

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 3348

Konkoly Observatory
Budapest
4 July 1989
HU ISSN 0374 - 0676

PHOTOMETRIC MULTIPERIODICITY OF THE Be STAR 120 TAURI

In the framework of our spectroscopic and photometric observations of Be stars, started on the beginning of eighties at the Brera-Merate Astronomical Observatory, we collected a rich harvest of photometric data of the star 120 Tauri (HR 1858). In our knowledge, there are very few papers devoted to the variability of this star: Hubert-Delplace and Hubert (1979) observed changes in emission lines during the period 1954-1975; Pavlovski and Bozic (1982) showed "large variations in continuum light, reaching about 0.1 mag. in V".

We measured 120 Tau in the period Jan. 23-Feb.15, 1989, using a digital photon-counting photometer attached to the 50 cm. reflector telescope of Merate Observatory. Comparison and check stars were HR 1860 and 121 Tauri respectively. We collected 581 and 201 values of Δm (in the sense $m_{HR1860} - m_{120Tauri}$) for γ and β -wide filters. These photometric data have been analysed with a nonlinear least-squares period determination routine similar to the program PERDET (Breger, 1982).

Table 1 shows the results of this analysis: here the found frequencies ν , the oscillation amplitudes a and the phases φ , referred to $T_0 = 7563.3703$ J.D., are pointed out for γ and β -wide filters and in order of decreasing amplitudes. Figs.1 and 2 represent the γ and β -wide normal points (that is the averages of some Δm values) with the synthesized light curves obtained for the five frequencies shown in Table 1.

We can preliminary point out that:

1. taking into account the data errors of Table 1, the two sets of frequencies for γ and β -wide filters can be considered as coincident;

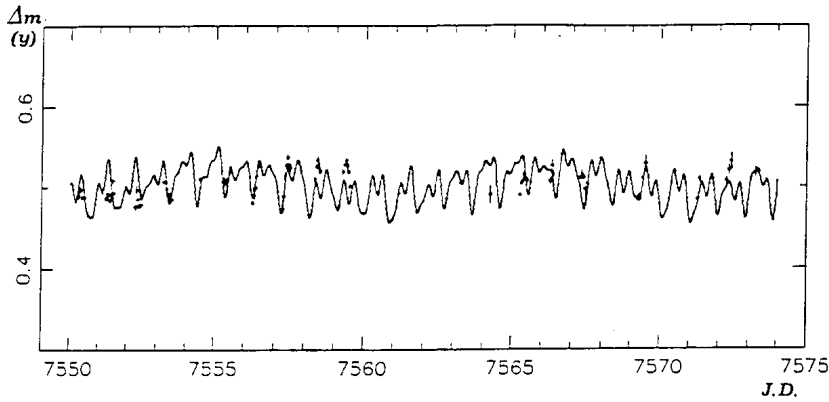


Figure 1

TABLE 1

	ν (c/d)	β -wide FILTER a (mag)	ϕ
f_1	$1.094 \pm .005$	$0.023 \pm .004$	$-2.60 \pm .16$
f_2	$0.104 \pm .005$	$0.022 \pm .004$	$0.27 \pm .15$
f_3	$2.143 \pm .006$	$0.013 \pm .003$	$-0.73 \pm .23$
f_4	$3.122 \pm .009$	$0.010 \pm .003$	$0.38 \pm .28$
f_5	$0.772 \pm .009$	$0.004 \pm .002$	$2.12 \pm .37$

	ν (c/d)	y FILTER a (mag)	ϕ
f_1	$1.085 \pm .002$	$0.017 \pm .002$	$-2.62 \pm .12$
f_2	$0.093 \pm .002$	$0.016 \pm .002$	$-0.13 \pm .12$
f_3	$2.156 \pm .003$	$0.013 \pm .001$	$-0.86 \pm .11$
f_4	$3.131 \pm .004$	$0.008 \pm .001$	$0.07 \pm .21$
f_5	$0.775 \pm .002$	$0.008 \pm .001$	$2.16 \pm .11$

2. against every appearance, we think that the four frequencies f_1, f_2, f_3 and f_4 are not due to aliasing; in fact: a) if we leave out even only one of them, the fit of the light curves gets worse remarkably; b) taking into account the error bars, we can not consider their differences as integers;
3. the great variation reported by Pavlovski and Bozic (1982) in ν light is not confirmed;
4. the found multiperiodicity is consistent with the presence of multimodal non-radial pulsations: the range of frequencies

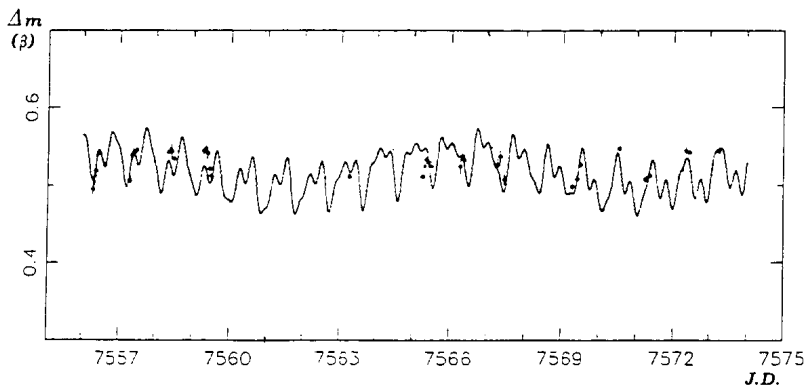


Figure 2

observed is reminiscent of the 53 Per variable stars which are surely non-radial pulsators (Smith, 1980);

5. an international photometric campaign on 120 Tau, with the aim to confirm these results, should be welcome.

MICHELE BOSSI, GIANANTONIO GUERRERO and GABRIELLA BIANCHINI

Osservatorio Astronomico di Brera
via E. Bianchi 46
22055 MERATE (Como)
ITALY

REFERENCES

- Breger, M.: 1982, Vienna Internal Report 82/2
Hubert-Delplace, A.M., Hubert, H.: 1979, An Atlas of Be Stars,
Paris-Meudon Observatory.
Pavlovski, K., Bozic, H.: 1982, Hvar Observatory Bulletin 6(1), 45
Smith, M.A.: 1980, Nonradial and Nonlinear Stellar Pulsation,
Lect. Not. Phys. No 125 - Eds. H.A. Hill and
Dziembowski (Springer-Verlag) 60