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**PHOTOMETRY OF 39 PMS VARIABLES
IN THE TAURUS-AURIGA REGION**

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The previous studies have shown that most of the well known Pre-Main Sequence (PMS) stars in the Tau-Aur region demonstrate some periodic light variations (Grankin, 1997). Such periodicities can be interpreted as the rotational modulation of the stellar flux by a group of dark surface spots. Thus, the photometric observations of spotted PMS stars allow to measure their rotational periods with high accuracy. The aim of our research is an extension of PMS stars sample with known rotational periods, which are fundamental stellar parameters. Unfortunately, most of the spotted PMS stars show the periodic light variations very seldom, when spots are disposed on a star surface extremely inhomogeneously (Grankin, 2005). Therefore, it is necessary to make some long-term observations of such PMS star to discover its rotational period with confidence. In this connection, we have made long-term observations of representative sample of new PMS stars in Tau-Aur region.

We present a photometric study of 39 PMS stars discovered in the Taurus-Auriga star-forming region, based on high-resolution echelle spectroscopy and proper motion data (Wichmann et al., 2000). Photometric data were collected with three 60-cm telescopes at the Mt. Maidanak Observatory (Uzbekistan) during several runs from 2000 to 2006. Each telescope was equipped with a pulse counting FEU-79 photomultiplier tube and a set of standard *BV* Johnson and *R* Kron–Cousins filters.

The light curves obtained during our campaign were analyzed with use the string-length algorithm (Dworetzky, 1983). The spacing of our observations in time (one day) causes so-called false periods (Tanner, 1948). Both true and false periods produce fully equivalent folded light curves. In order to determine the true period it is necessary to carry out some intensive monitorings within several nights. Unfortunately, we could make such intensive observations only for several objects from our list.

In Table 1 we present first detection of periodic light variations for 15 PMS stars, for which a few monitorings have been made. Their phased light curves in *V* band are shown in Figure 1. We found periodic variations for other seven PMS stars, without any monitorings. Therefore, we could not select the true period for them. These seven PMS stars are listed in Table 2 and their phased light curves are displayed in Figure 2. In Table 2 only the two most probable periods for these stars are presented. At last, we could not discover any periodicity for 17 PMS stars from our list. All these stars are the

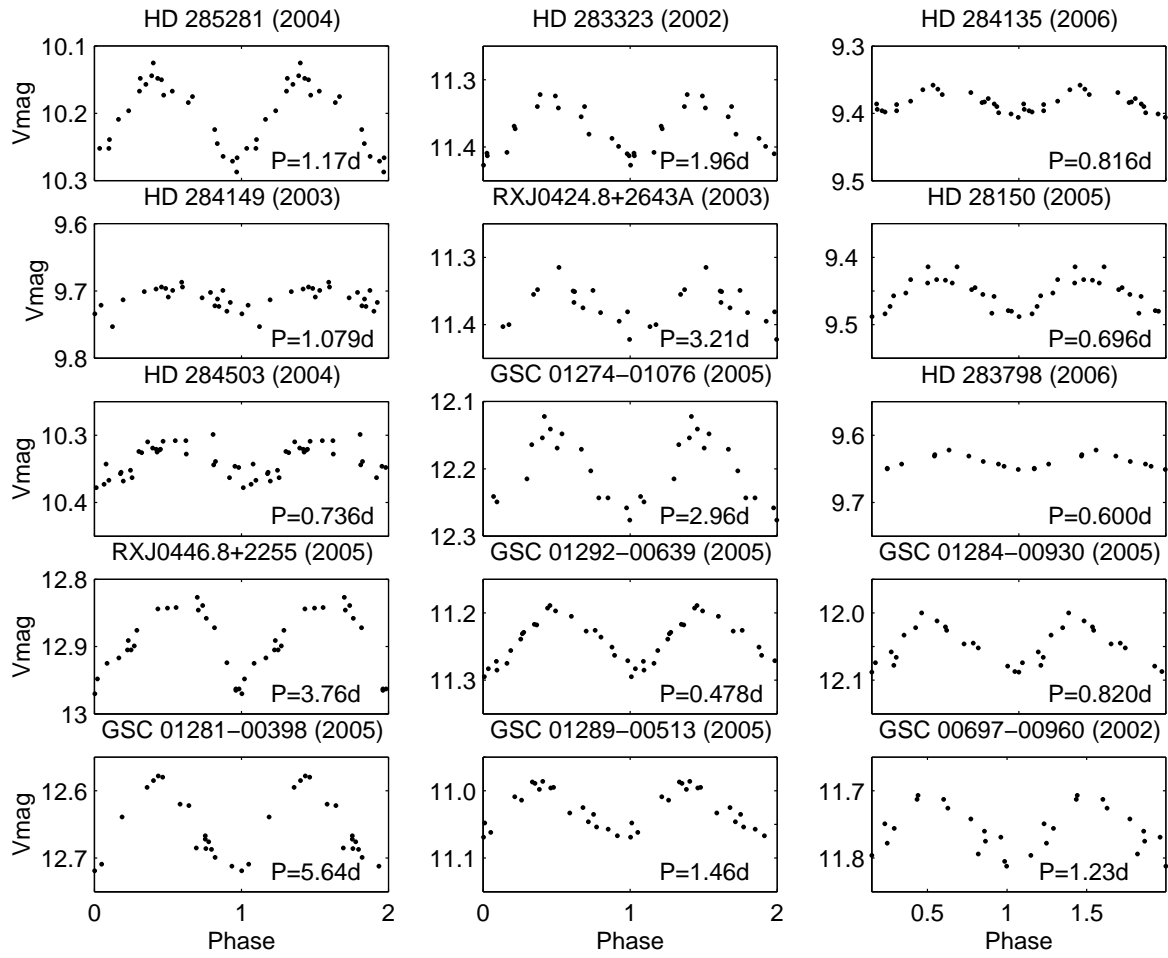


Figure 1. Light curves of new regular PMS stars with a few monitorings

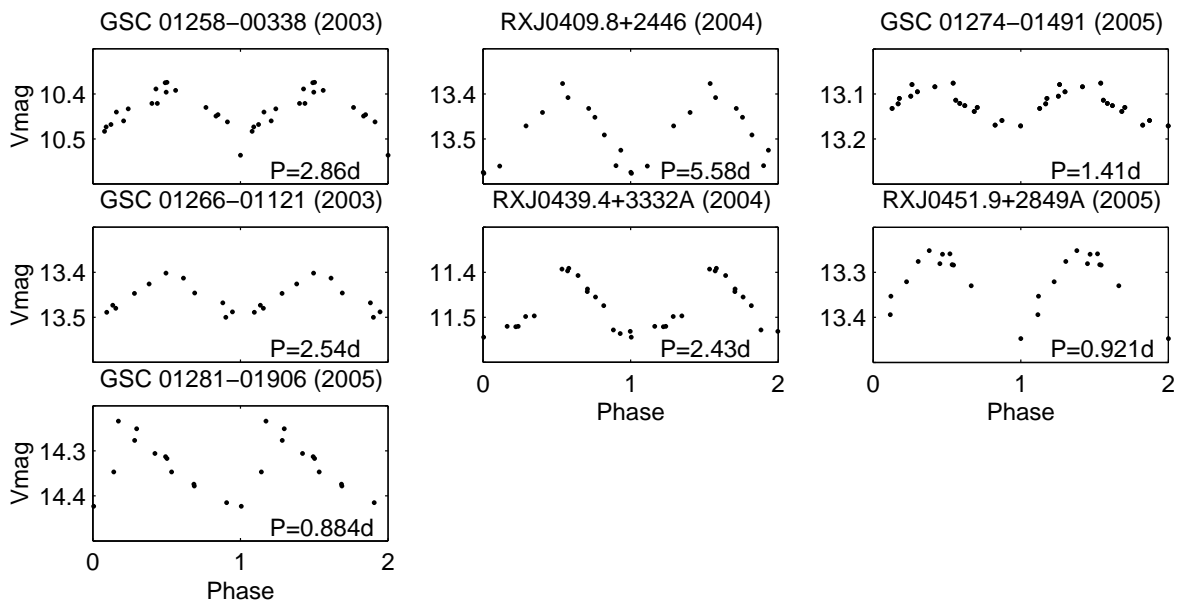


Figure 2. Light curves of new regular PMS stars without any monitorings

Table 1. List of new regular PMS stars with a few monitorings. Columns are: star's name, Right Ascension and Declination of the star calculated for J2000.0, SpT – spectral type, N_s – number of observational seasons, Δm_V – observed maximal amplitude of variation in Johnson V band for one of observational seasons, range V – photometric range in the V band for all observational seasons, P – period of variation in days

Star Name	RA (2000)	Dec (2000)	SpT	N_s	Δm_V	range V	P [days]
HD 285281	04 00 31.07	19 35 20.8	K1	4	0.16	10.12–10.29	1.1683
HD 283323	04 05 12.34	26 32 43.6	K2	6	0.12	11.21–11.49	1.9610
HD 284135	04 05 40.58	22 48 12.0	G3	5	0.06	9.29–9.44	0.8160
HD 284149	04 06 38.80	20 18 11.2	G1	5	0.07	9.62–9.75	1.0790
RXJ0424.8+2643A	04 24 48.18	26 43 16.0	K1	6	0.17	11.22–11.42	3.2100
HD 28150	04 27 04.86	18 12 27.2	G5	6	0.12	9.30–9.51	0.6962
HD 284503	04 30 49.19	21 14 10.7	G8	4	0.13	10.26–10.40	0.7360
GSC 01274-01076	04 38 13.04	20 22 47.0	K2	5	0.15	12.12–12.28	2.9600
HD 283798	04 41 55.16	26 58 49.4	G7	5	0.05	9.61–9.69	0.6000
RXJ0446.8+2255	04 46 53.22	22 55 13.1	M1	3	0.14	12.80–12.97	3.7620
GSC 01292-00639	04 50 00.18	22 29 57.7	K1	4	0.15	11.15–11.31	0.4778
GSC 01284-00930	04 52 30.76	17 30 25.8	K4	6	0.09	12.00–12.11	0.8204
GSC 01281-00398	04 56 13.56	15 54 22.0	K7	3	0.14	12.58–12.76	5.6400
GSC 01289-00513	04 57 30.63	20 14 28.6	K3	4	0.19	10.96–11.20	1.4600
GSC 00697-00960	04 59 46.14	14 30 55.2	K4	7	0.26	11.56–11.89	1.2308

Table 2. List of new regular PMS stars without any monitorings. Columns are: star's name, Right Ascension and Declination of a star calculated for J2000.0, SpT – spectral type, N_s – number of observational seasons, Δm_V – observed maximal amplitude of variation in Johnson V band for one of observational seasons, range V – photometric range in the V band for all observational seasons, P – period of variation in days

Star Name	RA (2000)	Dec (2000)	SpT	N_s	Δm_V	range V	P [days]
GSC 01258-00338	04 05 19.61	20 09 25.2	K1	4	0.16	10.31–10.54	2.86 (0.741)
RXJ0409.8+2446	04 09 51.11	24 46 21.5	M1.5	3	0.20	13.38–13.59	5.58 (1.214)
GSC 01274-01491	04 33 34.68	19 16 48.6	G6	3	0.10	13.08–13.20	1.41 (0.585)
GSC 01266-01121	04 38 27.63	15 43 38.2	K3	4	0.10	13.22–13.50	2.54 (1.651)
RXJ0439.4+3332A	04 39 25.47	33 32 44.8	K5	5	0.16	11.39–11.56	2.43 (0.708)
RXJ0451.9+2849A	04 51 56.90	28 49 42.7	K4	2	0.20	13.25–13.45	0.921 (11.66)
GSC 01281-01906	04 56 56.54	16 00 24.8	M1	2	0.25	14.23–14.50	0.884 (7.62)

irregular variables. These seventeen irregular PMS stars are listed in Table 3. The original photometric data for all 39 PMS stars is available at the IBVS website as 5752-t4.txt.

Previously to our study the rotational periods for 24 PMS stars from the Wichmann's list were known (Bouvier et al., 1997; Broeg et al., 2006). Now the sample of the PMS stars with known periods in this star-forming region has increased almost twice. We hope that this result will allow to study the evolution of an angular moment of young stars in the Tau-Aur region more carefully.

Table 3. List of new irregular PMS stars. Columns are: star's name, Right Ascension and Declination of a star calculated for J2000.0, SpT – spectral type, N_s – number of observational seasons, Δm_V – observed maximal amplitude of variation in Johnson V band for one of observational seasons, range V – photometric range in the V band for all observational seasons, P – period of variation in days

Star Name	RA (2000)	Dec (2000)	SpT	N_s	Δm_V	range V	P [days]
GSC 01259-00232	04 12 50.65	19 36 58.0	K6	4	0.10	12.51–12.65	1.569?
HD 285579	04 12 59.87	16 11 47.8	G1	5	0.07	10.95–11.12	-
GSC 02371-02073	04 15 51.42	31 00 36.0	G6	4	0.12	12.34–12.47	0.414?
GSC 01270-00735	04 32 53.22	17 35 34.0	M2	2	0.07	13.64–13.77	0.857?
GSC 01270-00230	04 33 42.01	18 24 27.4	G6	3	0.06	12.04–12.12	1.122?
RXJ0435.9+2352	04 35 56.81	23 52 05.4	M1.5	2	0.16	13.31–13.49	-
GSC 02373-00920	04 37 16.87	31 08 19.8	K4	3	0.09	13.12–13.31	1.429?
V1117 Tau	04 38 15.59	23 02 28.1	M1	2	0.12	13.74–13.90	1.185?
GSC 01838-00189	04 41 24.00	27 15 13.2	G8	3	0.05	13.05–13.15	-
GSC 01267-00362	04 43 25.98	15 46 03.6	G7	6	0.13	12.81–12.97	1.11?
GSC 01275-00669	04 44 26.78	19 52 17.5	M1	4	0.11	12.53–12.64	-
HD 283782	04 44 54.40	27 17 45.5	K1	4	0.07	9.48–9.55	-
GSC 01284-01283	04 51 54.24	17 58 28.1	M1.5	2	0.18	13.89–14.08	1.348?
GSC 01843-00400	04 51 56.52	28 49 26.2	K2	2	0.12	14.08–14.20	-
GSC 01288-00790	04 52 57.07	19 19 50.1	K5	6	0.09	12.05–12.29	-
GSC 02391-00494	04 53 08.69	33 12 01.6	G8	2	0.14	13.69–13.88	-
HD 31281	04 55 09.62	18 26 31.1	G1	4	0.07	9.16–9.27	-

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