8.9 Young Stars Towards the CO Cepheus Void

Alexis Klutsch[1], D. Montes[1], P. Guillout[2], A. Frasca[3], F.-X. Pineau[2], N. Grosso[2], E. Marilli[3] and J. López Santiago[1]

[1] Universidad Complutense de Madrid, Dpt. de Astrofísica, Facultad C.C. Físicas, Spain
[2] Observatoire Astronomique de Strasbourg, CNRS, UMR 7550, France
[3] INAF - Osservatorio Astrofisico di Catania, Italy

Abstract

[a] Once mixed in the galactic plane stellar population, young stars are virtually indiscernible from older ones. In the *RasTyc* sample, we nevertheless discovered 4 lithium-rich field stars that are located within a few degrees from each other on the celestial sphere and near the *Cepheus-Cassiopeia* complex. They form a homogeneous group of T Tauri stars. To discover some new comoving companions, we selected optical counterparts of ROSAT All-Sky Survey X-ray sources cross-identified with late-type stars around these 4 young stars thanks to multivariate analysis methods. Our recent intermediate- and high-resolution spectroscopic observations of this sample allowed us to discover additional lithium-rich sources. From the analysis of their spectra, we found that 6 of our young star candidates have similar physical and kinematical properties as those of the 4 comoving T Tauri stars. Moreover they are all located inside or close to the CO Cepheus void. They have properties rather similar to those of members of the TW Hydrae association, although they are slightly older and placed in the northern hemisphere. These young stars in the field are of great importance to give new insight into the process of stellar formation outside standard star-forming regions.

[a]The printed version of the poster presented during this workshop is available at this URL.

Introduction

Guillout et al. [2010] discovered a group of four comoving T Tauri stars (TTS) towards the *Cepheus-Cassiopeia* complex. Although this sky area is rich in CO molecular regions and dark clouds, the stars are projected in front of a region devoid of interstellar matter. Klutsch et al. [2010] selected 162 *young star candidates* to search for new members of this group. We also included all TTS discovered by Tachihara et al. [2005] located in this region to determine their kinematics and find a possible connection with ours.

Preliminar results

We identified 24 sources displaying a strong lithium line. We applied the ROTFIT code (Frasca et al. [2006]) to estimate astrophysical parameters. Using the spectral subtraction technique, we measured their lithium equivalent width, EW(Li), from the residual spectrum obtained with ROTFIT. Till now, 8 targets have an EW(Li) higher than that of Pleiades cluster stars (Fig. 8.11, left panel). We derived kinematics of all lithium-rich sources (Fig. 8.11, right panel). Among them, 6 sources are good young comoving candidates, 5 of which are located in the CO Cepheus void. That seems to confirm the existence of a link between the TTS discovered towards this region, where 15 stellar X-ray sources turn to be rich in lithium.

Acknowledgments

This work was supported by AstroMadrid (CAM S2009/ESP-1496), Universidad Complutense de Madrid, and the Spanish Ministerio de Ciencia e Innovación (MICINN) under grants AYA2008-00695 and AYA2008-06423-C03-03. Part of this study is supported by the Italian Ministero dell'Istruzione, Università e Ricerca (MIUR), and the Région Alsace.

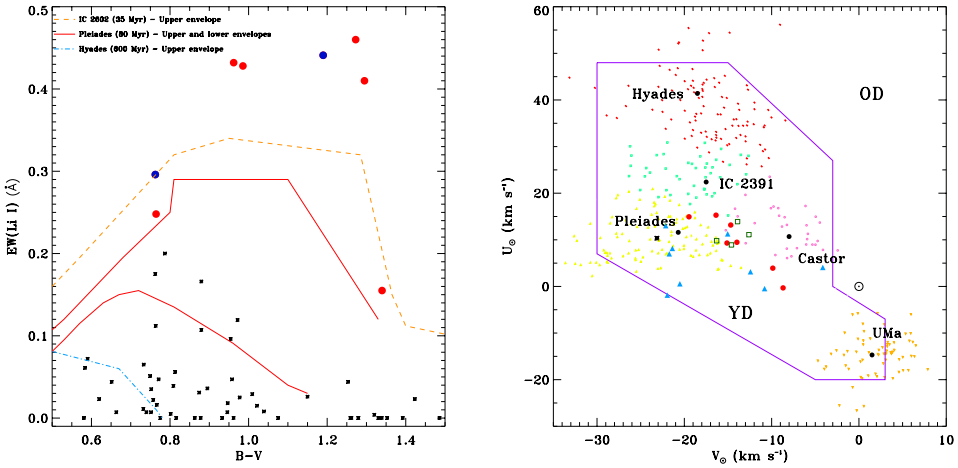

Figure 8.11: *Left panel*: Li I λ6707.8 line equivalent width versus $B-V$ colour index for the selected sources. 6 of our candidates (red circles) and 2 Tachihara's TTS (blue circles) are above the Pleiades lithium upper envelope. *Right panel*: U-V kinematic diagram for all our lithium-rich candidates. The stars for which we already derived the astrophysical parameters are showed with red circles. We use blue triangles and open squares for the remaining candidates and the original TTS, respectively.

Bibliography

Frasca, A., Guillout, P., Marilli, E., et al. 2006, A&A, 454, 301
Guillout, P., Frasca, A., Klutsch, A., Marilli, E., & Montes, D. 2010, A&A, 520, A94
Klutsch, A., Montes, D., Guillout, P., et al. 2010, ArXiv e-print: 1012.1979
Tachihara, K., Neuhäuser, R., Kun, M., & Fukui, Y. 2005, A&A, 437, 919