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ABSTRACTS OF PAPERS PRESENTED AT THE
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MULTIPLE PERIODICITIES IN MIRA
VARIABLES: V BOO AND U PER

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Abstract

Several Mira variables are known to exhibit multiple periodicities, which may reveal information about the modes of oscillation of these stars. An analysis is presented of the light curves of V Boo and U Per to demonstrate the capabilities and limitations of Fourier analysis in identifying such multiple periodicities.

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CH CYGNI - AN UPDATE

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Abstract

The 30-year (1952 - 1982) light curve of the interesting symbiotic variable CH Cygni is reviewed. Previous work has shown that there are at least two interacting periods of brightness fluctuation in the star's light curve. The existence of multiple periods is discussed in light of the star's current abnormally bright maximum.

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X-RAYS FROM HM SAGITTAE

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Abstract

The visual light curve of HM Sge since its eruption in 1975 has

been exceedingly dull - it may have become slightly dimmer over the past 5 years, but there have been no large changes in its visual brightness. With G. Wallerstein, E. Brugel, R. Stencil, and others, I have been looking at x-ray observations of HM Sge made with the Einstein Observatory (HEAO-2) in 1979, 1980, and 1981. The resulting x-ray light curve shows that either the total x-ray intensity has been decreasing or the x-ray temperature has been decreasing - in either case, there is a significant change on a time scale of about 5 to 15 years. Based on other evidence we suspect that HM Sge, V1016 Cyg, and RR Tel are similar systems; this assumption allows us to extend the "light curve" over about 30 years, with results consistent with the results for HM Sge alone.

Examination of the shape of the x-ray spectrum leads to some interesting conclusions about the nature of the system producing the x-rays. If the spectrum is interpreted as a black body spectrum, the source size can be derived - 10 km, implying a neutron star. However, other considerations, including the lack of very-short-term variability, lead us to favor another interpretation of the spectrum. We suspect that the emission is free-free radiation coming from a hot coronal wind around a white dwarf star. The 1975 eruption of HM Sge can then be interpreted as a nova-like explosion occurring on a white dwarf as a result of mass transfer from the cool (Mira type?) component. Before erupting, such a system might well resemble R Aqr.

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FILTERING NOISY LIGHT CURVES

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Abstract

Recent advances in the fields of Stochastic Differential Equations and Stochastic Filtering Theory yield new numerical techniques for filtering noisy light curves, such as those found for eclipsing binaries, in which one of the members is an extremely dense object.

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SUPERMAXIMA OF SU URSAE MAJORIS STARS

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Abstract

Supermaxima (long, bright, and infrequent outbursts) of four SU Ursae Majoris type dwarf novae (SU Uma, AY Lyr, YZ Cnc, and TY Psc)

are discussed. AAVSO data indicate that each star has two or three different supermaxima periods with each period lasting from 3 to 30 cycles, that supermaxima of each star follow a linear ephemeris, and that supermaxima dates of these stars may be predictable.

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VACUUM-DRIED PLATES

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Abstract

Untreated 103a-0 plates were compared with IIa-0 plates dried in a vacuum and baked in forming gas, and with 103a-0 plates similarly dried and kept in dry nitrogen but not baked. Both treatments allow a saving of one third in exposure time, with the baked IIa-0 plates preferred because of finer grain. A good series of exposures on HT Aquilae during the tests leads to the conclusion that the star has no variation as large as 0.4 magnitude.

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NEW BOOKS AND EQUIPMENT FOR PHOTOELECTRIC PHOTOMETRY

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Abstract

Since the review paper on photoelectric instrumentation and books given in JAAVSO 10, 2, new books and equipment have become available in the rapidly developing field of photoelectric photometry. Three new books and five pieces of equipment are briefly summarized and described.

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STARGAZING WITH CAMERA LENSES

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Abstract

Stargazing - including variable star observing - may be done using camera lenses as optical aids. Using camera lenses offers many advantages, as they are light and portable, wide-field, comfortable to use, and versatile. They are easily mounted on tripods and can (obviously) be used for ordinary photography as well. The lens must, however, be a T-thread lens, so that an eyepiece back can be attached to it to give enough back focus to accommodate short-focus eyepieces. T-thread lenses come in a huge assortment of focal lengths and ratios, and can fit into virtually every budget.

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ANTONIA MAURY, BETA LYRAE, AND THE MASS-LUMINOSITY RELATION

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Abstract

Around the turn of the century, Antonia Maury and others were analyzing observational data for spectroscopic and visual binary stars. On the theoretical side, Eddington began developing stellar models. In 1924 he calculated the mass-luminosity relation and, to confirm it, he used the stellar masses derived from the binary stars. Meanwhile, Antonia Maury had begun her intensive work on Beta Lyrae, an eclipsing binary with very complex spectral changes. After she published her analysis of the star in 1933, Struve discredited her results: the masses she derived for the binary components did not fit Eddington's widely-accepted relationship. Subsequent studies of Beta Lyrae, as well as of stellar masses and luminosities, resolved the discrepancy: Eddington's curve was valid for main-sequence stars, whereas the components of Beta Lyrae fit neither the Hertzsprung-Russell main-sequence nor the Eddington mass-luminosity curve.

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