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**PHOTOMETRIC OBSERVATION OF T TAURI TYPE STARS:
DI Cep, T Tau, V410 Tau, GW Ori, V649 Ori**

Most of the pre-main sequence stars, as well as T Tauri type stars, are characterized by some kind of variability of their brightness. In the *UBV* photometric system, magnitudes of these stars change by up to 2.8 mag on a time scale of hours to years (e.g. Appenzeller and Mundt, 1989; Herbst et al., 1994).

Photometric observations over the past 50 years showed that sometimes regular, sometimes erratic behaviour casts some light on the processes taking place in these objects and on their interaction with the environment. On the analysis of more than 10000 entries on 80 young stars, Herbst et al. (1994) proposed that there were three groups of light variations related to the spectra of these stars. Application of modern Fourier analysis methods now allows to reveal periodic components of light variability for some of these objects. This property of the T Tauri stars can be explained by rotational modulation for a star with an asymmetric distribution of spots on its surface (e.g. Vrba et al., 1989; Shevchenko et al., 1991). However, a more detailed study of these objects needs a large quantity of observational data on individual stars during a long time interval.

Our *WBVR* observations of the T Tauri type stars DI Cep, T Tau, V410 Tau, GW Ori, and V649 Ori were carried out in autumn 1995 with the single-channel photon-counting photometer attached to the 60 cm telescope at the Crimean laboratory of Sternberg Astronomical Institute (Moscow). Observations were done by differential photometry. All stars were measured together with two comparison stars, and background light was measured at least twice in each band. For transformation to the standard system, we observed standard stars of luminosity classes IV–V and late spectral types from the list of Kornilov et al. (1991). Rms errors of the differential photometry are about 0.01–0.02 mag for *BVR* bands and 0.03 mag for the *W* band. In this note, we report on the results of observations for five objects. The results are presented in the table.

Application of the *W* photometric band (Straizys, 1977) for CTTSs has some advantages compared to the *U* band; thus, the *W* band has lower transmission at larger wavelengths decreasing the influence of the Balmer jump, which is essential for stars with emission-line spectra. On the other hand, the *W* band reduces the red leak, while the *U* band has a considerable red leak. Our measurements in the *W* band showed little difference compared to *U* band measurements of other authors (see, e.g., Herbst et al., 1994).

Table 1. *WBVR* observations of T Tauri stars

JD24...	<i>V</i>	<i>W</i> - <i>B</i>	<i>B</i> - <i>V</i>	<i>V</i> - <i>R</i>	JD24...	<i>V</i>	<i>W</i> - <i>B</i>	<i>B</i> - <i>V</i>	<i>V</i> - <i>R</i>
T Tau					GW Ori				
50002.223	9.91	0.59	1.28	0.75	50002.320	9.67	0.38	1.03	0.90
50003.423	9.90	0.47	1.20	0.76	50003.377	9.69	0.38	1.02	0.88
50004.420	9.96	0.57	1.16	0.78	50004.390	9.73	0.37	1.03	0.89
50004.502	9.89	0.55	1.19	0.70	50004.552	9.81	0.34	0.96	0.92
50005.402	9.91	0.58	1.19	0.73	50006.467	9.80	0.46	0.88	0.95
50006.355	9.92	0.57	1.10	0.80	50006.550	9.97	0.38	0.86	
50006.379	9.94	0.50	1.18	0.80	50007.464	9.93	0.38	0.89	
50006.466	9.93	0.58	1.22	0.71	50008.462	9.88	0.37	0.88	
50007.353	9.96	0.56	1.26		50009.434	9.82	0.36	0.91	0.90
50007.420	9.97	0.55	1.23		50010.397	9.75	0.38	0.94	0.94
50008.387	9.86	0.54	1.16						
50009.361	9.90	0.52	1.17	0.79					
50010.363	9.91	0.53	1.19	0.73					
DI Cep									
49970.420	11.43	-0.15	0.87	0.57	50006.195	11.46	0.06	0.91	0.57
49973.401	11.40	-0.13	0.90	0.56	50006.233	11.46	0.06	0.94	0.68
49974.422	11.38	-0.17	0.91	0.58	50007.198	11.36	-0.26	0.89	
50002.402	11.68	-0.12	0.62	0.88	50008.197	11.40	-0.24	0.88	
50003.208	11.71	-0.25	0.65	0.89	50008.242	11.38	-0.25	0.90	
50004.202	11.41	-0.18	0.92	0.60	50009.218	11.36	-0.18	0.87	0.59
50004.289	11.43	-0.12	0.96	0.59	50009.270	11.36	-0.07	0.80	0.60
50005.206	11.42	-0.21	0.73	0.59	50010.309	11.36	-0.15	0.91	0.55
50005.261	11.43	0.04	0.75	0.55	50010.367	11.35	-0.14	0.91	0.55
50006.177	11.14	-0.32	0.21	0.26					
V410 Tau					V649 Ori				
49969.576	10.77	0.89	1.27	0.93	50002.379	12.02	0.51	1.11	0.72
49972.533	11.03	0.84	1.01	1.23	50003.472	12.00	0.49	1.10	0.74
49974.451	10.86	0.82	1.16	0.98	50004.420	11.99	0.53	0.98	0.77
50002.125	10.86	0.75	1.15	0.97	50007.473	11.98	0.57	1.01	
50003.323	10.98	0.91	1.02	1.20	50008.484	12.09	0.59	0.91	
50004.310	10.75	0.86	1.28	0.97	50009.442	12.11	0.51	0.99	0.82
50005.420	10.85	0.83	1.17	0.96	50010.413	12.12	0.46	1.06	0.85
50006.299	10.97	0.95	1.07	1.18					
50007.320	11.06	0.89	0.95						
50008.346	10.87	1.03	1.16						

Fortunately, a long sequence of clear nights on October 10–20 allowed me to get continuous measurements of some program stars. In the table, we presented Julian Dates, *W*, *B*, *V*, and *R* measurements.

Photometric monitoring of T Tauri type stars by different authors has revealed periodic variations in some stars, with periods between 2 and 15 days. Our data allow us to monitor variability of the program stars continuously, for 7–10 days. Moreover, our measurements show light variability of some stars within a night.

DI Cep

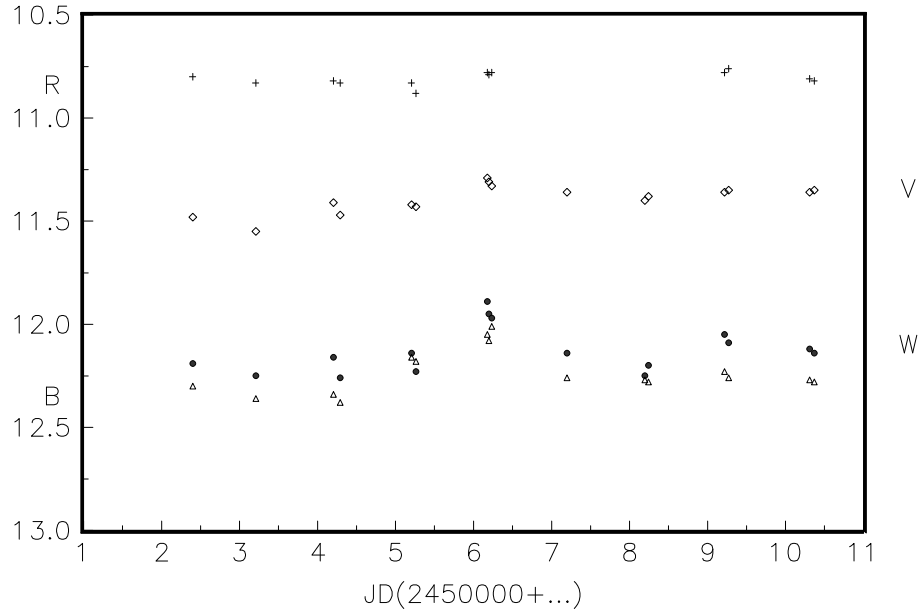


Figure 1

T Tau

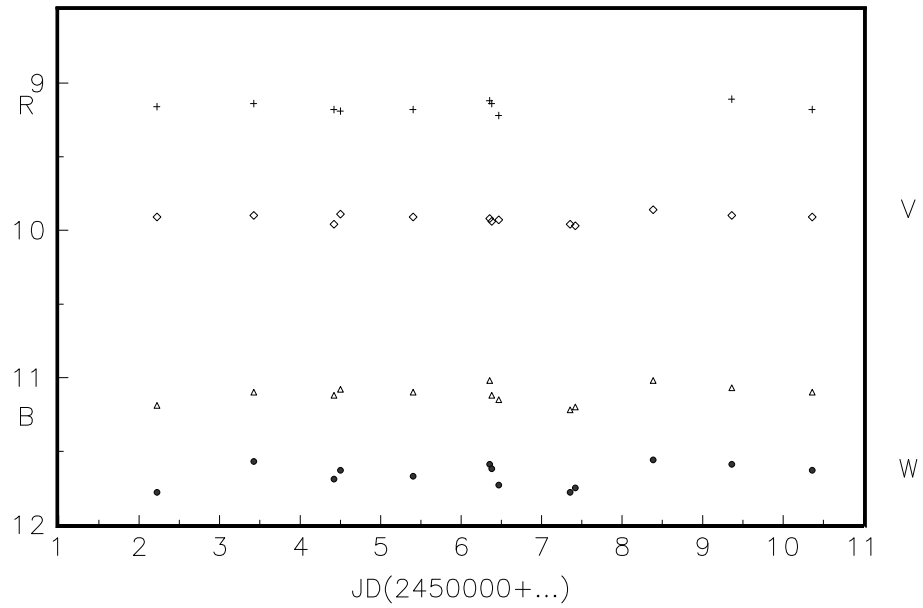


Figure 2

In Figures 1 and 2, as an example, we present portions of light curves respectively of DI Cep and T Tau in all photometric bands. Figure 1 shows that, on JD 2450006, DI Cep increased its brightness by $0^m.2$ in *W* and *B* and by $0^m.1$ in *V* and *R* bands. Thus, we see photometric activity of DI Cep during that night. Other program stars showed no marked photometric activity ($\Delta V \leq 0^m.1$).

So, continuous photometric monitoring has not revealed evident periodic modulation of brightness for program stars. We observed variability in $WBVR$ bands within $\Delta V=0^m1$ for all stars and a higher photometric activity for DI Cep.

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