the bulge, using photometry provided by the VISTA Data Flow System. The goal of this project is to duly provide science-ready data products in the form of a simple on-line database which may serve as the basis for various specific studies from stellar pulsation to microlensing, conducted by the VVV community. I will discuss the main steps of the procedure, the characteristics and possible uses of the database, the current status of the project, and will conclude by highlighting selected results.

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PARAMETERS FOR SMC CLUSTERS FROM CMD MODELING

B. Dias[1,2], L. Kerber[1,3], B. Barbuy[1], B. Santiago[4], S. Ortolani[5], and E. Balbinot[4]

Stellar clusters in the Small Magellanic Cloud are fundamental pieces to study the chemical and dynamical evolution of this neighbouring dwarf galaxy, enabling inspection of a large period covering ∼10 Gyr. The main goals of this work are the derivation of age, metallicity, distance modulus, reddening, core radius and central density profile for each cluster, and place them in the context of the Small Cloud evolution. The studied clusters are: AM 3, HW 1, HW 34, HW 40, Lindsay 2, and Lindsay 3, where HW 1, HW 34, and Lindsay 2 are studied for the first time. Optical colour-magnitude diagrams (V, B-V CMDs) and radial density profiles were built from images obtained with the 4.1m SOAR telescope, reaching V ∼ 23. The determination of structural parameters were carried out applying King profile fitting. The other parameters were derived in a self-consistent way by means of isochrone fitting, which uses the likelihood statistics to identify the synthetic CMDs that best reproduce the observed ones. Membership probabilities were determined comparing the cluster and control field CMDs. Completeness and photometric uncertainties were obtained performing artificial star tests. The results confirm that these clusters (except HW 34, identified as a field fluctuation) are intermediate-age clusters, with ages between ∼1 and ∼5 Gyr. Their metallicities follow the age-metallicity relation by Pagel & Tautvaisiene (1998), with some spread as described by Parisi (2009) and Piatti (2011). In particular HW 1, Lindsay 2, and Lindsay 3 are located in a region that we called West Halo. (Based on paper by Dias et al. 2013, A&A, accepted; arXiv: 1311.4579).

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A PSF-FITTING PIPELINE FOR VVV-ESO: THE STAR CLUSTER PISMIS 24

R. A. G. Dias[1] and C. Bonatto[1]

Este trabalho apresenta um algoritmo para a extração de dados fotométricos do catálogo *"VISTA Variables in the Via Láctea"* (VVV) do ESO. A principal característica do algoritmo é evitar a interação com o usuário mantendo precisão e profundidade fotométrica, de fato o algoritmo foi capaz de gerar dados mais precisos para as estrelas menos brilhantes (J $\gtrsim$ 16, H $\gtrsim$ 15,5 e H $\gtrsim$ 15) e confiável fotometria para estrelas mais de uma magnitude mais fracas do que as detectáveis com outras técnicas. Embora o algoritmo obtenha resultados menos precisos para as estrelas mais brilhantes, este provou ser o método mais adequado, uma vez que queremos trabalhar com aglomerados abertos jovens, onde a pré-sequência principal é de maior importância. Além disso, podemos combinar 2MASS e VVV para substituir as estrelas saturadas do VVV.

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PROPER MOTIONS OF PRE-MAIN SEQUENCE STARS

A. C. S. Ferreira[1], R. Teixeira[1], C. Ducourant[2], P. A. B. Galli[1], J. F. Le Campion[2], and M. Fidêncio[1]

The kinematic study of young stars is an important tool to discuss the early stages of star formation. In this context, proper motions allow us to detect moving group structures of young stars to which they belong. Individual distances to moving group members can be inferred from proper motion and radial velocity data using the convergent point strategy. The main objective of this work is to determine proper motions of pre-main sequence stars in nearby star-forming regions. This work represents an improvement of an existing database by including more pre-main sequence stars and refining the astrometry for

stars with poor proper motion information in the literature. We calculate the stellar proper motions from observations performed with the CCD meridian circles located at the Abrahão de Moraes Observatory (Valinhos, SP) and the Bordeaux Observatory, and also use data from the literature. Here we discuss the accuracy of our results and compare them with published astrometric catalogs.

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CLASSICAL CEPHEIDS FROM LONG-BASELINE INTERFEROMETRY: DIAMETERS, DISTANCES, CIRCUMSTELLAR ENVELOPES AND BINARITY

A. Gallenne[1], P. Kervella[2], A. Mérand[3], and J. Breitfelder[2,3]

Optical interferometry is the only technique giving access to milli-arcsecond resolution at optical/infrared wavelengths. For Cepheids, this is a powerful and unique tool to measure distances in a pseudo-geometric way, and probe the close circumstellar environment.

While the measured mean angular diameter allows us to probe the pulsation mode, its angular and linear variation can provide the distance to the star. Independent distance measurements are particularly important because classical Cepheids are used as primary distance indicator in the Local Group.

Interferometry also offers the possibility to probe the close environment of these stars, and so study their circumstellar envelopes (CSEs) and the companions. The characterization of the CSEs is particularly important as they give access to the present mass loss rate of Cepheids. These CSEs were probably formed through past or ongoing mass loss, possibly generated by shock waves in the pulsating atmosphere of the Cepheid. Their presence can also bias the distance estimate through the Baade-Wesselink method. Finally, when Cepheids are in binary systems, we can investigate their age and evolution, estimate the mass and distance, and constrain evolution and pulsation models. However, most of the companions are located too close to the Cepheid ($\sim$ 1-40 mas) to be observed with a 10-meter class telescope. The only way to spatially resolve such systems is to use long-baseline interferometry or aperture masking.

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TWIN-PEAK QUASI-PERIODIC OSCILLATIONS IN X-RAY BINARIES: CLUES FROM THEIR AMPLITUDE AND COHERENCE

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Low-mass X-ray binaries (LMXBs) with either a black hole or a neutron star show power spectra characterized by several enhanced fractions of power at given frequencies, such as quasi-periodic oscillations (QPOs). Twin-peak high-frequency QPOs (HF QPOs) are typical of the orbital motion time-scale for matter orbiting within 10 r_g from the compact object ($r_g = GM/c^2$ is the gravitational radius of the compact object). Thus, such modulations could arise from the energy released by accreting clumps of matter interacting with the strong gravitational field of the compact object. Twin-peak HF QPOs are characterized by their central frequency ν, root mean square amplitude (rms) and coherence $Q = \nu/\Delta\nu$, where $\Delta\nu$ is the width of the peak. Here we investigate on the characteristic behavior of the rms observed in several LMXBs. We highlight the work done by the strong tidal force as root source of the energy (rms) released by a QPO. By means of the Schwarzschild potential we estimate the maximum allowed radius of clumps of matter that can survive to tides in the inner part of the accretion disk. It turns to be $R \sim 40$ m for matter in an accretion disk around a 2 $M_\odot$ neutron star and $R \sim 150$ m for matter around a 10 $M_\odot$ black hole. The work loaded by tides on the clump of matter depends on the Schwarzschild potential shape for the given orbit. We highlight that for orbits approaching to the inner most stable circular orbit (ISCO) the changing Schwarzschild potential shape may account for the observed behavior of the energy (rms) carried by the twin-peak HF QPOs.

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