on 2MASS images was carried out for populous clusters younger than approximately 100 Myr and whose ages are available. The integrated magnitudes and colors extracted from the surface photometry showed the same bimodal distribution in JHK diagrams as that found for more distant galaxies, suggesting that the phenomenon is universal. We confirm the index Q_d as a powerful tool to distinguish clusters younger than about 7 Myr from older clusters.

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MAPPING OF THE PHYSICOCHEMICAL CONDITIONS OF THE PLANETARY NEBULA MENZEL 1

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We prensent a study of the physicochemical conditions of the planetary nebula Menzel 1 using the method of spatially resolved spectrophotometric mapping. The data used in this study were collected in the Cerro Tololo Inter-American Observatory (CTIO) 0.9 m telescope. Observations were made with traditional long-slit spectroscopy with exposures taken for multiple parallel positions along the object in order to map it. The separation of the 4" slits were of 4". Initially, a data cube was created with the spectra obtained for each position of the slit. We used MPFIT - a software package that aims to find parameters that best fit the data to a function - to fit gaussians to the emission lines observed in each pixel of the spatial direction, for each slit in the data cube. We then reconstructed the image of the nebula for each a given emission line extracted from the data cube, interpolating between observed slit positions. With these maps, we obtained the interstellar extinction from the $H\alpha/H\beta$ ratio pixel by pixel. We obtained the density map from the [SII]671.7nm/673.1nm ratio and the temperature map from the [NII](654.8+658.4)nm/575.5nm ratio. Using the code NEAT (Nebular Empirical Analysis Tool), the maps of the chemical abundance were calculated from the flux maps. These maps provide a spatially resolved overview of the physicochemical conditions found in this object. From the maps, we calculated mean values for the main diagnostics, which compared well with values from the literature, showing that we retrieved results from observations without spatial resolution. This method allows the study of planetary nebulae in more detail than conventional methods.

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MODELING BLUE HORIZONTAL BRANCH STARS

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The stars of the Blue Horizontal Branch (BHB) are characterized by having being through most of their evolutionary process and lost part of their external layers, leaving only a thin layer of hydrogen and a burning Helium nucleus. This makes these stars very blue and hot, although old. They are present in many stellar population systems (e.g. stellar clusters and elliptical galaxies), and their presence can induce errors in the age determination of these objects using integrated spectra. The stellar population analysis technique using integrated spectra is a very powerful tool nowadays, however stellar population models do not account for the BHB stars. Because of that, the presence of these stars induces to the determination of younger ages than expected for these systems. In this project we will create synthetic spectra for the BHB stars that can be incorporated to the stellar population models to be used in spectral synthesis. Here we present a study of the atmospheric parameters of these stars that will be used to create the synthetic spectra.

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ACCRETION DISC MAPPING OF THE SHORTEST PERIOD ECLIPSING BINARY SDSS J0926+36

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AM CVn stars are ultracompact binaries ($P_{orb} <$ 65 min) where a hydrogen-deficient low-mass, degenerate donor star overfills its Roche lobe and transfers matter to a companion white dwarf via an accretion disc. SDSS J0926+36 is currently the only eclipsing AM CVn star and also the shortest period eclipsing binary known. Its light curve displays deep ($\sim$ 2 mag) eclipses every 28.3 min, which last for $\sim$ 2 min, as well as $\sim$ 2 mag amplitude outbursts every $\sim 100 - 200$ d. Superhumps were seen in its quiescent light curve in some occasions, probably as a reminiscence of a (in some cases undetected) previous outburst. Its eclipsing nature allows a unique opportunity to disentangle the emission from several different light sources, and to map the surface brightness distribution of its hydrogen-deficient accretion disc with the aid of maximum entropy eclipse mapping techniques. Here we report the eclipse mapping analysis of optical light curves of SDSS J0926+36, collected with the 2.4 m Liverpool Robotic Telescope, covering 20 orbits of the binary over 5 nights of observations between 2012 February and March. The object was in quiescence at all runs. Our data show no evidence of superhumps nor of orbital modulation due to anisotropic emission from a bright spot at disc rim. Accordingly, the average out-of-eclipse flux level is consistent with that of the superhump-subtracted previous light curves. We combined all runs to obtain an orbital light curve of improved S/N. The corresponding eclipse map shows a compact source at disc centre ($T_b \simeq 17000\,K$), a faint, cool accretion disc ($\sim 4000\,K$) plus enhanced emission along the gas stream ($\sim 6000\,K$) beyond the impact point at the outer disc rim, suggesting the occurrence of gas stream overflow at that epoch.

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ALS 2883: ANALYSIS OF SPECTROSCOPIC FEATURES

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ALS 2883 (RA $13^h02^m47^s$, DEC $-63^o50'08''$, M_v 10.1) is the first known radio pulsar with an emission B-type companion system, discovered in 1992. The Be companion of ALS 2883 has all line profiles in the visible range in emission. This emission is a common hallmark among many Be stars, and this effect is thought to be due to the presence of a circumstellar environment. Also, the star is orbiting a X-ray source as has been detected by the XMM-Newton Science Operation Center. In this study, we present the observations of ALS 2883 made at the OPD/LNA 1.60 m telescope with the Coudé spectrograph in the range 4000 to 5000 Å and S/N $\simeq$ 200, performed in April 2011. First-order estimations of T_{eff} and log g parameters have been performed through Johnson's UBV and JHK photometric calibrations. Projected rotation velocity V sin i has been estimated through the mean of the first zeroes of the Fourier transforms of neutral helium rotation profiles adopting linear, quadratic and square-root limb-darkening laws. The physical conditions of the circumstellar envelope were estimated through the solution of the radiative transport equation assuming local thermodynamic equilibrium within a disk-shaped circumstellar environment with a Keplerian velocity field. The radiative transport equation is solved assuming the Roche model as a boundary condition in the circumstellar environment. Iterating the computations with a downhill-simplex algorithm, this analysis leads to a best solution for an envelope with T $\simeq$ 9500 K, gas density $\rho \simeq 2 \times 10^{-15} g.cm^{-3}$, internal radius $r_i \simeq 8\ R_\odot$ and external radius $r_e \simeq 30\ R_\odot$, rotating with $V_{rot} \simeq 140$ km.s^{-1} and expanding with $V_{exp} \simeq 90$ km.s^{-1}.

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TIME-DEPENDENT NONEXTENSIVITY ARISING FROM THE STELLAR ROTATION

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In nonextensive formalism (NF) the index q can be interpreted as a parameter of long-memory. When $q \to 1$ the system becomes extensive and the memory effects are negligible. We found that for solar-type stars in open clusters the index q of the distribution of $V \sin i$ decreases with the cluster age. The extensivity of the distributions ($q = 1$) is not present until about an age range of $100 - 700$Myr. A possible explanation for the anti-correlation can be the