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

E. L. Andrade[1] and R. Baptista[1]

Dwarf novae (DNs) are mass-exchanging binaries showing repeated outbursts, lasting from days to weeks and recurring on timescales from weeks to years, in which their accretion discs brighten by factors 20-100 either because of a thermal-viscous instability cycle in the accretion disc (the DI model) or as a consequence of an instability in the mass-donor star leading to a burst of enhanced mass-transfer (the MTI model). While the issue seemed to be settled in favor of the DI model, the last decade has progressively provided compelling evidence in support of the idea that there is a group of DN the outbursts of which are powered by MTI. V2051 Oph is one of the DNs yielding stronger evidence in favor of the MTI (Baptista et al. 2007). Here we report eclipse mapping analysis of velocity-resolved ($|v| = 400 - 1000\,km/s$) $H\beta$, $HeI\,\lambda4922$ and nearby continuum light curves of V2051 Oph on 4 consecutive nights along its 2002 July outburst, based on spectroscopy collected with the 1.5 m ESO telescope. The outburst starts with a ring of enhanced emission at the circularization radius, which spreads inwards and outwards with velocities of $\geq -0.9\,km/s$ and $+0.2\,km/s$, respectively, to form an extended bright disc in less than a day. The outburst maximum $H\beta$ map shows two asymmetric arcs reminiscent of the spiral arms seen in other outbursting dwarf novae. Assuming a distance of 108 pc, the disc temperatures at outburst maximum barely reach the critical temperature above which the gas should be while in outburst according to DI model, and remain below that limit on all other nights. The results are at odds with predictions of the DI model, but are in good agreement with the expected response of a viscous disc to a burst of dense, enhanced mass-accretion through its sparse outer regions.

[1] Grupo de Astrofísica, Universidade Federal de Santa Catarina, Brazil (eduardo.andrade@astro.ufsc.br, raybap@gmail.com).

SPECTROSCOPY OF THE OPEN CLUSTER REMNANT CANDIDATE ESO429-SC02

M. S. Angelo[1], W. J. B. Corradi[1], J. F. C. Santos Jr.[1], and F. F. S. Maia[1]

In this study we intend to assess the physical nature of the open cluster remnant (OCR) candidate ESO429-SC02. In a previous work, the method of characterization devised by Pavani & Bica (2007) failed to characterize the object as an OCR or as an asterism, classifying it as a possible OCR. We carried out multi-object spectroscopy of 31 stars in its inner area (r $\lesssim 4'$) using GMOS/GEMINI-S (resolution $R \approx 2000$). We cross-correlated (IRAF's FXCOR task) our science spectra with all templates from ELODIE and PHOENIX libraries to obtain radial velocities and atmospheric parameters. We also employed 2MASS photometric data and proper motions from UCAC4. Individual distances via spectroscopic parallax and reddening values were derived for our science stars. In order to identify candidate member stars, we performed a 5-dimensional sigma-clipping routine using positional an kinematical data to interactively reject outliers and selected those stars well fitted by a Padova isochrone in $K_s \times (J - K_s)$ and $(J - H) \times (H - K_s)$ diagrams. Although a isochrone fitting solution was found, individual distances of stars close to the *turnoff point* or to the RGB range from 1.5 kpc to 4.4 kpc; $E(B - V)$ values range from 0.0 to 0.46; $[Fe/H]$ from -0.95 to 0.61 dex and radial velocities from 9 to 64 km/s. Besides, spectral types distribution of candidate member stars along the main sequence and the high dispersion in the parameters derived for them are inconsistent with what is expected for a coeval system. Our results suggest that ESO429-SC02 is a random overdensity of field stars along the line of sight.

[1] Physics Department - ICEx/UFMG (Brazil).

FAST AND SLOW RADIATION-DRIVEN WIND SOLUTIONS USING ZEUS-3D

I. Araya[1], M. Curé[1], A. ud-Doula[2], and A. Santillán[3]

Currently, the theory of radiation–driven winds of massive stars possess three known solutions for the velocity and density profiles of the stellar winds, namely: the fast, Ω–*slow* and δ–*slow* solutions. In order to confirm their stability we use a time–dependent numerical hydrodynamic code called ZEUS-3D, and then we compare their results with the stationary solutions from our numerical hydrodynamic code. ZEUS-3D needs an initial trial solution to start to integrate, for this we use the stationary solution (from our code) or a β–law for the velocity field. In both cases we obtain the same results. Fast and both slow stationary solutions are

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attained in ZEUS-3D and are all stable. Furthermore, there is a very good agreement with the velocity and density fields from ZEUS-3D and our code, having differences between the terminal velocities lower than 3%.

In addition, we found that ZEUS-3D is very sensitive to the boundary conditions (base density and velocity profile), in some cases we obtain *kinks* in the velocity profiles, similar to the ones obtained by Madura et al. (2007) for stars with high rotation. Such kinks are most likely the result of the wind being mass overloaded, but further investigation is needed to understand its nature better.

Currently, we are exploring the effects of small perturbation at the base of the wind in order to study possible transitions or oscillations between δ–slow and fast solutions.

[1] Instituto de Física y Astronomía, Universidad de Valparaíso, Chile (ignacio.araya@uv.cl).
[2] Penn State Worthington Scranton, Dunmore, USA.
[3] DGTIC, Universidad Nacional Autónoma de México, Mexico City, Mexico.

EFFECTS OF NON-STANDARD NEUTRINO EMISSION ON THE EVOLUTION OF LOW-MASS STARS

S. Arceo-Díaz[1], K-P. Schröder[1], D. Jack[1], and K. Zuber[2]

Using the Pools et al. (1995) version of the STARS code with updated numerical tables for neutrino plasmon decay (Kantor et al. 2007), along with the reinterpretation of the Reimers mass-loss prescription by Schröder et al. (2005), we analyze the consequences of enhanced neutrino emission on the internal structure and late evolution of the degenerated cores in low-mass stars, the non-standard increase in tip-RGB luminosity and the impact on the calibration of the Reimers mass-loss mechanism and the changes driven in post-RGB phases. With synthetic spectra generated with the PHOENIX code Baron & Hauschildt et al. (1997), we also study the dependence of the non-standard increase in brightness on the selected NIR photometric band. By comparing our stellar evolutionary models with the synthetic spectra and the photometric data base of $\omega-$Cen by Sollima et al. (2004), we find the limit value $\mu_\nu \leq 2.2 \times 10^{-12} \mu_B$.

[1] Departamento de Astronomía, UGTO, Campus Guanajuato, apartado postal 36240, Guanajuato, México (santiago@astro.ugto.mx).
[2] Institut fur Kern- und Teilchenphysik, Technische Universitat Dresden, Zellescher Weg 19, D-01069 Dresden, Germany.

WIND STUDY OF B SGS STARS

C. Arcos[1], M. Curé[1], S. Kanaan[1], L. S. Cidale[2], and M. Haucke[2]

The estimation of the stellar and wind parameters of B SG stars, give us important information to understand their evolution. It is known from previous studies that the A type non-rotating (or slow rotator) SGs stars can have two types of solution: one fast and one slow. Here we study the two types of solutions for eight B SGs stars (HD41117, HD42087, HD79186, HD52382, HD80077, HD52382, HD75149, HD53138) using the hydrodynamics to calculate the velocity profile and using the modified version of FASTWIND to reproduce the H_α line profile. Finally, we compare these results with the β Law using FASTWIND and HDUST code. We obtained less mass loss values using FASTWIND than hydrodynamic ones (in a factor between 2-3). The Wind-Luminosity Relation agrees with Kudritzki et al. (1999) for the velocity profiles β type, but for the values found with hydrodynamics the relation has a negative slope. For the ratio v_∞/v_{esc}, we obtained as the v_{esc} increases the v_∞ decreases, like it was found by Curé et al. (2011) for δ-slow solutions.

[1] Departamento de Física y Astronomía, Universidad de Valparaíso, Valparaíso, Chile. (katalina.arcos@uv.cl).
[2] Instituto de Geofísica y Astronomía, Universidad Nacional de La Plata, La Plata, Argentina.

ON MAGNETIC FIELDS IN BAROTROPIC STARS

C. Armaza[1,*], A. Reisenegger[1], J. A. Valdivia[2], and P. Marchant[1,3]

Although barotropic matter does not constitute a realistic model for magnetic stars on short timescales, it would be interesting to confirm a recent conjecture that states that magnetized stars with a barotropic equation of state would be dynamically unstable (Reisenegger 2009). In this work we construct a set of barotropic equilibria, which can eventually be tested using a stability criterion. A general description of the ideal MHD equations governing these equilibria is summarized, allowing for both poloidal and toroidal magnetic field components. A new