RevMexAA (Serie de Conferencias), **20**, 270–270 (2004)

TIME-RESOLVED SPECTROSCOPY AND DOPPLER TOMOGRAPHY OF UX UMa

V. F. Suleimanov,[1] V. V. Neustroev,[2] N. V. Borisov,[3] and I. S. Fioktistova[3]

Medium resolution spectroscopy of nova-like cataclysmic variable UX UMA was performed using the 6-m telescope SAO RAS in April 1999. Obtained spectra cover the total orbital period including eclipse phases and allow us to reproduce the radial velocity curve. The radial-velocity variations of the Hβ emission line are found to have semi-amplitude of about 100 km/s.

The nova-like cataclysmic variable UX UMA is well known short period ($0^d.1966713$) eclipsing close binary. It has been extensively investigated in the past (Schlegel et al. 1983, Shafter 1984, Rutten et al. 1994, Baptista et al. 1995, Knigge et al. 1998, Froning et al. 2003). The radial velocity curves for different emission and absorption lines with semi-amplitudes K_1 ranged from 140 to 360 km/s were obtained by Schlegel et al. (1983). Shafter (1984) found K_1 for Hα equal 157±6 km/s and this value is used now for UX UMA (see, for example, Baptista et al. 1995). On the other hand, Froning et al. (2003) found the extremely low K_1 value (70 km/s) for far ultraviolet absorption lines. Obtaining an accuracy value of K_1 is one of the main aims of our time-resolved spectroscopy of UX UMA. A total of 63 medium resolution (~2.6 Å) spectra of UX UMA in the wavelength range 3920-5250 Å and with exposures of 300 s were obtained on 6-m telescope at Special Astrophysical Observatory during 1999 April 8 and 10. The spectra show Hβ, HeII λ4686, CIII λ4648 in emission for all phases (Fig. 1). Hδ, Hϵ, HeI λ4471 and MgII λ4481 are in absorption at all phases except eclipse. Using the double-gaussian fitting method (Schneider & Young 1980; Shafter 1983), we have determined K_1 (from Hβ) to be 100±20 km s^{-1}. It means a white dwarf mass is greater than one solar mass, because the secondary mass ($0.45\ M_\odot$) and the inclination angle ($i = 72^o$) are good known from the orbital period and the eclipse duration (Baptista et al. 1995; Shafter 1984). We have also found that during our observations UX UMA showed some features which are commonly used for the identification of the SW Sex subclass stars. We have used Doppler tomography to investigate the emission line brightness distributions along the accretion disk surface.

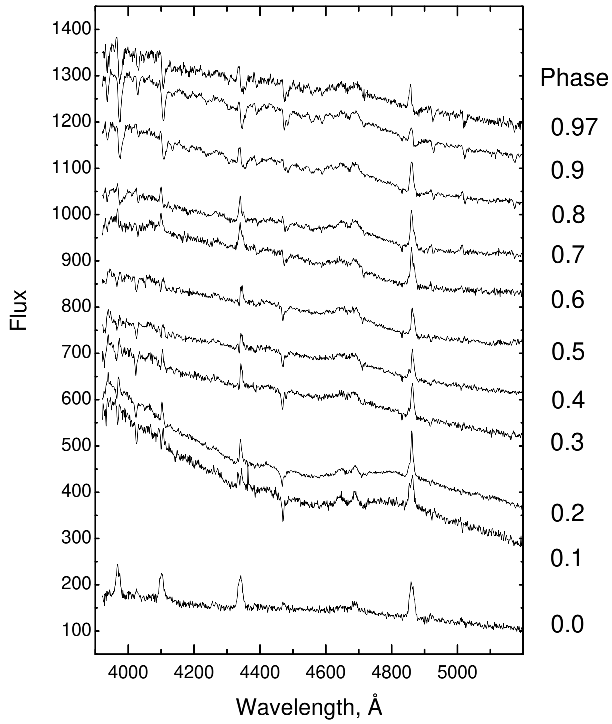

Fig. 1. The phase-resolved spectra of UX UMA. All spectra are shifted to each other except phases 0.0 and 0.1.

V.S. acknowledges financial support from the Russian Foundation for Basic Research (grant 02-17-174) and the Program of Support of Leading Scientific Schools of Russia (project 1789.2003.02).

REFERENCES

Baptista, R. et al., 1995, ApJ, 448, 395
Froning, C., Long, K., & Knigge, C., 2003, ApJ, 584, 433
Knigge, C. et al., 1998, ApJ, 499, 414
Rutten, R. G. et al., 1994, A&A, 283, 441
Schlegel, E., Honeycutt, R., & Kaitchuck, R. 1983, ApJSS, 53, 397
Schneider, D., & Young, P., 1980, ApJ, 238, 946
Shafter, A., 1983, ApJ 267, 222
Shafter, A., 1984, AJ, 89, 1555

[1]Department of Astronomy, Kazan State University, Kremlevskaya str. 18, 420008, Kazan, Russia (vals@ksu.ru).
[2]Computational Astrophysics Laboratory, National University of Ireland, Galway, Ireland (benj@it.nuigalway.ie).
[3]Special Astrophysical Observatory, Russia.