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CCD Photometry of the Open Cluster Tombaugh 5 in the Vilnius System

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Abstract. We present the results of eight-color CCD photometry of 674 stars in the direction of the open cluster Tombaugh 5 in Camelopardalis. The stars are observed in the Vilnius system supplemented by the broad-band *I* filter; the field is of 22' diameter, the limiting magnitude is $V = 17.7$ mag. The catalog contains the coordinates, *V* magnitudes, seven color indices, two-dimensional spectral types determined from photometric parameters, interstellar extinctions and distances. The color-magnitude diagram plotted for 480 individually dereddened stars is used to identify cluster members and to determine the distance (1.74 kpc) and age (200–250 Myr) of the cluster. The faintest cluster stars classified are of spectral class G0. The cluster contains two blue stragglers of spectral classes B2–B4, both of them seem to be visual binaries. The extinction A_V for the cluster stars is non-uniform, being spread between 2 and 3 mag, with a mean value of 2.42 mag. The extinction vs. distance dependence can be modeled by the Parenago exponential curve with dust concentrations in the Camelopardalis dark clouds at about 150 pc and the Cam OB1 association clouds at 0.9–1.0 kpc.

Key words: stars: fundamental parameters – Galaxy: open clusters: individual (Tombaugh 5)

Vilnius Multicolor CCD Photometry of the Open Cluster NGC 752

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Abstract. We have performed multicolor CCD observations of the central area of NGC 752 to search for faint, low-mass members of this open cluster. Four $12' \times 12'$ fields were taken on the 1.8 m Vatican Advanced Technology Telescope (Mt. Graham, Arizona) using a 4K CCD camera and eight intermediate-band filters of the *Strömvil* system. In this paper we present a catalog of photometry for 405 stars down to the limiting magnitude $V = 18.5$, which contains V magnitudes and color indices of the *Vilnius* system, together with photometric determinations of spectral types, absolute magnitudes M_V , interstellar reddening values E_{Y-V} and metallicity parameters $[\text{Fe}/\text{H}]$. The good quality multicolor data made it possible to identify the locus of the lower main sequence to four magnitudes beyond the previous (photographic) limit. A relatively small number of photometric members identified at faint magnitudes seems to be indicative of actual dissolution of the cluster from the low-mass end.

Key words: techniques: photometric – stars: fundamental parameters – Galaxy: open clusters: individual (NGC 752) – Galaxy: stellar content

Chemical Composition of the RS CVn-type Star 33 Piscium

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Abstract. Abundances of 22 chemical elements, including the key elements and isotopes such as ^{12}C , ^{13}C , N and O, are investigated in the spectrum of 33 Psc, a single-lined RS CVn-type binary of low magnetic activity. The high resolution spectra were observed on the Nordic Optical Telescope and analyzed with the MARCS model atmospheres. The following main parameters have been determined: $T_{\text{eff}} = 4750$ K, $\log g = 2.8$, $[\text{Fe}/\text{H}] = -0.09$, $[\text{C}/\text{Fe}] = -0.04$, $[\text{N}/\text{Fe}] = 0.23$, $[\text{O}/\text{Fe}] = 0.05$, $\text{C}/\text{N} = 2.14$, $^{12}\text{C}/^{13}\text{C} = 30$, which show the first-dredge-up mixing signatures and no extra-mixing.

Key words: stars: RS CVn binaries, abundances – stars: individual (33 Psc = HD 28))

On the Optical Spectrum of 89 Her

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Abstract. The high resolution spectra of a post-AGB candidate, binary system 89 Her, were analysed for the chemical composition. The star was found to be metal deficient with $[\text{Fe}/\text{H}] = -0.50 \pm 0.20$. No enhancement of s-process elements was found. The refractory elements are depleted but this is not the reason of metal deficiency. More than 320 narrow and weak emission lines from low levels of neutral metals were identified. Radial velocities of these lines coincide with the systemic velocity. We propose that the circum-binary dusty disk is observed face-on.

Key words: stars: AGB and post-AGB – stars: atmospheres, abundances – stars: individual (89 Her)

Disks Controlling Chaos in a 3D Dynamical Model for Elliptical Galaxies

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Abstract. A 3D dynamical model with a quasi-homogeneous core and a disk component is used for the chaos control in the central parts of elliptical galaxy. Numerical experiments in the 2D system show a very complicated phase plane with a large chaotic sea, considerable sticky layers and a large number of islands, produced by secondary resonances. When the mass of the disk increases, the chaotic regions decrease gradually, and, finally, a new phase plane with only regular orbits appears. This evolution indicates that disks in elliptical galaxies can act as the chaos controllers. Starting from the results obtained in the 2D system, we locate the regions in the phase space of the 3D system, producing regular and chaotic orbits. For this we introduce and use a new dynamical parameter, the $S(w)$ spectrum, which proves to be useful as a fast indicator and allows us to distinguish the regular motion from chaos in the 3D potentials. Other methods for detecting chaos are also discussed.

Key words: galaxies: kinematics and dynamics – galaxies: elliptical

Determination of Homogenized Effective Temperatures from Stellar Catalogs

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Abstract. Some selected catalogs of the effective temperatures (T_{eff}) for F, G and K stars are analyzed. By an improved technique we estimate the external errors of these catalogs from data intercomparisons. The T_{eff} values are then averaged with the appropriate weights to produce a mean homogeneous catalog based on the selected data. This catalog, containing 800 stars, is compared with some other independent catalogs for estimating their external errors. The data may be used as a source of reliable homogeneous values of T_{eff} , together with their errors.

Key words: catalogs – stars: fundamental parameters: effective temperatures