THE CHROMOSPHERE-LIKE ENVELOPE OF THE VARIABLE STAR T TAU

I.V. Shpychka, N.V. Virun
Lviv State University, Lviv 290005, Ukraine

ABSTRACT. The emission measure of the near-star chromosphere-like envelope of variable star T Tau with various mechanisms of radiation is computed. The normalization on the observed distribution of energy in continuum spectrum is carried out. The accretion disk and chromosphere models of the T Tau are discussed.

Key words: Stars: T Tau, Nebula T Tau.

Academician Ambartsumian in this classic works presented,that variations of brightness of many irregular variable stars are closely connected with variations of brightness of emission nebulae, close to them. In particular, that pertain to star T Tau and Bernham nebulae (nebulae T Taurus). Schwartz (1974, 1975) was published observations of nebula T Taurus and reduced fluxes H and He lines (in units of energy).

Zanstra method was used to calculate Lc-radiation flux giving vise to T Taurus nebulae emission. This nebulae spectral date, published Schwartz (1974, 1975) were taken. Having compared Fo value to photometric observations at IUE satellite and land observations in UBVR system we revealed that they very well by a smooth line representing T Tau continuous spectrum energy distribution curve from visual region to for UV. Besides, our theoretical estimates showed that even a half of Fo flux is enough to give vise to T Taurus nebula.

However, there arises a question, where Lc-quanta of T Tau star are taken from, as its spectral class is late F-K. This difficulty disappears as its spectral fast as we suppose that T Tau star has a chromosphere. We calculated this chromosphere emission measure $ME = Ne^2V$ for different emission mechanisms (tabl. 1). We found, that $ME = 3.55 \cdot 10^{55}\mathrm{cm}^{-3}$, that revealed to be very close to ME, got from T Tau spectral observations in far UV (Cram, 1979; Cram et. al., 1980). In table 1 we presents theoretically calculated measures of emission chromosphere-like envelope of variable star T Tau different radiation mechanisms: free-free transitions (f-f), free-bound combined (f-b) and also for two-quantum 2q-radiation. As we see, in the table 1, that value of measure of emission is dependent from what point of continuous spectrum is taken for setting norms. We emphasize that, the points of setting norms are taken from observational distribution of energy in continuous spectrum T Tau. Schwartz (1975) give some more value $ME = 2.00 \cdot 10^{56}\mathrm{cm}^{-3}$, offered before, but he do not give noting commentary. Because we are inclined to think that the most probable value of emission measure can be value $ME = 3.55 \cdot 10^{55}\mathrm{cm}^{-3}$. Consequently easy to obtain geometrical dimension of this envelope.

What observational arguments, besides this, are in witness of chromosphere in variable stars T Tau? There are two arguments. The first, emission spectrum T Tau is like spectrum of solar chromosphere, is seen well the lines H and K calcium, and lines of ionized Fe and titanium. The second, characteristic time of many variations of brightness T Tau is equal 30-40 minutes. This is give possibility to estimate electronic concentration Ne in that points stellar atmosphere, in which they took place. The estimates Ne give the value very closely to electronic concentration in solar chromosphere.

However, the assumption about presence of chromosphere variable star T Tau is not only one way to find source of L_c-quanta for excitation of nebulae T Taurus. Such source can be presence an accretion disk in variable star T Tau. Exactly the same model for star type T Tau was developed in work (Lamsin et al., 1996).

We notes, that disk sometimes can give considerable greatest flux in X-ray region, than powerful chromosphere-like envelope or chromosphere. Thus, even the most X-rays detectors do not registrate observable flux of energy in X-ray region for T Tau star.

It should be interesting to built the accretion disk model and to analyze all data of observations T Tau as the most studying representative of that kind variable stars.

However, in our opinion, now chromospheric model of T Tau is the most confirmed by observational data. In the work (Golovatyj et al., 1979) developed photoionization model of nebulae T Taurus in base on abovementioned value Fo and i the work (Golovaty V.V. and Novosyadlyj B.S.) too, in which the photoionization model of nebulae T Tau is making more precise by calculation radiation.

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Tabl.1. Measure of emission with different radiation mechanisms

n	Radiation mechanism	Setting norms	Measure of emission
1	(f-b)-transitions	$F_0 = 6 * 10^{-29}$	$3.74 * 10^{55}$
2	(f-f)-transitions	$F_{\lambda=6sm} = 5 * 10^{-30}$	$3.36 * 10^{55}$
3	2q-radiation	$F_0 = 6 * 10^{-29}$	$8.58 * 10^{55}$
4	(f-f)-transitions	$F_0 = 6 * 10^{-29}$	$2.29 * 10^{59}$
5	(f-f)-transitions	Schwartz (1975)	$2.00 * 10^{56}$
6	Observations on IUE	Cram et al. (1980)	$7.22 * 10^{54}$