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OBSERVATIONS OF THE BY DRACONIS
VARIABLE GLIESE 182

The dMe star Gliese 182 (= Vyss 111) has recently been recognized as a BY Draconis variable by Bopp and Espenak (1977), who noted a range of variation in V of ~ 0.1 mag, with a period near two days. We report here additional photometry and spectroscopy of GL 182 obtained at CTIO in 1974 and 1975. The available data suggest a provisional rotational period $P = 1.858$ days for GL 182.

The photometric data consist of fifteen nights of BVR photometry obtained during 1975-76 at KPNO and reported by Bopp and Espenak. In addition, twelve UBVR observations were made at CTIO during 1974-75 by Torres and Busko. These observations were done independently, and by a happy coincidence, the same comparison stars (BD +00°911, +00°915) were used. Table I gives the measured differential magnitudes ΔV , $\Delta(B-V)$ in the sense Gliese 182 minus BD +00°915. Neither of the photometric systems was standard, and some transformation non-linearities were encountered. This may account for the discrepancy of 0.03 mag in the $(B-V)$ colors. We note, however, that the internal consistency of each set of $(B-V)$ colors is good, and no evidence for color changes over the photometric cycle is seen. In both cases, $(V-r)$ colors could not be accurately transformed to the Johnson system, but again neither data set showed significant variability.

The 1974 CTIO data appear brighter than the others by ~ 0.03 mag, which may reflect a real change in mean light level. For the purpose of the period analysis, we have added 0.028 mag to the 1974 data. Using all the data, we find four periods of almost equal probability: 1.833, 1.858, 2.189 and 2.199 days. Shorter periods, less than one day, do fit the data, but if these were correct, we would expect higher dispersion spectra to show rotationally broadened lines, but no line broadening is evident on 18 \AA mm^{-1} spectrograms (Bopp and Fekel 1977). We adopt the provisional period $P = 1.858$ days, which is satisfied by all the data sets. We assume in this analysis that no changes in phase or period have occurred, which may not be true in general for BY Dra variables (Oskanyan *et al.* 1977). The data are plotted in Figure 1; zero phase is taken arbitrarily as JD 2442000.

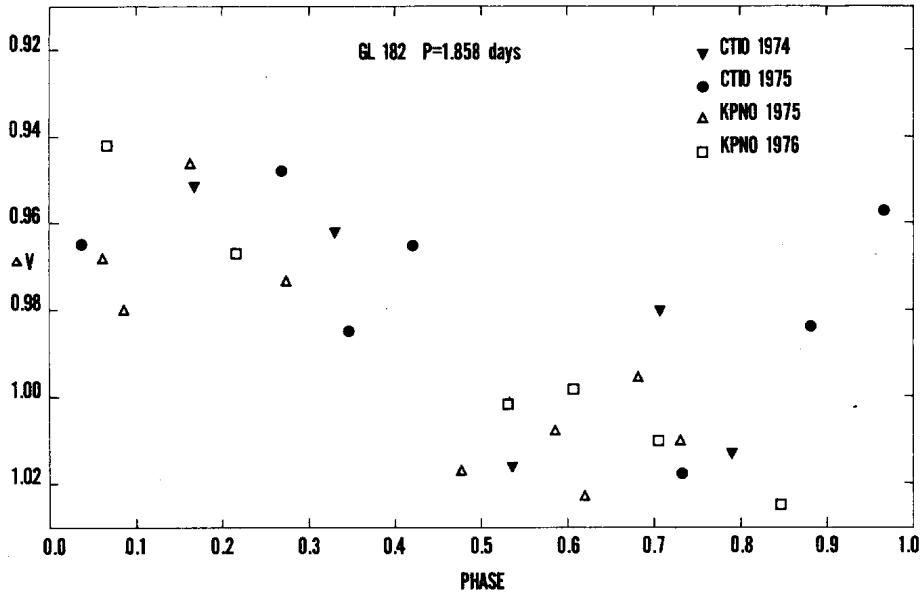


TABLE I

HJD 2442000+	ΔV	$\Delta(B-V)$	Observatory
296.890	+0.985*	-----	CTIO
297.894	0.934	-----	CTIO
316.854	0.988	-----	CTIO
319.886	0.924*	-----	CTIO
320.887	0.952	-----	CTIO
701.823	1.018	+0.239	CTIO
702.819	0.948	0.238	CTIO
704.826	0.985	0.239	CTIO
705.820	0.984	0.243	CTIO
706.816	0.965	0.242	CTIO
707.830	0.957:	0.224:	CTIO
709.824	0.965	0.242	CTIO
719.926	1.017	0.192	KPNO
721.013	0.968	0.202	KPNO
721.993	1.008	0.217	KPNO
722.922	0.980	0.212	KPNO
723.913	1.023	0.232	KPNO
724.921	0.946	0.204	KPNO
725.880	0.995	0.206	KPNO
727.833	1.010	0.211	KPNO
728.843	0.973	0.210	KPNO
829.648	1.002	0.192	KPNO
830.643	0.942	0.208	KPNO
831.646	0.998	0.195	KPNO
833.689	1.010	0.214	KPNO
834.640	0.967	0.203	KPNO
837.667	1.025	0.223	KPNO

*Differential with respect to BD +00°911

In addition, eight image tube spectrograms (dispersion 18 \AA mm^{-1}) were obtained at the coude' focus of the CTIO 1.5 m reflector in 1974. The spectrograms record the H α region, and reveal significant night-to-night variations of the H α emission strength, but no correlation with the photometric period is apparent. The Li I $\lambda 6707$ feature can be seen as a relatively strong absorption line, confirming the observations of Bopp (1974).

Gliese 182 continues to be an intriguing BY Dra star: with no radial velocity variations evident, it is an apparently single star, yet its equatorial rotational velocity, assuming a two day rotational period, is $\sim 15 \text{ km s}^{-1}$, remarkably high for a single late-type dwarf. The presence of the Li I feature might suggest extreme youth, yet Gliese 182 is apparently not a member of any young cluster and is kinematically unremarkable.

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