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1988 BVRI PHOTOMETRY OF XY UMa

The eclipsing system XY UMa (= BD+55^o 1317, SAO 27143, #69 in the catalog of Strassmeier et al. (1988)) is an outstanding member of the short-period RS CVn group. Geyer (1980) has observed XY UMa since 1955, he interprets the large and long-term changes of the system's distortion wave as arising from starspot activity on the hotter (~ G2-5V), primary star. Geyer (private communication) has also seen short-term brightness spikes in the light curve, and Zeilik et al. (1983) have made multicolor observations of a flare-like event in January 1982. Budding et al. (1982) noted that XY UMa had the strongest Mg II lines of the short-period RS CVn systems, and Budding and Zeilik (1986) demonstrated that XY UMa is by far the most active of these, based on three activity descriptors (rotation, photometric distortion, and chromospheric lines' flux). Budding and Zeilik (1987) analyzed the 1982 Capilla observations in the context of a starspot model and found two active regions on the primary star at longitudes 81^o and 203^o with radii of 13.0^o and 15.9^o. Jassur (1986) concluded, from his 1979 observations, that one spot group appeared at longitude 180^o, radius 17.2^o.

Aside from the work of Geyer, XY UMa has been little observed. We therefore selected it as part of our renewed effort on the RS CVn stars with the Capilla Peak 61-cm telescope and a CCD camera (Laubscher et al., 1988) used in the mode of a multichannel photometer. Observations were made on 6, 9, 15 and 19 Mar 1988 UT. The star BD+55^o 1320 (F8) was taken as a comparison star, its fainter companion was included in the reduction aperture, which covered a diameter of 54". Our filters have effective wavelengths of B, 466.1 nm; V, 537.5 nm; R, 667.0 nm, and I, 806.4 nm. Figures 1-4 show our results in instrumental delta magnitudes. The overall errors amount to 1.1%. Note the scatter in the data near 90^o, we believe that these are intrinsic variations in the system. Other short-period RS CVn stars show this phenomenon, especially ER Vul.

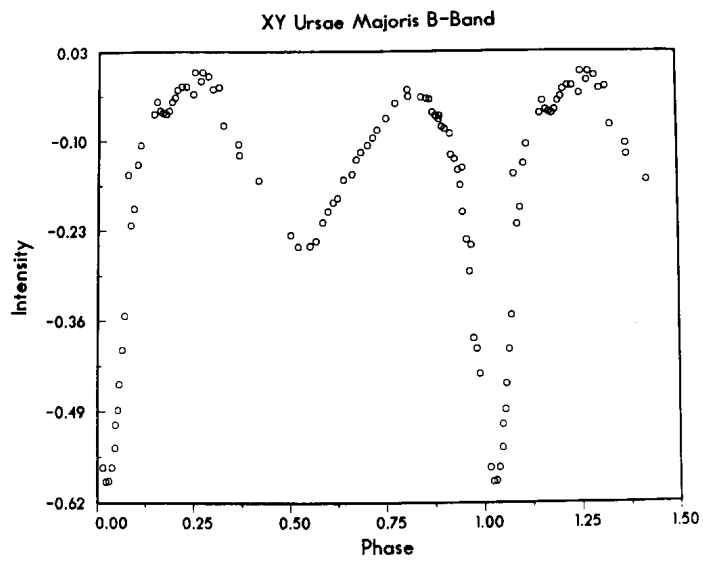


Figure 1

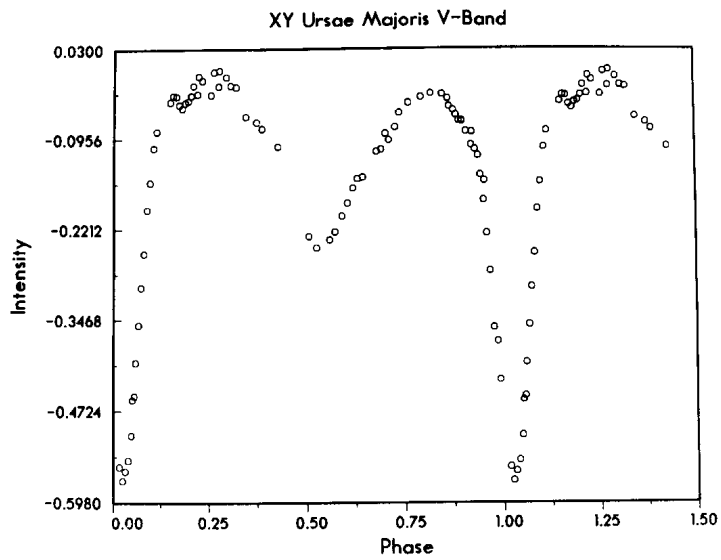


Figure 2

XY Ursae Majoris R-Band

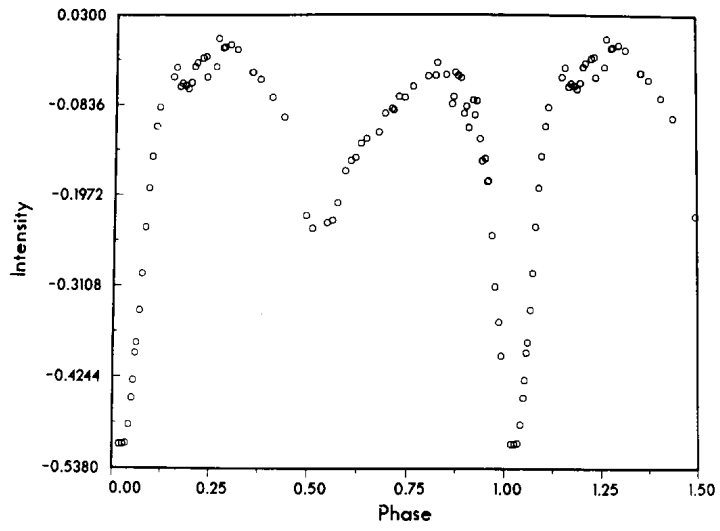


Figure 3

XY Ursae Majoris I-Band

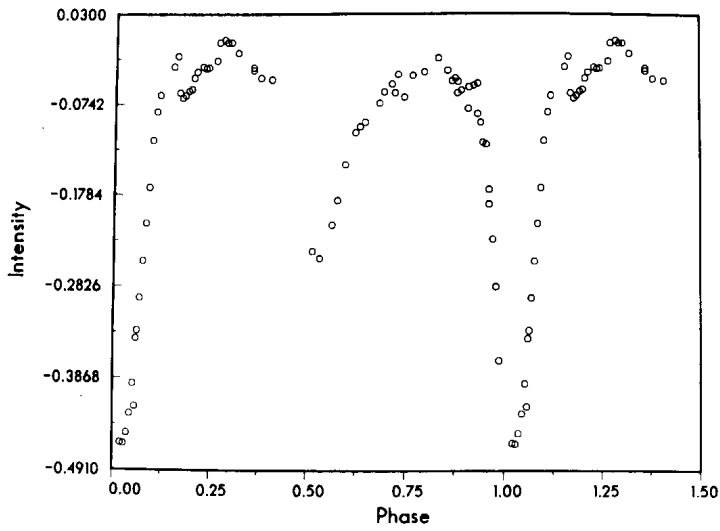


Figure 4

We followed the starspot parameterization procedure of Budding and Zeilik (1987) to analyze the V-band light curve. Our numerical fits gave us a single spot group with longitude 242° , latitude 60° , and radius 18.3° . Our data do not show clear evidence for a second spot group at the epoch. But the one active region does appear at quadrature, as is common in these systems.

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