

RECENT UBVR PHOTOMETRY OF SYMBIOTIC STARS

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Abstract. We present recent photometric observations of Z And, BF Cyg, and AX Per made in the standard Johnson *UBVR* system. The main characteristics of their light behavior can be summarized as follows: Z And: our observations cover the recent active phase, from its maximum in 2000 December to the latest measurements (2003 September). BF Cyg: the minimum of the recent wave in the star's brightness was the deepest ever observed; in 2003 February a short-term flare developed in the light curve. AX Per: from 1995 October the light curve displays signatures of a quiescent phase of the star; in 2003 May a 0.5 mag flare was detected.

Key words: stars: binaries: symbiotic – techniques: photometric

Symbiotic stars are interacting binary systems consisting of a cool giant and a hot compact star. Typical orbital periods are between 1 and 3 years, but can be significantly larger. The mass-loss from the giant represents the primary condition for interaction between the binary components. A part of the material lost by the giant is transferred to the more compact companion via accretion from the stellar wind or Roche-lobe overflow. This process generates a very hot ($T_h \approx 10^5$ K) and luminous ($L_h \approx 10^2$ – $10^4 L_\odot$) source of radiation.

During *quiescent phases* the hot component releases its energy approximately at a constant rate and spectral distribution. Generally, we observe a wave-like variation in their light curves (hereafter LC) as a function of the orbital phase.

During *active phases* the hot component radiation changes significantly, which leads to the 2–3 mag brightening of the object in the optical. As an example of the complex behavior of LCs of studied

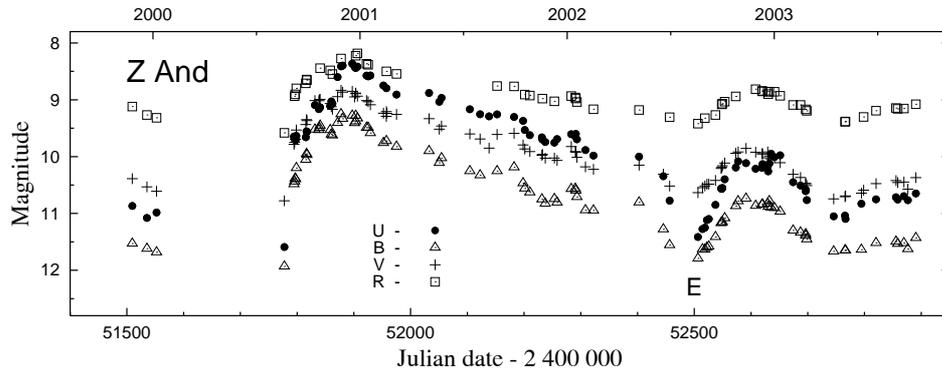


Fig. 1. The recent *UBVR* light curves of Z And.

symbiotic binaries, we present LC of Z And.

The *U, B, V, R* measurements were performed in the standard Johnson system using single-channel photoelectric photometers mounted in the Cassegrain foci of 0.6 m reflectors at the Skalnaté Pleso and Stará Lesná observatories.

Z And is the prototype of the symbiotic stars. The orbital period is about 758 days. The binary Z And is composed of a late-type M4.5 III giant and a magnetic accreting white dwarf (Sokoloski & Bildsten 1999). An example of the photometric variability in the LC is shown in Figure 1. It shows the recent evolution in the LC covering the active phase, with a maximum at the beginning of 2000 December and the following gradual decrease to the latest measurements at 2003 September. At around 2002 August we detected for the first time a minimum, which is due to the eclipse of the active object by the red giant (Skopal 2003). The latest observations show a slow gradual increase in the star's brightness, which suggests that Z And continues to be active.

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