UV SPECTROSCOPY OF THE NOVALIKE VARIABLE TT ARIETIS

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TT Ari was detected by Strohmeier et al. (1957) and is classified as a novalike variable. It was hitherto unclear whether TT Ari is a special type of dwarf nova (Warner, 1976) or an old nova (Cowley et al., 1975). Our group obtained a total of four IUE spectra between 1979 and 1981 in the short and long wavelength region. The first spectrum was taken in July 1979, when the system had a visual brightness of 11.3 magnitudes. The following two IUE observations in November 1980 revealed TT Ari in the lowest optical state ($V = 14^m.3$) observed so far. The fourth spectrum was obtained during the rise to maximum in January 1981, when the system had an apparent magnitude of $V = 11^m.8$. From this behavior, Krautter et al. (1981) concluded that TT Ari is a dwarf nova with extremely extended standstills as they are typical for Z Cam stars.

During standstill, the spectra are dominated by broad absorption lines (Duerbeck et al., 1980), which, in quiescence, are present in emission. The spectrum taken in January 1981 is showing that absorption is also present during the rise to maximum, although weaker than at standstill; some lines can still be observed in faint emission (e.g. C IV at λ 1550 Å). The standard deviation of the absolute fluxes of the C IV line from its mean value amounts to about 40 % during the different activity phases (determined from the three SWP spectra), while the continuum flux undergoes variations by a factor of 10 to 15.

The absolute flux distribution of the UV continuum can be interpreted as arising from two black body radiators with very different temperatures: the accretion disc with about 20000 K, and a hot component with 150000 - 200000 K. The latter, might be the boundary layer between accretion disc and white dwarf or, as an alternative, the hot

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spot. The cool secondary contributes in the UV less than 0.1 % to the total radiation and can therefore be neglected. The disc temperature is constant in all activity stages; the temperature of the hot component shows only marginal variations within the above mentioned range. However, both components undergo significant variations of their radiating areas: the disc radius from 0.035 $R_\odot$ (quiescence) to 0.15 $R_\odot$ (standstill), the hot component from 0.005 $R_\odot$ to 0.015 $R_\odot$, respectively.

REFERENCES

Cowley, A.P., Crampton, D., Hutchings, J.B., Marlborough, J.M.: 1975, Astrophys. J. 195, 413

Duerbeck, H.W., Klare, G., Krautter, J., Wolf, B., Seitter, W.C., Wargau, W.: 1980, Proc. "Second European IUE Conference", Tübingen, 26-28 March 1980, ESA SP-157, 91

Krautter, J., Klare, G., Wolf, B., Wargau, W., Drechsel, H., Rahe, J., Vogt, N.: 1981, Astron. Astrophys. 98, 27

Strohmeier, W., Kippenhahn, R., Geyer, E.: 1957, Kl.Veröff.Sternwarte Bamberg Nr. 18

Warner, B.: 1976, in "Structure and Evolution of Close Binary Systems", IAU-Symp. No. 73, eds. P. Eggleton et al. (Dordrecht: Reidel Publ.), 85

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