37.08.05 Limb Darkening Coefficients for Cool Model Stellar Atmospheres. A. MANDOCA, R. A. B. ELLE, Univ. Maryland, B. Gustafsson, Upsala  - Limb-darkening coefficients over UV and visible bandpasses have been calculated for selected cool giant and supergiant models from the atmosphere grid given by Bell et al. (1976, Astron. & Astrophys. Supp. 23, 37). The models lie in the range 6000 $\lesssim T$ $\lesssim 3700$ K, 4.0 $\lesssim$ log g $\lesssim 0.75$, 0.0 $\lesssim$ [Fe/H] $\lesssim$ -2.0. The calculations, with a comprehensive treatment of spectral lines and continuum scattering, have been carried out at $\mu = 1, 0.6, 0.4, 0.2$ and 0.1 from synthetic spectra calculated at 1 Å resolution. The degree of limb darkening is found to: (a) be relatively insensitive to surface gravity in all except the U and v bands, (b) increase significantly with decreasing gravity in those bands, and (c) decrease strongly with decreasing metal abundance for models with $T_\text{eff} \lesssim 5000$ K. The calculations are used to study the effect of limb darkening on existing solutions for the cool giant eclipsing binaries EZ Can and AR Mon (Popper, 1976, ApJ, 208, 142). Possible applications in the field of angular diameter determinations are also discussed.

37.09.06 The Evolution of a Fast Nova Model with a 2+0.5 Envelope From Pre-Explosion to Extinction. D. Pralinik, M. M. Shara and G. Shaviv, Tel Aviv Univ.  - A model of a fast nova explosion is presented. The model consists of a 1.25 $M_\odot$ C/O core and an envelope of $10^{-5} M_\odot$ with solar composition. The envelope is assumed to be accreted from a companion. 85% of the envelope mass is ejected during the thermonuclear runaway which produces luminosity close to the Eddington luminosity. The outer envelope layers accelerate and are ejected by the continuous action of radiation pressure. The nova's light-curve mechanism is the same as that of a slow nova - near total exhaustion of the envelope mass. All mass ejection takes place within a timespan of 19 hours. The iso-temperature ratios $\theta^{1/2}$ and $\theta^{1/4}$, as well as $\lambda_{bol}(\nu)$ agree well with observations.

37.10.07 Far Infrared Observations of Planetary Nebulae. Harvey Nussey, D. A. Harper, and R. F. Lowenslau, University of Chicago  - We have observed eight planetary nebulae in two passbands centered at 35$\mu$m and 7$\mu$m. The observations are consistent with emission from the nebula, with dust temperatures of 85$^\circ$ for the more compact objects such as IC 418, and cooler temperatures for larger, presumably more evolved objects.

37.11.06 The Radius and Mass of F6 Sagittae. C. A. Whitney, C. F. A. - F6 Sgr is the central star of a planetary nebula whose expansion age is 6000 years. Between 1895 and 1967, the star brightened by four magnitudes (q hgt.), and it is now fading. Between 1955 and 1975 its spectral type changed from B4 I to later than G2 I, although its bolometric magnitude remained nearly constant. Photoelectric data for 1950 - 1976 have been used to determine angular diameters and absolute radii. Semiregular variations of brightness follow a rough P32 relationship and, when interpreted as pulsations, to an upper limit of 0.5 - 1.0 $M_\odot$ for the mass of this star.

37.12.09 Submillimeter Intensity Structure in Pulsar PSR 0950+08 and its Impulse. T. B. Banks, Arcetri Observatory, V. Borkhohf, Naic  - The main pulse and the interpulse of the pulsar PSR 0950+08 have been studied with a 0.8 $\mu$m time resolution with dispersion distortion removed by digital computer filtering before detection. Occasional unresolved micropulses have been found. Autocorrelation analysis indicates that there is no consistent variation with pulse longitude of the characteristic microstructure scale size of about 125 $\mu$m in the main pulse. The 75 $\mu$m interpulse microstructure scale size, however, is significantly shorter than it is in the main pulse. Several clear examples of periodic microstructure have been found, but with periods inconsistent from one example to the next.

37.13.06 The Spotted DMa Flipping Binary Flare Star CM Draconis. C. H. Lacy, Phys. of TX - Austin  - The physical properties of this unusual nearby system - currently the smallest, faintest, least massive main sequence eclipsing binary known - are investigated using high-speed multi-color photometry, infrared differential photometry, broadband infrared photometry, and high-dispersion spectroscopy. The system consists of a typical flare stars, with a flaring frequency about a factor of 20 less than classical Pop. I flare stars of similar luminosity. The system also displays low-amplitude (<0.01 magn.) sinusoidal photometric variations attributable to star spots or non-uniform surface brightness. Similar complications are seen in the light variations of the other dMe eclipsing binary, YY Gem. With these exceptions the system is simple enough new spot to have nearly equal eclipses with a short (2 min.) duration of totality. The eclipse data yield very accurate relative radii and a fundamental determination of the limb darkening coefficient (0.500±0.03 at 0.82$\mu$m). Although the system is quite faint ($V$=12.00, B=14.50) an accurate radial velocity curve was obtained at a dispersion of 4.4$\lambda/\text{mm}$ using the 1024 channel self-scanned digicon detector developed by K. Tullo for the 2.7 m telescope at McDonald Observatory. Very accurate absolute dimensions (0.252 and 0.235 $R_\odot$ ± 3%), masses (0.237 and 0.207 $M_\odot$ ± 4%), luminosities (5.5$x10^{-3}$ and 4.8$x10^{-3}$ $L_\odot$) and other fundamental parameters of the components have been derived. The space velocity of the system is found to be 163 km s$^{-1}$ characteristic of a Pop. II origin. The mass-radius, mass-luminosity, and radius-luminosity relations of this system are therefore not necessarily the same as for Pop. I systems.

37.14.05 Observational Evidence for the Gravity Darkening of Components of Close Binary Systems. Joel A. Eaton*, NASA/CCPC - Over the past half decade the use of improved models (cf. Wilson and Devinney 1971, ApJ, 165, 605) and the study of observations obtained at a wider wavelength range have lead to accurate determinations of gravity darkening for a respectable sample of stars. It now appears that not all stars having radiative envelopes are gravity darkened to the degree specified by von Zeipel's law [Bolometric flux = (local gravity)$^{1/2}$, g = 1]. While the components of a number of systems have g < 1 (II Aur, V Pup, MR Cyg, U Oph), there are others with g < 1 (VV Ori, AW UMa, EZ Tau) and others for which in all probability g is significantly greater than unity (LY Aur, UW CMa). The few gravity-darkening studies of systems having components with convective envelopes have given conflicting results or are inconclusive. However, the visual/near-infrared color data of W-type stars in the W UMa systems are consistent with a low but non-negligible degree of gravity darkening.

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