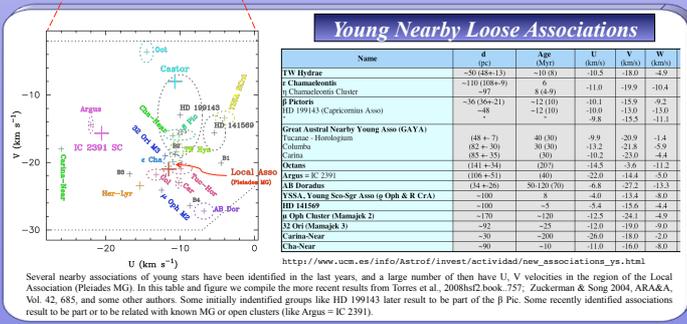
In this contribution we review the different stellar kinematic groups currently known in the literature. We include the young and old classical moving groups and superclusters, the recently identified young nearby loose associations as well as other stellar streams identified in recent surveys that contains large number of dwarf and giant stars. In addition, we summarize the high resolution spectroscopic surveys that our group have carried out during the last years aimed to identify cool stars member of these groups. Among these are the surveys of late-type stars possible members to young moving groups (Montes et al. 2001; López-Santiago, et al. 2005, 2010), FGK stars in the solar neighborhood (Martínez-Arnaiz et al. 2010, Maldonado et al. 2010), and RasTyc sample (cross-correlation of the ROSAT All-Sky Survey (RASS) with the TYCHO catalog, Guillout et al. 2009). Other surveys like the SACY (Search for Associations Containing Young stars) survey (Torres et al., 2008) and ongoing and future surveys centred on pre-Gaia or follow-up Gaia targets are also discussed.



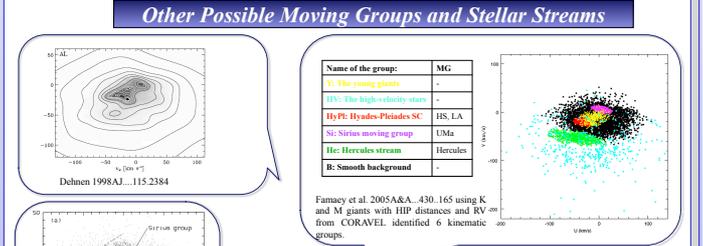
This table and figure shows the oldest moving groups located outside the boundaries (dotted line) that determine the young disk population as defined by Figen (see Montes et al. 2001MNRAS.328...45) except Groomb 1830 and Kapteyn groups that have very high velocities. In this figure it is also plotted in dashed line the velocity ellipsoid determined by Francis & Anderson 2009NewA...14.615 to eliminated high velocity stars.



The youngest (age < 650 Myr) and best documented moving groups (MG) in the solar vicinity are the Hyades, Ursa Major (UMa), Local Association (LA), IC 2391 and Castor (see Montes et al. 2001MNRAS.328...45 and references therein). Substructures in these MG have been found like the B1-B4 subgroups of the LA (Asian et al. 1999A&A...341..427) and some possible new MG as Hercules-Lyra has been identified more recently (López-Santiago et al. 2006ApJ...643.1160).



Several nearby associations of young stars have been identified in the last years, and a large number of them have U, V velocities in the region of the Local Association (Pleiades MG). In this table and figure we compile the more recent results from Torres et al. 2008b2book.757, Zuckerman & Song 2004, ARA&A, Vol. 42, 685, and some other authors. Some initially identified groups like HD 19143 later result to be part of the β Pic. Some recently identified associations result to be part or to be related with known MG or open clusters (like Argus = IC 2391).



Famaey et al. 2005A&A...430..165 using K and M giants with HIP distances and RV from CORAVEL identified 6 kinematic groups.

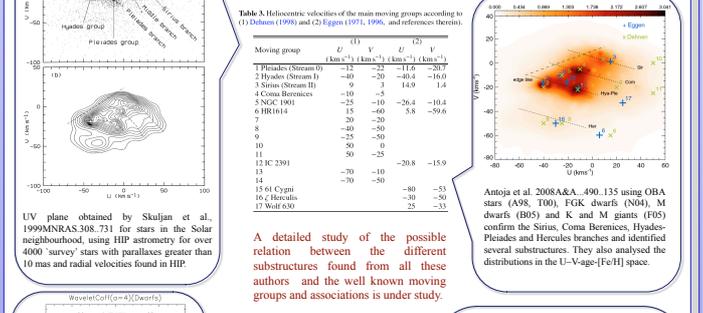
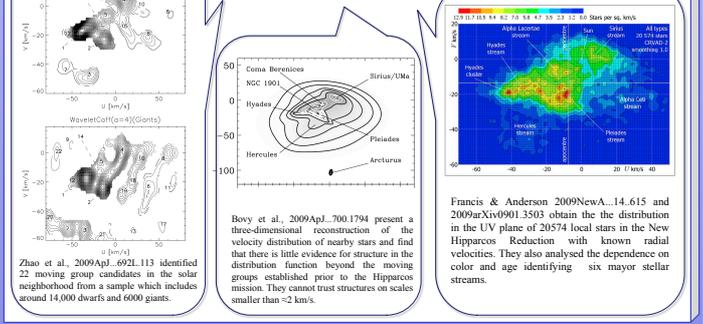


Table 3. Helio-centric velocities of the main moving groups according to (1) Dehen (1998) and (2) Figen (1991, 1996, and references therein).



A detailed study of the possible relation between the different substructures found from all these authors and the well known moving groups and associations is under study.

Ongoing and future high resolution spectroscopic surveys of possible late-type stars members of the different stellar kinematic groups:

Survey late-type stars in MGs

Collaborators (UCM): Montes D., López-Santiago J., Gálvez-Ortiz M.C., Crespo-Chacón I., Martínez-Arnaiz R.M., Fernández-Figueroa M.J., De Castro E., Cornide M.

High resolution echelle spectroscopic survey of late-type stars, identified by Montes et al. 2001 MNRAS, 328, 45 as possible members of young MG. See Montes et al. 2001 A&A, 37, 976; López-Santiago et al. 2005, PhD Thesis UCM; 2006 ApJ, 643, 1160; 2009 A&A, 499, 129; 2010 A&A, 514, A97.

This survey analyse in more detail the membership of these stars to the different young MG kinematic membership (U, V, W), age-dating methods for late-type stars such as the chromospheric activity level and the lithium absorption line.

FGK in the solar neighbourhood

Collaborators (UCM, UAM, CAB): Montes D., Martínez-Arnaiz R.M., Maldonado J., Eiroa C., Montesinos M.

The survey of FGK stars in the solar neighbourhood (d < 25 pc) which include the DUNES sample, an approved HETDP with the aim of detecting cool faint dusty disks provide also information about membership of these stars to young and old MG (Martínez-Arnaiz et al. 2008, 2010, A&A, astro-ph/1002.4591; Montes et al. 2009, Maldonado et al. 2008, 2010, A&A, in press).

RasTyc Survey

Collaborators (Strasbourg, Catania, UCM): Guillout P., Klutsch A., Frasca A., Freire Ferrero R., Marilli E., Montes D.

The spectroscopic survey of the youngest field stars in the solar neighbourhood selected from the RasTyc sample (cross-correlation of the ROSAT All-Sky Survey (RASS) with the TYCHO catalogue; Guillout et al. 2009, A&A, 504, 829) identified new late-type stars MG members and new MGs. See also Klutsch et al. 2010, IAU, Sp807-p.56 and Guillout et al. 2010, IAU, Sp807-p.79.

SACY Survey

Collaborators: Torres et al., 2008A&A, 460, 695; Viana Almeida et al., 2009A&A, 501, 965, dedicated to ROSAT all-sky X-ray sources in the Southern Hemisphere, confirm some previously known associations and identified some new ones (Torres et al., 2008b2book.757).

The high resolution spectroscopic observations of the SACY survey (Search for Associations containing young stars; Torres et al., 2008A&A, 460, 695; Viana Almeida et al., 2009A&A, 501, 965), dedicated to ROSAT all-sky X-ray sources in the Southern Hemisphere, confirm some previously known associations and identified some new ones (Torres et al., 2008b2book.757).

Future Surveys

Chemical Tagging: The detailed analysis of the chemical signatures (chemical tagging) is another powerful method that provide clear constraints to the membership to these stellar kinematic groups. Using our previous high resolution spectroscopic observations and additional ones we are applying the chemical tagging to some MGs like the Hyades supercluster (see Tabernero, Montes, González Hernández et al. 2010).

- Surveys centred on pre-Gaia or follow-up Gaia targets. Additional high resolution spectroscopic observations will be needed in order to apply age-dating methods for late-type stars and be able to understand the nature of these kinematic structures. All this in the framework of Gaia complementary ground based observations related with the RISE (Red para la Exploración Científica de Gaia) and the Gaia GREAT working groups like *WGB1: Gaia science on Open Clusters and Young Associations* and *WGA3: Chemical Tagging*, as well as the GREAT Chemo Dynamical Survey (GCDS) consortium.