

PHOTOGRAPHIC INFRARED SPECTRA OF SYMBIOTIC STARS*

Y. Andrillat and L. Houziaux
Observatoire de Haute Provence and
Institut d'Astrophysique de
l'Université de Liège

Relatively few spectra of symbiotic stars have been recently published in the photographic infrared. We have observed six objects during the period 1962-1977 with a grating spectrograph attached to the newtonian focus of the 120-cm telescope at Observatoire de Haute Provence. The reciprocal dispersion is $230 \text{ \AA} \cdot \text{mm}^{-1}$ and the region 5800 to 8800 \AA has been covered using hypersensitized IN plates. The minimum equivalent width for an emission line to be seen is about 0.5 \AA . The spectra are displayed on plates I and II. We now briefly review the main spectral characteristics.

Z And. Only H α and O I 8446 \AA appear as bright lines. The latter is however absent in November 1975. TiO bands appear at λ 6852, λ 7054-7126 and λ 7589. The presence of a band at λ 8432 is doubtful. Let us note that on a spectrum in the near ultraviolet taken on August 8, 1978 a strong Balmer continuum emission is seen.

AG Peg. If we adopt a 830-day period with a minimum at JD 2 440 928, the phases of our observations are (according to the order adopted on plate I) 0.106, 0.106, 0.460, 0.590, 0.878, 0.021, 0.304 and 0.312. Emission lines at H α , He I $\lambda\lambda$ 6678, 7065 O I 8446 are seen at all phases except near minimum when only H α is bright. Ca II lines at $\lambda\lambda$ 8598, 8662 are conspicuous absorptions as well as the TiO bands at λ 6852, λ 7054-7126 (strong) and 7589 \AA . The absence of TiO λ 8432 together with the strength of the Ca II lines lead to a spectral type M3 III. On our near ultraviolet spectrum taken on August 11, 1978, the Balmer jump is not seen either in emission or in absorption.

*Les observations ont été effectuées à l'Observatoire de Haute Provence (C.N.R.S.)

BF Cyg. Shows strong emissions due to $H\alpha$ and O I λ 8446. The latter considerably weakened in July 1976. Absorptions due to Ca II are absent. TiO bands are strong at $\lambda\lambda$ 7054, 7126 and at λ 7589. The presence of the band at λ 8432 indicates a spectral type later than M4 for the red component.

AX Per. $H\alpha$ is a constant emission feature but He I $\lambda\lambda$ 6678, 7065 and O I λ 8446 are seen in emission only on the November 1976 spectra. Ca II absorptions are very weak but the TiO bands at $\lambda\lambda$ 6852, 7054-7126 and 7589 are strong. Again the absorption band at λ 8432 leads to a spectral type later than M4.

T Cr B. The period 1962-1977 is covered with 8 spectra. $H\alpha$ is weak or absent. The Ca II absorptions are conspicuous as well as the TiO bands.

C I Cyg. $H\alpha$, He I λ 7065 and O I λ 8446 appear in emission. The Ca II lines are seen in 1972 and 1973. All TiO bands in the wavelength range show conspicuous absorptions. The spectral type is M4 or later.

TX C Vn. Five spectra are available over the period 1962-1974. $H\alpha$ is weak in emission. Ca II lines appear distinctly in absorption, while O I is a shallow absorption feature, except in February 1966 where it is strong. The absence of molecular TiO bands, except for a weak band at 7054-7126 A, leads to a spectral type earlier than for the other stars, probably M1.

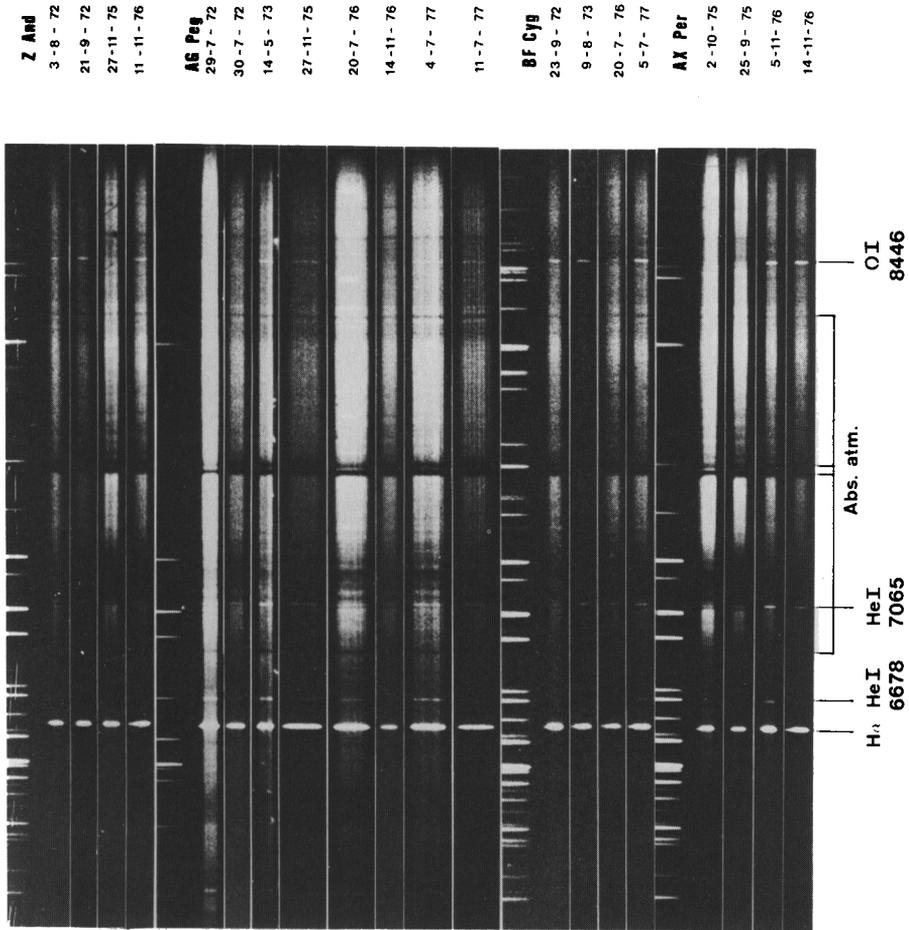


Plate I

T CrB

- 11 - 3 - 62
- 5 - 2 - 66
- 18 - 2 - 73
- 17 - 4 - 73
- 14 - 5 - 73
- 4 - 2 - 74
- 4 - 7 - 77
- 6 - 7 - 77

CI Cy0

- 30 - 7 - 72
- 15 - 4 - 73
- 13 - 5 - 73
- 19 - 7 - 76
- 4 - 7 - 77
- 6 - 7 - 77

TX CVn

- 13 - 3 - 62
- 4 - 2 - 66
- 19 - 2 - 73
- 15 - 5 - 73
- 3 - 2 - 74

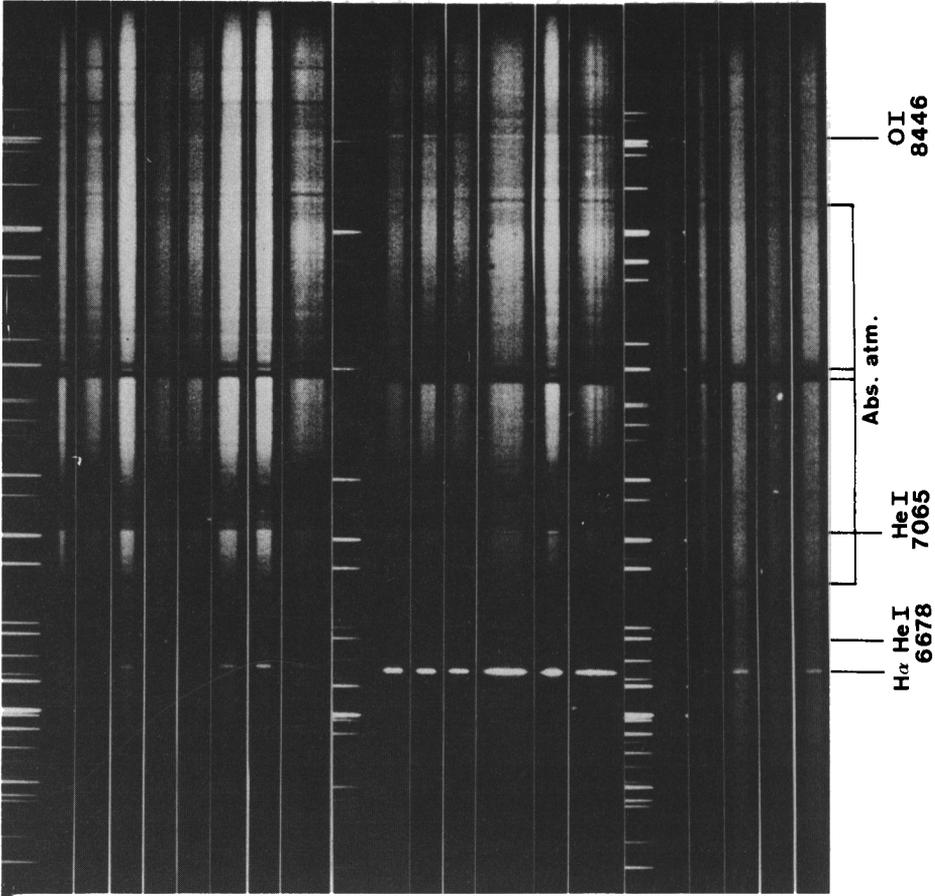


Plate II