THE NEAR ULTRAVIOLET SPECTRUM OF ζ TAU

A. M. DELPLACE
Observatoire de Meudon, France
and
K. A. VAN DER HUCHT
Space Research Laboratory of the Astronomical Institute at Utrecht, The Netherlands

By using several ultraviolet spectrograms in the λ 2100–2800 Å wavelength range, the absorption features and the flux values of ζ Tau have been determined and compared to different early type stars.

The material was obtained by the Utrecht Orbiting Stellar Spectrophotometer S59 on board the ESRO satellite TD-1A. This instrument is described in detail by de Jager *et al.* (1974).

Three wavelength regions were scanned simultaneously (2060–2160 Å, 2495–2595 Å, 2775–2875 Å) with spectral resolution 1.8 Å. The decrease of the S59 sensitivity between 1972–1973 has been considered (Hoekstra, 1974).

Since ζ Tau is classified, in the visible wavelength range, B2III–B2IV according to various classifications, we have chosen for comparison several stars of about the same spectral type and different luminosity; γ Lup (B2IV), γ Peg (B2IV), β Lup (B2III), ε CMa (B2II), χ Car (B3IV), o^2 CMa (B3Ia), η CMa (B5Ia).

Strong shell features are identified in the ultraviolet spectrum. The same photospheric lines (Fe III, Mn III, Cr III, Ti III, Ni III, Si III, O III, He I, C II ...) are generally found in the S59 spectrum of the B1II-III stars (Van der Hucht *et al.*, 1975) and the shell lines (Fe II, Cr II, Ti II, Ni II, Si II, Mg II, Mg I) generally correspond to the strongest lines observed in the A2 Ia star, α Cyg, *ibid.* ...

Several lines have an interstellar or circumstellar origin.

The flux measurements were calibrated by Stecher's measurements of ζ Pup as standard (1970). In each channel, the wavelength dependent sensitivity was taken into account (Lamers, 1974). The fluxes were measured at λλ 2110 Å, 2553 Å, and 2815 Å; they are normalized to magnitude $V = 0$ and corrected for the interstellar reddening using the law of Bless and Savage (1972).

For the four B2 comparison stars, the flux values at λλ 2110 Å, 2553 Å, and 2815 Å are in sufficiently good agreement.

By comparison to the B2 stars, ζ Tau shows a deficiency in the continuum of about 0.3 magnitude, but the flux ratios (2100 Å/2800 Å, 2500 Å/2800 Å) of ζ Tau and the B2 comparison stars are in agreement. According to a study by Heap (1974), in the 1100–2050 Å wavelength range the comparison of the ratios C III/C IV and Si III/Si IV indicates an effective temperature of about 27 000 K. Therefore, ζ Tau must be considered at least as hot as a B2 star.

The deficiency of the continuum of ζ Tau does not seem to be a rotational effect. In 1973, there was more material in the shell as the result of a new outburst (Delplace, 1975). In the ultraviolet range, the shell looks like an absorbing screen, while the line blocking effect is as high as for an A-type supergiant star.

A. Slettebak (ed.), Be and Shell Stars, 197–198.

References

Bless, R. C. and Savage, B. D.: 1972, *Astrophys. J.* **171**, 293.
Delplace, A. M.: 1975, *Astron. Astrophys.*, in preparation.
Heap, S.: 1974, *Astronomy in Ultraviolet*, The Royal Society, London.
Hoekstra, R.: 1974, *S59 Information Sheet*, No. 7401.
Hucht, K. A. van der, Lamers, H. J., Faraggiana, R., Hack, M., and Stalio, R.: 1975, *Astron. Astrophys.*, in press.
Jager, C. de, Hoekstra, R., Hucht, K. A. van der, Kamperman, T. M., Lamers, H. J., Hammerschlag, A., Werner, W., and Emming, J. G.: 1974, *Astrophys. Space Sci.* **26**, 207.
Lamers, H. J.: 1974, *S59 Information Sheet*, No. 7401.
Stecher, T. P.: 1970, *Astrophys. J.* **159**, 543.