

Membership of late-type stars to new stellar kinematic groups with Gaia-DR3 and HERMES spectroscopy

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Abstract

Late-type stars (F, G, K) members of stellar kinematic groups are very useful as benchmark stars to understand several physical mechanisms occurring in the stars (as the dynamo, magnetic breaking, diferencial rotation, etc.) and its age evolution. Some young and old classical moving groups and superclusters, have been widely studied, but the properties of several nearby young loose associations recently identified are poorly known. The new astrometric data provided by Gaia-DR3 together with high resolution ground-based observations give the possibility to discriminate more accurately if the observed stars belongs to a given association. In this work, we study several of these newly discovered associations (AB Dor, Her-Lyr, Castor, Psc-Eri and Oceanus) using HERMES high-resolution echelle spectrograph to determine accurate radial velocities and atmospheric parameters, absolute and differential chemical elemental abundances (chemical tagging), rotation, and age estimations based on the lithium abundance and chromospheric activity indicators. With all this information, we can confirm the membership of the candidate members and we can better understand the properties of stellar kinematic groups discerning between real physical structures of coeval stars with a common origin (debris of star-forming aggregates in the disk) and field-like stars (structures formed by resonance interactions, associated with dynamical resonances (bar) or spiral structure).

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