THE SYMBIOTIC STAR UV AURIGAE

Parag Seal
Indian Institute of Astrophysics
Bangalore 560034
INDIA

1. INTRODUCTION

The symbiotic variable UV Aur was observed by Merrill (1941) and Sanford (1944, 1949). UV Aur is classified as C8 ep carbon variable (Kukarkin et al. 1969) with a hot white dwarf and surrounding nebula. Infrared photometric observations have been done by Allen (1982), Noguchi et al. (1981) and Kenyon and Gallagher (1983) in the near infrared region and by Woolf (1973) at 2.2 micron to 20 micron region. UV Aur has also been observed by IRAS and IUE Satellite. Polarimetry of UV Aur has been studied by Khudyakova (1985) in the optical region.

2. OBSERVATION

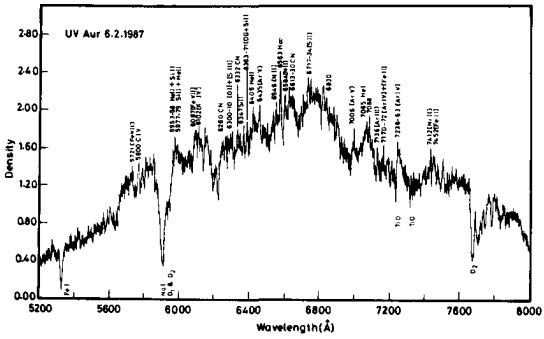
The observations of UV Aur were carried out with the 1 m telescope at kavalur during 1986-87 using the universal Astronomical Grating Spectrograph. Two spectra were obtained in the region 4200 A° to 5000 A° and 6000 A° to 7000 A° at a dispersion of 86 A°/mm. Later another spectra (5200 A° to 8000 A°) was also obtained at a dispersion of 50 A°/mm. Spectrophotometry was also done from 4000 A° to 6000 A° region.

3. ANALYSIS

The spectra of UV Aur 5200 A° to 8000 A° region is shown in the Figure. The Balmer lines are the strongest throughout the spectra. The low excitation lines of [Fe II] are present along with the high excitation lines of [Fe VII]. Also absorption bands for Na I D_1 and D_2, TiO and O_2 are present.

From the spectrophotometric data, relative intensities of emission lines are derived from the magnitudes which are normalised to λ = 5000 A°. From the ratio of hydrogen line relative intensities the reddening and colour excess are derived as A_v = 0.78±0.10,

J. Mikolajewska et al. (eds.), The Symbiotic Phenomenon, 293–294.



Density tracing of the spectrum of UV Aur

E_{B-V} = 0.25±0.03.

From the relative intensities of H-beta, He I 4471 and He II 4686 lines the temperature of the hot component is derived as T_h = 58.3x10^3 K. From the intensity ratio of [O III] λ 5007 + λ 4959 to λ 4363 as 1.88±0.50, the electron density of the nebular component is derived as 10^8 cm^{-3}, assuming the electron temperature as usual T_e = 17000 K.

From the infrared data (Kenyon et al. 1983) bolometric luminosity and effective temperature are calculated as M_{bol} = -5.2 and T_{eff} = 3200 K. The luminosity is of the order of L ≃ 10^4 $L_\odot$. From IRAS observation, the flux ratio F_ν (25 micron)/F_ν (12 micron) = 0.32 is derived.

References

Allen,D.A. : 1984, Proc.ASA. 5, 369.
Boyarchuk,A.A., Gershberg,R.E. and Pronik,V.I. 1963, Isvestia, Crime 29, 291.
Iijima,T.: 1981, Photometric & Spectroscopic Binary System, NATO Advanced Study Institute, ed. E.B.Carling and Z.Kopal, (Dordrecht: Reidel), p.517.
Kenyon,S.J. and Gallagher,J.S. : 1983, Astron.J. 88, 666.
Khudyakova,T.N.: 1985, Sov. Astron. Lett. 11, 262.
Kukarkin,B.V., Kholopov,P.N., Efremov,Yu,N., et al. : 1969, General Catalog of Variable Stars 1, Nanuka, Moscow.
Merrill,P.W.: 1941, Astrop.J. 93, 40.
Noguchi,K., Kawara,K., Kobayashi,Y., Okuda,H. and Sato,S. ; 1981, Pub. Astron. Soc. Jap. 33, 373.
Sanford,R.F.: 1944, Pub. Astron. Soc. Pac. 56, 122.
Sanford,R.F.:1949, Pub. Astron. Soc. Pac. 61, 261.
Woolf,N.J.: 1973, Astrop. J. 185, 229.

https://doi.org/10.1017/S0252921100103689 Published online by Cambridge University Press