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1989 BVR PHOTOMETRY OF CG CYGNI

CG Cygni (=BD +34° 4217 = #142 in the catalog of Strassmeier *et al.* 1988) is a member of the short-period RS CVn group as defined by Hall (1976). Since the discovery of its variability by Williams (1922), CG Cyg has been observed intensely at frequent intervals. Heckert and Zeilik (1989) presented 1987 V-band photometry; Dapergolas *et al.* (1989) collected complete 1987 light curves at B and V. We report here on 1989 BVR data, where the R-band allows us to estimate the temperature of the spotted regions.

Our observations were carried out at Capilla Peak Observatory (CPO) the nights of 18 July and 3-5 August 1989 UT. Our CCD camera (Laubscher *et al.*, 1989) was used in a multichannel mode to measure CG Cyg, the companion star (BD + 34° 4216), and the sky simultaneously. Our new filter set (Beckert and Newberry, 1989) matches closely Johnson BV and Kron-Cousins R-band response. The data were reduced with an effective aperture of 21 arcsec. Phases were calculated from the ephemeris in Strassmeier *et al.* (1988).

Figures 1-3 present the observational data in the instrumental system at BVR; note the coverage is complete and accomplished within a month. The statistical error in each datum is less than 0.01 magnitude. Note the small-scale "bumps" that appear on the shoulders of the light curve. They are clearly visible at all wavelengths. The weather was photometric on all nights, so we consider these features to be real, not observational artifacts. Such "bumps" are just discernable in Jassur's 1978 data (Jassur, 1980); they are not apparent in our 1987 light curve (Heckert and Zeilik, 1989).

Figure 4 presents an optimized binary model fit (solid line) to the V-band data (open circles). This comparison clearly reveals the maculation effect (near 90°), as well as the smaller variations. This fit follows the procedures of Budding and Zeilik (1987) and uses a

CG Cygni Instrumental B-Band
Jul/Aug 1989 Capilla

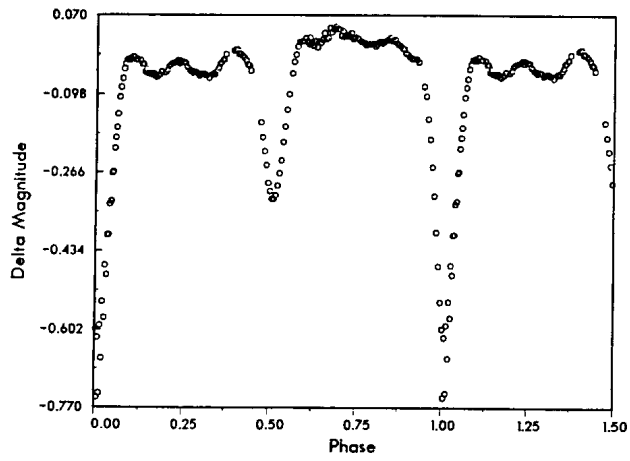


Figure 1

CG Cygni Instrumental V-Band
Jul/Aug 1989 Capilla

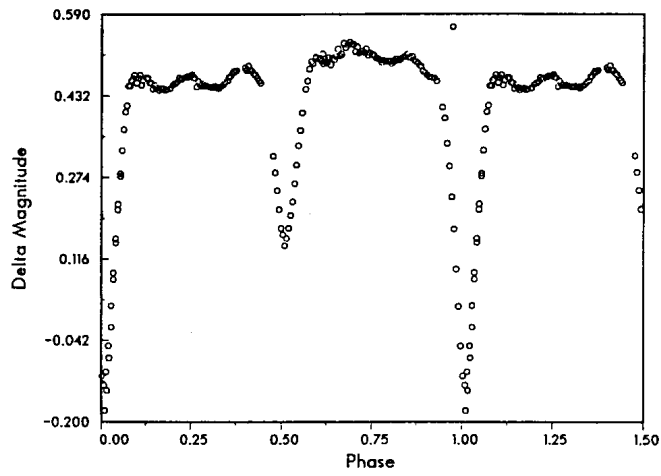


Figure 2

CG Cygni Instrumental R-Band
Jul/Aug 1989 Capilla

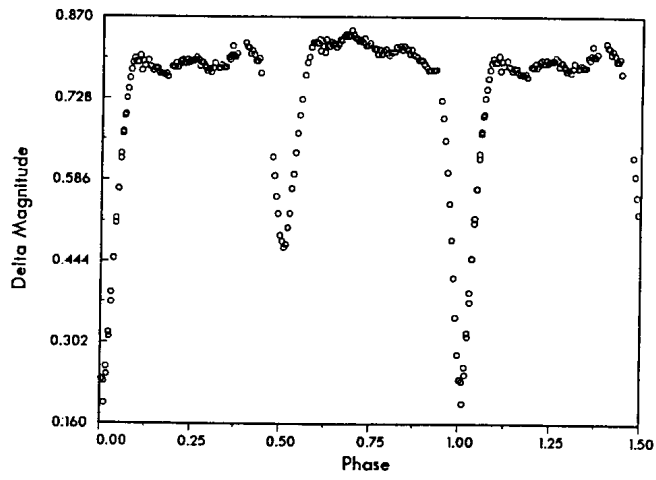


Figure 3

CG Cygni V-Band
Jul/Aug 1989 Capilla

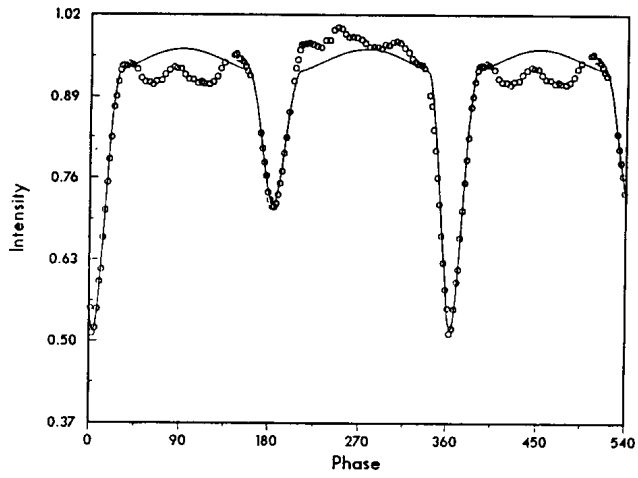


Figure 4

temperature of 5200 K for the primary star and 4400 K for the secondary. We fitted a single black, circular spot to the distortion wave and found these following optimized starspot parameters: longitude = $86.0^\circ \pm 3.4^\circ$, radius = $15.6 \pm 0.5^\circ$, and latitude = 41.7° . (The latitude fit was an indeterminate solution and so has no formal errors). Compared to our 1987 results, we find that the spotted region has moved to a lower longitude but stayed at about the same latitude. Its area has increased roughly 40%. Using the V and R data together, we estimate that the temperature difference of the spotted region compared to primary star's photosphere is $1140 \text{ K} \pm 160 \text{ K}$, or $T_{\text{spot}} = 4060 \text{ K}$ for $T_{\text{primary}} = 5200 \text{ K}$.

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