show that the dynamical age of the association obtained via the traceback technique and the average age derived from theoretical evolutionary models are in good agreement.

[1] Instituto de Astronomia, Geofísica e Ciências Atmosféricas (IAG/USP).
[2] CNRS, LAB, UMR - Observatoire de Bordeaux.
[3] SIM/IDL - Depto. Física - Universidade de Lisboa.
[4] Dept. of Physics & Astronomy - UCLA.
[5] Lab. Astrophysique - Observatoire de Grenoble.
[6] Dept. of Physics & Astronomy - University of Georgia.

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## DIFFERENTIAL CHEMICAL ABUNDANCES OF HEAVY ELEMENTS IN SOLAR TWINS

M. Tucci Maia[1] and J. Meléndez[1]

In this work we present differential chemical abundances of neutron-capture elements (Z >30) in solar twins. We have obtained high resolution (R = 60,000) and high S/N ( >100) spectra of solar twins in the ultraviolet region (310-400nm) with the UVES spectrograph at the VLT/ESO. In the same configuration we also observed that the Sun, that is our reference for the differential analysis, thus obtaining results with high accuracy and precision. In the ultraviolet there is a large number of atomic transitions of heavy elements, which allows the detailed study of the r and s processes. Our sample of solar twins covers a wide range of ages, so it will be possible to study the temporal evolution of the neutron capture elements.

[1] Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, Rua do Matão, 1226, Cidade Universitária, São Paulo, Brasil (marcelotuccimaia@usp.br).

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## ON THE SENSITIVITY OF EXTRASOLAR MASS-LOSS RATE RANGES: HD 209458B A CASE STUDY

C. S. Villarreal D'Angelo[1], E. M. Schneiter[1,2], A. Costa[1,2], P. Velázquez[3], A. Raga[3], and A. Esquivel[3]

We present a 3D hydrodynamic study of the effect that different stellar wind conditions and planetary wind structures have on the calculated Ly$\alpha$ absorptions during the transit of HD209458b. We approach the problem using 3D hydrodynamic simulations. Considering a range of stellar wind speeds $\sim[350 - 800]$ km s$^{-1}$, coronal temperature $\sim [3 - 7] \times 10^6$ K and two values of the polytropic index $\Gamma \sim [1.01 - 1.13]$, while keeping fixed the stellar mass loss rate, we found a that a $\dot{M}_p$ range between $\sim [3 - 5] \times 10^{10}$g s$^{-1}$ give account for the observational absorption in Ly$\alpha$ measured for the planetary system. Also, several models with anisotropic evaporation profiles for the planetary escaping atmosphere were carried out, showing that both, the escape through polar regions, resembling the emission associated with reconnection processes, and through the night side, produced by a strong stellar wind that compresses the planetary atmosphere and inhibits its escape from the day hemisphere yields larger absorptions than an isotropic planetary wind.

[1] Instituto de Astronomía Teórica y Experimental, CONICET-UNC(cvillarreal@oac.uncor.edu).
[2] Faculty of Ciencias Exactas, Físicas y Naturales UNC.
[3] Instituto de Ciencias Nucleares, UNAM.

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## INFRARED ACCRETION DISC MAPPING OF THE DWARF NOVA V2051 OPHIUCHI IN OUTBURST AND IN QUIESCENCE

E. Wojcikiewicz[1] and R. Baptista[1]

Dwarf novae are compact binaries where a late-type star (the secondary) fills its Roche lobe and transfers matter to a companion white dwarf (the primary) via an accretion disc. They show outbursts which recur on timescales of weeks to years, where the accretion disc brightens by factors 20 to 100 either due to a thermal-viscous instability in the disc (DI model) or to a burst of enhanced mass-transfer from the secondary (MTI model). We report time-series of fast photometry of the dwarf nova V2051 Oph in the J and H bands, obtained with the CAMIV at the 1.6 m telescope of Observatório Pico dos Dias/Brazil, during the decline of an outburst in 2005 June, and in 2008 when the object was in quiescence. We modeled the ellipsoidal variations caused by the secondary to infer its contribution to the J and H fluxes, and fitted stellar atmosphere models to find a photometric parallatic distance of $d = (111 \pm 14)pc$. Front-back brightness asymmetries in J and H-band eclipse maps along the decline from the 2005 outburst suggest that the accretion disc had a non-negligible opening angle which decreased as the disc cooled down. The time evolution of the disc radial temperature distribution along the outburst decline shows a cooling wave which *accelerates* as is travels inwards – in contradiction to a basic prediction from the DI model.

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[1] Grupo de Astrofísica, Universidade Federal de Santa Catarina, Brazil (eduardo@astro.ufsc.br; bap@astro.ufsc.br).

## MASS SEGREGATION OF YOUNG STAR CLUSTERS

J. Yu[1]

Mass segregation of the young star cluster is one of the dynamical properties which is an important tool to investigate the star forming process and dynamical evolution of star clusters. The origin of this mass segregation has been suggested as either primordial, that is, it is a result of the star formation process in which stars form mass segregated from their parent molecular cloud, or dynamical, i.e., resulting from fast dynamical evolution. Recent $N$-body simulations suggest initially dynamically cool and sub-structured star clusters can be mass segregated within very short timescale. We investigate the influence of different initial parameters to further constrain our theoretical model for young-mass segregated star clusters. In particular, we focus on the correlation between the morphology and the degree of mass segregation of the early evolution of young star clusters. We find that young star clusters cannot be highly mass segregated while they are still fractal. Therefore, we conclude that mass segregation of young star clusters is unlikely to be purely dynamical.

[1] Pontificia Universidad Católica de Chile (yujc@astro.puc.cl).

# GALAXIES

## STELLAR FEEDBACK FROM BLACK-HOLE HIGH-MASS X-RAY BINARIES IN GALAXY FORMATION MODELS

M. C. Artale[1,2], P. B. Tissera[1,2], and L. J. Pellizza[1,3]

In recent years, many works have suggested the role of black-hole high-mass X-ray binaries (BH-HMXB) as potential sources of heating and re-ionization in the interstellar and intergalactic medium. Furthermore, because of the suggested increase of their production rate and X-ray luminosity with decreasing metallicity, BH-HMXBs could be relevant to explain the thermal and ionization history of the Universe at its early stages. As observations indicate, a meaningful amount of the energy released by these sources could be deposited in the local interstellar medium, suggesting that BH-HMXB could modify star forming regions on the host galaxy. In this work, we study the kinetic BH-HMXB feedback using hydrodynamical cosmological simulations which also include SNe feedback. Our preliminary results suggest that BH-HMBXs feedback is not efficient at modifying the star formation activity. However, due the complexity of the problem and the wide dynamical range needed to describe properly different physical events, there are still different schemes to explore. In the future, we will study the role of BH-HMXBs in high numerical resolution simulations at high redshifts, and how the energy is released into the interstellar medium.

[1] Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina.
[2] Instituto de Astronomía y Física del Espacio, Buenos Aires, Argentina.
[3] Instituto Argentino de Radioastronomía, Berazategui, Argentina.

## THE LMC OUTER DISK STELLAR POPULATION IN THE LIGHT OF THE DARK ENERGY SURVEY

E. Balbinot[1,2], B. Santiago[1,2], L. Girardi[4], L. N. da Costa[2,3], and M. A. G. Maia[2,3]

The outermost regions of the Large Magellanic Clouds (LMC) have recently been covered by Dark Energy Camera (DECam) Science Verification data, in preparation for the Dark Energy Survey (DES). Although the DES footprint misses the bar and main star forming regions of the LMC, the available data sample a large and continuous area of the LMC disk down to $r \simeq 24$ at distances greater than 5 degrees from its center. This large surveyed region opened the possibility to study the outer LMC star formation history (SFH) with unprecedented detail. In this work we employ the partial models method (Gallart et al 1999; Javiel et al 2005) to recover the SFH and its spatial variations in the outskirts of the LMC from the observed colour-magnitude diagrams. We take the MW foreground stars into account by modelling them with TRILEGAL (Girardi et al. 2005). With this technique we were able to recover the spatial dependency of the LMC outer components SFH and estimate its extension as well as the inclination and depth of the LMC disk. As a byproduct of our