XIV Latin American Regional IAU Meeting (Florianópolis/SC, Brazil, 25-30 November 2013)
Editors: A. Mateus, J. Gregorio-Hetem & R. Cid Fernandes

field (around 100 MG on surface) and a low accretion rate. To study the accretion, from the mass-donor star to the white dwarf, we obtained time-resolved spectroscopy using the Goodman spectrograph at the SOAR telescope in observing runs distributed around the first semester of 2012. We found the object in different brightness states. In the low state, we gathered data with two spectral resolutions (219 km/s and 170 km/s). In a brighter state, the spectral resolution was ≈170km/s. The low (high) spectral resolution data cover the spectral region from 360 to 760 nm (435 to 700 nm). The continuum varies in both states and the cyclotron humps are visible at some orbital phases. The low-state spectra show Balmer emission lines superimposed on absorption features from the mass-donor star. The bright-state spectra show strong Balmer, HeI, and HeII emission lines. The Balmer and HeII lines are not single Gaussians: in bright state the lines are broader and have three components; in low state, the lines are narrower and two components are distinguished in some phases. Doppler tomography of the low state reveals that line emission arises mainly from a region near the white dwarf. The orbital dependence of the cyclotron emission was modeled using the Cyclops code, which adopts a 3D representation of the accretion column.

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HIGH-RESOLUTION SPECTROSCOPIC OF RED GIANTS STARS IN NGC 2360

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Open clusters are excellent laboratories to test our knowledge of the formation and evolution of the two components of the disk (thick and thin disk), and stellar structure and evolution, since the stars present the same age and distance reducing the uncertainties associated with field stars of the Galaxy. NGC 2360 is an open cluster with 0.85 Gyr, with galactocentric distance equal to 9.28 Kpc and height equal to −30 pc. We determine to 15 stars in the NGC 2360 using high resolution spectroscopy the atmospheric parameters and the chemical composition for Fe, Ni, Cr, Ca, Mg, Si, Ti, Na, Al, Ba, Y, Zr, La, Ce and Nd with measures of equivalent widths of absorption lines, and spectral synthesis for C, O and N. The spectra of 14 stars were obtained with FEROS at the 2.2m ESO telescopes at La Silla (Chile). Only one star was observed with UVES/VLT at Paranal Observatory. Atmospheric parameters and abundances were determined using the LTE atmosphere models of Kurucz and the spectral analysis code MOOG. The abundance of alpha and iron-peak elements of NGC 2360 are typical disk abundances. We also observed a slight overabundance of the elements generated by the s-process in NGC 2360 with respect to field stars of the disk. The overabundance of the elements generated by the s-process occurs in young open clusters and may be linked to high-efficiency of these nucleosynthesis in low-mass stars ($< 1.5 M_{\odot}$). However, this high-efficiency has not been explained by the stellar evolutionary models. Additional observations and high resolution spectroscopic analysis of intermediate-age open clusters (like NGC 2360) are necessary to confirm the slight overabundances of s-process elements with relation to field stars of the disk and old open clusters.

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DISCRIMINATING LOCAL GROUP EMBEDDED STAR CLUSTERS FROM OLDER ONES USING NEAR-IR PHOTOMETRIC INDEXES

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Several grand-design spiral galaxies show a bimodal distribution of their system of star clusters and star forming complexes in JHK diagrams. The $(J-H)$ vs $(H-Ks)$ diagram revealed that embedded clusters, still immersed in their parental clouds of gas and dust, have in general a redder $(H-Ks)$ colour than older clusters, whose gas and dust have already been ejected. In addition, the reddening-free index $Q_d = (H-K_s)$ - 0.884 $(J-H)$ was shown to correlate with age for the young clusters and thus provided an effective way to differentiate the embedded clusters from the older ones. In the present work, the aforementioned photometric indices were explored for star cluster systems in the Local Group. In particular, we investigate the effectiveness of the Q_d index in sorting out clusters of different ages at their early evolutionary stages. Surface photometry