RevMexAA (Serie de Conferencias), **20**, 222–222 (2004)

NEW CLUES ON THE MODEL OF YY HER AFTER TWO SEASONS

L. Hric,[1] R. Gális,[2] A. Dobrotka,[3] V. Šimon,[4] K. Petrík,[5] P. Niarchos,[6] Z. Velič,[7] K. Gazeas,[6] L. Šmelcer,[8] P. Hájek,[9] P. Sobotka,[10] K. Koss,[9] L. Brát,[10] and F. Lomoz[10]

During two observational seasons of international campaign of YY Her we secured photometric data which covered the primary as well as the secondary minima and revealed unexpected outburst activity of this system.

YY Her belongs to the classical symbiotic binaries with nova-like outbursts. Recently Mikolajewska et al. (2002) explained the light variability of YY Her by combining the ellipsoidal changes and sinusoidal variations of the nebular continuum and line emission. In 2001 (Hric et al. 2001) we discovered in the binary system YY Her the presence of the secondary minimum that was indicated, however, by only three photometric observations from one observatory. This uncertainty stimulated us to activate the international photometric campaign for detailed covering of the light curve during the period of the expected secondary minimum.

To this campaign were integrated the following observatories: Stará Lesná Observatory of the Astronomical Institute and Beluša Observatory in Slovakia, University of Athens and Kryonerion Observatory in Greece as well as Valašské Meziříčí Observatory, Vyškov Observatory, N. Copernicus Observatory Brno and Ondřejov Observatory of the Astronomical Institute in Czech Republic. We obtained in this campaign a total of 218, 465, 286 and 291 observational data in B, V, R and I filter respectively, that cover the interval of JD 2 451 823 - 2 452 877.

There was a successful campaign conducted to also cover the primary minimum and it produced some interesting results. The periodic variations of the brightness are explained by the eclipses of the components in the symbiotic system. During the primary minimum about JD 2 452 440 we observed the flares that were later followed by the energetic outburst in about JD 2 452 700.

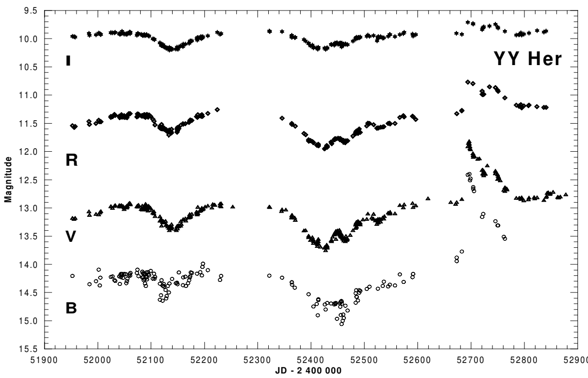

Fig. 1. BVRI photometry of YY Her secured during international campaign from 2001 to 2003.

At the first glance at the light curve it is evident that the amplitude of the outburst declines towards longer wavelengths while for the particular colour the following amplitudes in maximum were detected: 1.56 mag in B, 1.04 in V, 0.54 in R and 0.20 in I filter respectively. The monotonic decline of brightness from maximum was interrupted by an apparent dip. That coincides with the time of the secondary minimum.

In this paper we outlined the idea that the photometric behaviour of YY Her is possible to describe consistently by an eclipsing model. This explanation requires the presence of an optically thick envelope around the white dwarf with a temperature significantly lower than the temperature of the hot component. The existence of such an envelope is in agreement with assumptions about steady state burning of matter accreted on the white dwarf by a red giant wind. The occasionally observed outbursts are caused by transfer of blob of matter through L_1, by collision in the ring (the first weaker outburst) and by following impact on the white dwarf (the second stronger outburst).

REFERENCES

Hric, L., Petrík, K., Niarchos, P., Velič, Z., Gális, R. 2001, IBVS No. 5046

Mikolajewska, J., Kolotilov, E.A., Shugarov, S. Yu, Yudin, B.F. 2002, AA 392, 197

[1] Astronomical Institute of the Slovak Academy of Sciences, 059 60 Tatranská Lomnica, Slovakia (hric@ta3.sk).

[2] Faculty of Sciences, University of P. J. Šafárik, 041 54 Košice, Slovakia (galis@kosice.upjs.sk).

[3] Faculty of Materials Science and Technology STU, 917 24 Trnava, Slovakia (dobrotka@mtf.stuba.sk).

[4] Astronomical Institute, 251 65 Ondejov, Czech Republic.

[5] Faculty of Education, 918 43 Trnava University, Slovakia.

[6] Faculty of Physics, University of Athens, Greece.

[7] Observatory, 018 61 Beluša, Slovakia.

[8] Observatory, 757 01 Valašské Meziříčí, Czech Republic.

[9] Observatory, 682 01 Vyškov, Czech Republic.

[10] MEDUZA Group, 616 01 Brno, Czech Republic.