

RY TAURI AT HIGH BRIGHTNESS

The T Tau star RY Tau has increased its brightness from $V=10^m6$ to $V=9^m6$ in the period from middle of October to middle of November this year, with no changes in $U-B$ and $B-V$. Photometric monitoring of RY Tau is going on at the Crimean Laboratory of the Sternberg Astronomical Institute, Russia, with the 60-cm telescope and the photon-counting photometer. The following is a subset of the photometric data from 1995 and the recent observations in October and November 1996 (also plotted in Figure 1):

JD 2450...	V	U-B	B-V
060.3042	10.57	+0.56	+1.09
064.4076	10.46	0.56	1.08
...
362.5437	10.60	0.38	0.96
373.5500	10.22	0.51	1.04
392.5924	10.01	0.59	1.09
400.4896	9.85	0.58	1.05
402.5382	9.60	0.46	1.01
408.4861	9.72	0.60	1.07

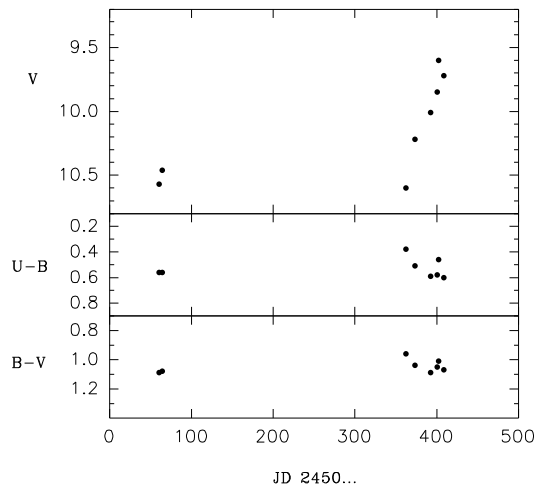


Figure 1. Light and colour variations of RY Tau

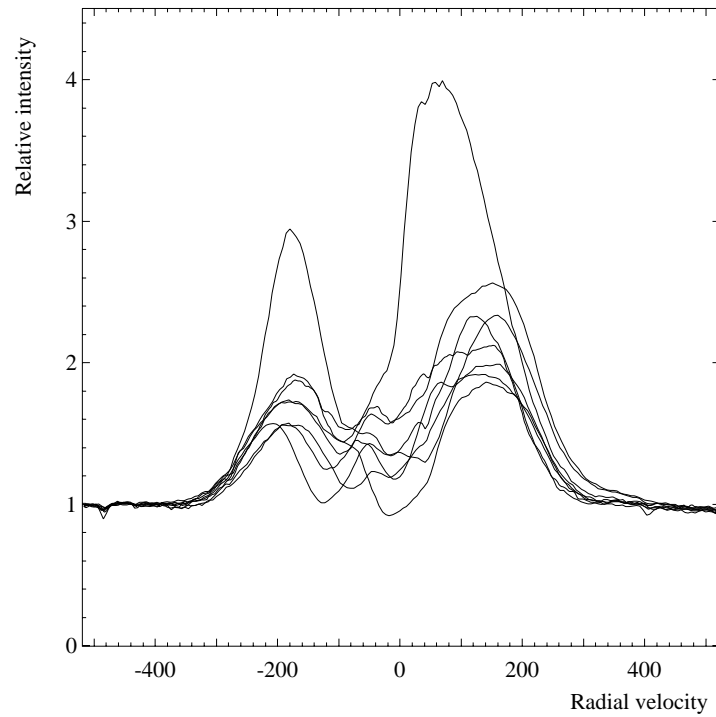


Figure 2. Variations in H α profile: the most intensive profile is of December 1995 (low brightness of the star), others are of November 1996 (high brightness)

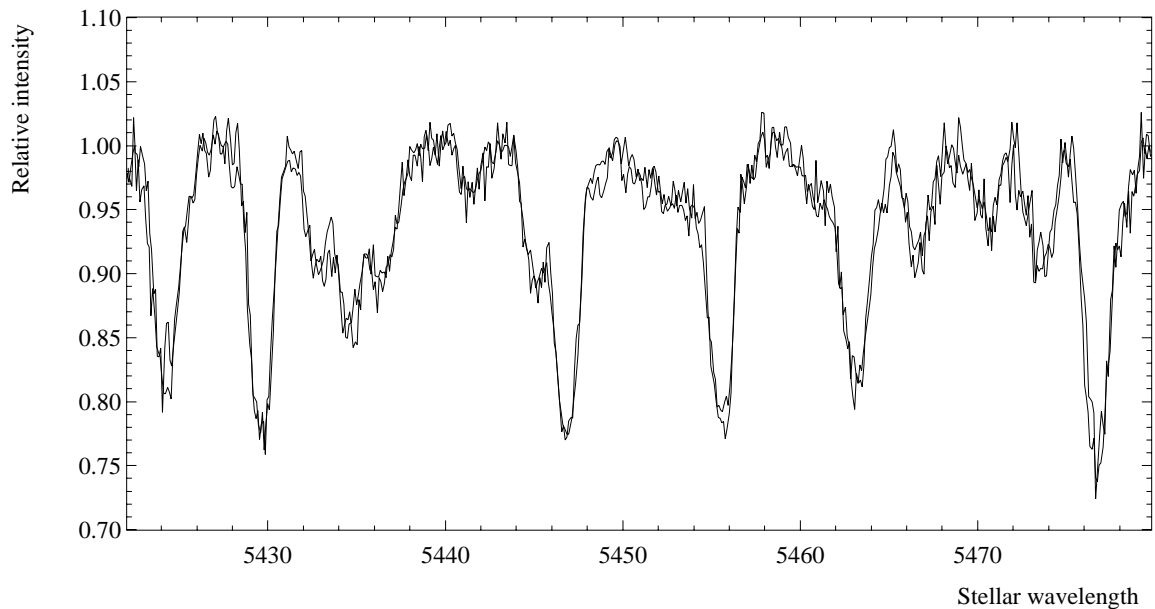


Figure 3. Fragment of the photospheric absorption spectrum of RY Tau, taken at different brightness of the star (the spectra are overplotted). No difference in line profile or intensity is noticeable

High-resolution echelle spectra of RY Tau were taken with the SOFIN spectrograph at the 2.5-m Nordic Optical Telescope (La Palma, Spain), at low brightness of the star (5 Dec. 1995) and at high brightness (20 Nov., 22 Nov., 25 Nov., 27-30 Nov. and 1 Dec. 96). The spectral range was 400-900 nm, the resolving power 25000, S/N ratio 170. In spite of the large brightness difference, all the spectra show the same photospheric spectrum of a late G star, with the same line depths and line ratios, and with the same veiling factor of about 0.5. The equivalent width of H α emission has changed from 1.8 nm to 0.7 nm, that is the flux radiated in the line remains at about the same level as before the brightening of the star (see Figure 2). The spectra taken at high brightness of RY Tau show the usual night-to-night variations in emission line profiles of H I and Ca II: superposition of broad emission with multiple variable absorption components at radial velocities from +50 to -150 km/s. No variations were found in photospheric absorption lines (see Figure 3).

Similar event of brightening of RY Tau by more than one magnitude with constant colours was observed in 1983/84 (Zajtseva et al., *Sov. Astron.Lett.*, 11(2), 109, 1985).

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