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BVR PHOTOMETRY OF SIX PRE-MAIN-SEQUENCE SPECTROSCOPIC BINARIES

The spectroscopic binaries (G8-K7) among the the naked T Tau stars (NTTS) population of the Taurus-Auriga, Scorpius-Ophiuchus and Corona Australis star-formation regions were discovered and spectroscopically investigated by Mathieu et al. (1989). They have orbital periods of about $2^d.42$ or longer. If their orbital planes are orientated along the line-of-sight, then an eclipse of components can be expected. In this case, we are able to determine the radii and masses of the pre-main-sequence stars using the spectroscopic data. A search for any variability of the stars is of interest. Some NTTS are known to have a periodic variability connected with stellar spots on their surfaces (Rydgren and Vrba, 1983; Grankin, 1993). Our aim was to discover any variability among the six spectroscopic binaries with the help of BVR photometry. The observations of the binaries were carried out in 1991/1992 with the 48 and 60 cm telescopes at the Mt. Maidanak. The comparison stars were chosen in the neighbourhood of the binaries. Their data are listed in Table 1.

Table 1

Star	Comparison star	V	B−V	V−R
045251+3016	BD +30°742	7.61	0.11	0.06
155913−2233	BD −22°4069	7.46	0.13	0.08
160814−1857				
160905−1859	BD −18°4243	7.98	0.18	0.18
162814−2427				
162819−2423S	CoD −24°12691	7.55	0.63	0.38

All the observational results of these six binaries were carefully analyzed but we failed to detect any eclipsing effects. However, three stars are shown to be variable and one of them is suspected in variability. The results of our photometry are given in Table 2 (n: number of the observations, P_{orb}: the orbital period, P_{rot}: the axial rotational one).

Table 2

Star	V		B−V	V−R	n	P_{orb}	P_{rot}
	Max	Min					
045251+3016	11.46	11.71	1.26	1.12	46	$>1000^d$	$9^d.32$
155913−2233	11.22		1.07	0.99	79	2.42378	
160814−1857	11.90	12.06	1.32	1.29	34	144.7	3.81
160905−1859	11.65		1.09	1.08	33	10.400	
162814−2427	11.92	12.24	1.50	1.49	43	35.95	
162819−2423S	10.82	var?	1.09	1.14	31	89.1	3.2?

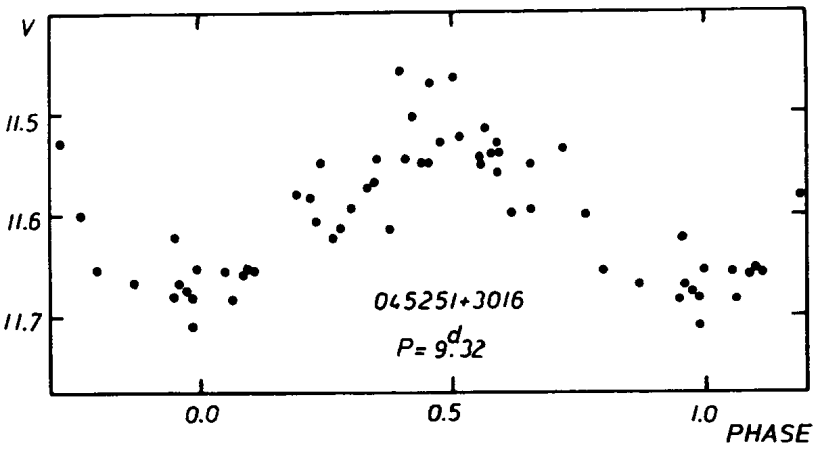

Figure 1

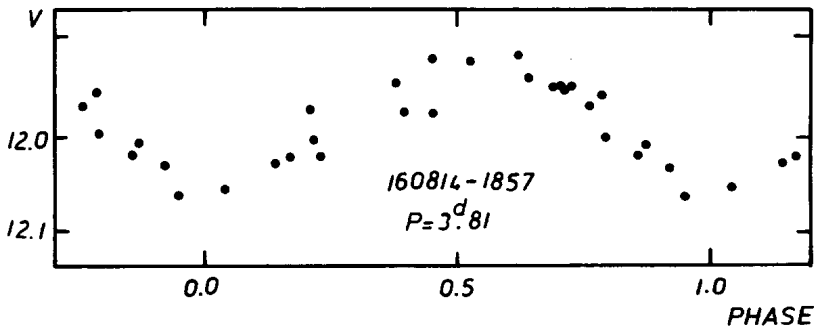

Figure 2

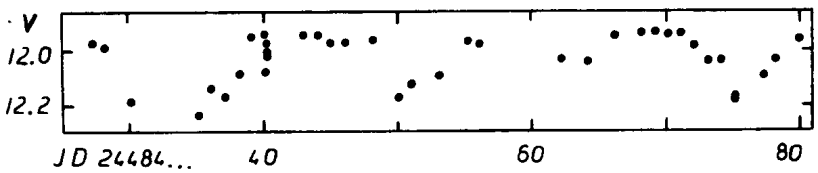

Figure 3

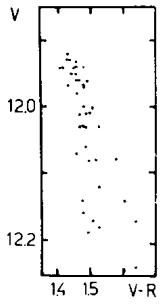

Figure 4

045251+3016. The star had brightness variations with an amplitude of $0^m.25$(V). This variability can be interpreted in terms of axial rotation of a spotted bright component.

160814−1857. The reason of variability of this binary is the same as that of the previous one. Its brightness changes with an amplitude of $0^m.16$(V). The light curve of the star is shown in Figure 2. It is also interesting, that the orbital period of the binary and the rotational one of the brighter component are commensurable (P_{orb}/P_{rot}=38).

162814−2427. The light curve of the variable is represented in Figure 3. The amplitude of the star reaches $0^m.32$(V). We have not found any reasonable explanation for the brightness variations. However, regular light changes are clearly seen in the Figure. The diagram V versus V−R color of the star is plotted in Figure 4. The T Tau type stars have the same diagrams.

162819-2423S. The star seems to be variable with small amplitude ($0^m.1$ in V), its rotational period being roughly $3^d.2$.

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