INFRARED PHOTOMETRY OF UV PISCUM

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Abstract. The eclipsing binary system UV Psc was observed in the near-infrared (JHK), and a wave-like distortions have been observed similar to those in the visible. The out-of-eclipse observations have shown real large amount of scatter. This cannot be attributed to the existence of spots on one of the components, which can explain the wave-like distortion of the light curves, but probably to the intrinsic variability of one of them.

1. Introduction

UV Psc, also designated HD 7700, BV 149, and BD + 6°0189, was discovered from photographic plates to be an eclipsing system by Strohmeier et al. at the Remeis-Bamberg Observatory in Germany in 1957. It was reported to be 9.56 at its maximum light and to have a primary minimum 0.7 deep. Strohmeier et al. (1957) also reported five times of minimum from photographic studies and one time of minimum has been announced by Nikulina (1958) from visual observations. Huth (1959) published a light curve of UV Psc made by Strohmeier from 348 photographic plates. The elements given in this report are 2428038.555 + 0.0861046E, while the magnitude range of the system is reported to be 9.6-10.5. One year later Strohmeier and Knigge (1960) published a new light curve, again photographic observations, which gave the maximum brightness of the star as 0.3 brighter than the last time and primary minimum 1.05 deep. The first photoelectric observations of the system were reported by Carr (1969) in his unpublished thesis.

More photoelectric observations were published by Oliver (1974) who obtained a light curve, incomplete outside minima, in the visual region. His light curve does not show any evidence of asymmetries while the one observed by Carr (1969) (less than half a year earlier) shows a depression around phase 0.75. Oliver, who classified UV Psc as an RS CVn-type system, suggested that the most probable spectral classification for the system's components according to the visual observed colours are G2V and K0IV or G2IV and K0IV.

Vivekananda Rao and Sarma (1984) estimated the spectral types of the two components, using their UBV photoelectric observations, and found G4-6V for the hotter and K0-2V for the cooler component.

Visual observations of UV Psc by Sadik (1979) show that asymmetries exist at their maxima and he suggested that a locally hotter region is possibly responsible for the irregularities.

Vivekananda Rao and Sarma (1983), found light variations outside eclipses in the system and analyzing the wave-like distortion that appears to migrate through the light.
curve, found that it is generally highly asymmetric and seldom characterized by two maxima and two minima. In their later work Vivekananda Rao and Sarma (1984) found that UV Psc shows remarkable light fluctuations that cannot be completely due to starspots but they suggested that the hotter component could be an intrinsic variable. In a recent paper by Busso et al. (1986), an analysis of both published and new photometric observations of UV Psc suggests the existence of cycles of variability, similarly to what is found in other systems of the same class. UV Psc has been found to be a flaring radio source at 6 cm by Spangler et al. (1977) while Agrawal et al. (1980) observed a flaring X-ray emission from the system in the energy range 0.18 to 3 keV.

Fig. 1. The differential infrared ($\Delta J, \Delta H, \Delta K$) light curves of UV Psc with respect to HR 434; October 1978 (○) and September 1976 (●) observations.