

sequence star. We estimated that NGC 2264 stars have masses, mainly, in the range $0.1\text{--}0.6M_{\odot}$ and the mean age of stars' cluster is 3.5 Myr, what is in agreement with other works.

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UNVEILING OPTICAL AND X-RAY PROPERTIES OF THE HIGH MASS X-RAY BINARY XMMU J054134.7-682550

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XMMU J054134.7-682550 is an X-ray source located in the Large Magellanic Cloud. Based on its X-ray properties, and from optical and near-infrared photometry, it was assumed to be a Be/X-ray binary. In this work we present the characterization of its optical counterpart from optical medium-resolution spectra acquired with the 3.6-m New Technology Telescope and the 4.1-m SOAR Telescope. Photospheric lines along with strong emission lines from the $H\alpha$, $H\beta$ and several transitions of iron show that the optical counterpart is a Be star with a dense or large circumstellar disk. Thus, it is now conclusive that the system is indeed a Be/X-ray binary. Additionally, we present an ongoing program which aims to improve the characterization of the system from XMM-Newton, Swift/BAT and ASM/RXTE X-ray observations.

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IN SEARCH OF PRECISE ISOCHRONAL AGES: MONTE CARLO AND BAYESIAN APPROACH

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Obtaining accurate ages for FGK stars is important to understand the Galactic structure and evolution as well as the evolution of exoplanetary systems. We build a dense grid of isochrones and evolutionary tracks aimed to identify, in several spectroscopic surveys, which are the most reliable stellar ages based on solid statistics. For this, we calculate their probability distributions of isochronal age and fundamental parameters such as mass, radius (at ZAMS) and surface gravity through Monte Carlo simulations and Bayesian inference. From these determinations, we will be able to derive a sample of MS and subgiant stars with very accurate isochronal ages covering an extensive domain of ages, masses and metallicities. This sample will be very useful for future observational follow-ups and, moreover, when applied to age-activity-rotation relationships will enable the construction of robust age calibrations for solar-type stars. Such calibrations of age and activity might contribute towards the establishment of firmer relations governing the evolution of angular momentum in solar-type stars.

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SYMBIOTIC STARS IN X-RAYS AND UV

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Until recently, symbiotic binary systems in which a white dwarf accretes from a red giant were thought to be mainly a soft X-ray population. I will describe the detection with the Swift/XRT of 14 white dwarf symbiotics that were not previously known to be X-ray sources. The 14 new X-ray detections were the result of a survey of more than 50 symbiotic stars using Swift fill-in programs during three years. Their X-ray spectra are consistent with thermal emission and fall naturally into three distinct groups. The first group contains those sources with a single, highly absorbed hard component, which we identify as probably coming from an accretion-disk boundary layer. The second group is composed of those sources with a single, soft X-ray spectral component, which likely arises in a region where low-velocity shocks produce X-ray emission, i.e. a colliding-wind region. The third group consists of those sources with both hard and soft X-ray spectral components. Simultaneous Swift/UVOT data allowed us to find that unlike in the optical, where

rapid, stochastic brightness variations from the accretion disk typically are not seen, detectable UV flickering is a common property of symbiotic stars. Supporting our physical interpretation of the two X-ray spectral components, the UV photometry shows that symbiotic stars with harder X-ray emission tend to have stronger UV flickering, which is usually associated with accretion through a disk.

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PHOTOMETRIC ANALYSIS OF GALACTIC STELLAR CLUSTERS IN VVV SURVEY

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We show the preliminary results of the study of the structure of the Horizontal Branch of Liller 1 and some results from the Calcium Triplet method using Ks magnitude applied to several Galactic Globular clusters using data from the VISTA Variables in the Via Lactea Survey (Minniti et al. 2010) and obtained with GeMS/GSAOI. The data are extracted with the new automatic VVV-SkZ_pipeline photometric pipeline (Mauro et al. 2013).

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ATMOSPHERIC STRATIFICATION SIGNS IN NON-LTE OF ³HE AND ⁴HE IN THE BP STAR A CEN

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We have analyzed a high-resolution and high-S/N UVES spectrum of the Bp star a Centauri (He-variable) by means of state-of-the-art non-LTE spectral synthesis. Atmospheric parameters were determined in an iterative way via ionization equilibria of OI/II and FeII/III and the matching of several Balmer lines simultaneously. Because of chemical stratification and the presence of ³He, the He lines are not matched with a standard model atmosphere.

A new He model atom accounting for the ³He isotope and an empirically solution for the He stratification in the line-formation calculations allow us to characterize this star in a more realistic manner than do classical models.

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STELLAR MODELS OF ROTATING, PMS STARS WITH MAGNETIC FIELDS

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We report our ongoing studies of the magnetic field effects on the structure and evolution of low-mass stars, using a method first proposed by Lydon & Sofia (1995, ApJS 101, 357) which treats the magnetic field as a perturbation on the stellar structure equations. The ATON 2.3 stellar evolution code (Ventura et al. 1998, A&A 334, 953) now includes, via this method, the effects of an imposed, parametric magnetic field whose surface strength scales throughout the stellar interior according to one of the three following laws: (a) the ratio between the magnetic and gas energy densities, β_{mg} , is kept at its surface value across the stellar interior, (b) β_{mg} has a shallower decrease in deeper layers, or (c) β_{mg} decays as $[m(r)/M_*]^{2/3}$. We then computed rotating stellar models, starting at the pre-main sequence phase, of 0.4, 0.6, 0.8 and 1.0 $M_{\odot}$ with solar chemical composition, mixing-length convection treatment with $\alpha = \Lambda/H_P = 1.5$ and surface magnetic field strength of 50 G. Summarizing our main findings: (1) we confirm that the magnetic field inhibits convection and so reduces the convective envelope; (2) the magnetic perturbation effect dominates over that of rotation for 0.8 and 1.0 $M_{\odot}$ masses, but their relative impact shows a reversal during the Hayashi tracks at lower masses (0.4 and 0.6 $M_{\odot}$); in any case, the magnetic perturbation makes the tracks cooler; and (3) the magnetic field contributes to higher surface lithium abundances.

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