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PHOTOMETRY DURING THE END-PHASE OF A SPOT CYCLE IN II Peg^{*}

II Peg is one of the most active RS CVn binaries with strong chromospheric and transition region emission lines. Its radio and X - ray emissions are comparable to the other active RS CVn members. The optical light curve shows variations in amplitude, shape, phase and mean light level due to the reorientation or appearance of spot groups. Recent observations by Byrne (1986) showed that the light curve had a larger amplitude than any of the previous photometry. He interpreted the behaviour as due to the occurrence of a large single spot group and the brightness at the maximum corresponded to the light level of the unspotted surface. In an analysis of the then available photometry of II Peg, Mohin, Raveendran and Mekkaden (1986) found that between the interval JD 2444175 and JD 2444595, the light curves had two minima and they concluded that this phenomenon could be due to the presence of two active regions located at different latitudes. But observations in July-November 1981 showed only one minimum (Rodono et al., 1986). Photometry of II Peg in August-September 1984 by Arevalo, Lazaro and Fuensalida (1985) indicated that the light curve had two minima. Thus the location, area and the number of spot groups change rapidly in this system.

Strömgren uvby photometry of II Peg was carried out at European Southern Observatory, La Silla, during 11 nights in October 1986 using the ESO 50 cm telescope and a single

^{*}Based on observations collected at European Southern Observatory, La Silla, Chile

beam photometer with ice cooled EMI 6256 tube. All observations were made differentially with respect to the comparison star HD 223094. Sufficient numbers of standard stars were observed for the conversion of the instrumental magnitudes to the standard system. The standard error for an individual observation in y is 0.015 mag. The Julian days of observation are converted to photometric phases using the ephemerides of Rucinsky (1977).

$$JD = 2443033.10 + 6^d.724183E$$

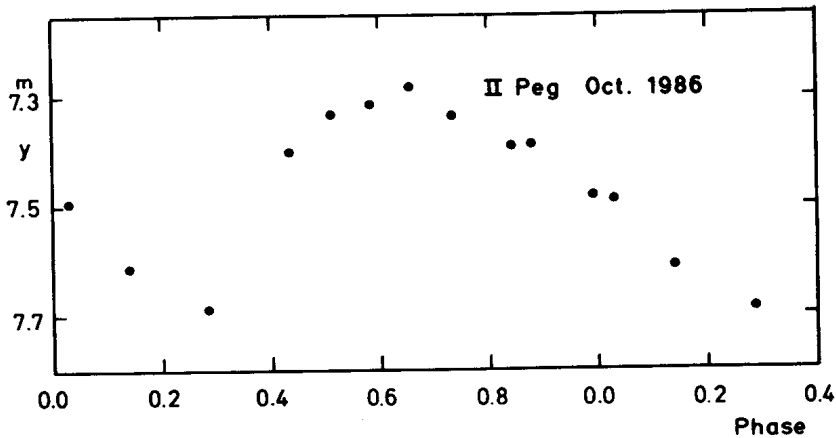


Figure 1

Figure 1 is a plot of the y band light curve of II Peg. It is known that Strömgren y is nearly the same as Johnson V and so a comparative study of the present work with the photometry available in the literature is possible. The y magnitudes at light maximum and mean light level are converted to Johnson V values using the relation $V = y + 0.015(b-y) - 0.003$ (Olsen, 1983) and found to be 7.29 and 7.49 mag. respectively.

The shape of the light curve and the maximum brightness of II Peg are similar to the observations of Byrne (1986) made one month earlier, but the amplitude is 0.40 mag.; less than in the previous month. Also the minimum of the light curve seems to be advanced by 0.10P. Though the current maximum is the brightest except for the observations of Chugainov (1976) in 1974, it is rather not possible to attribute this value to

the unspotted light level since the very active nature of II Peg causes sudden changes in the light curve and continuous observations over a few cycles are necessary to estimate the maximum brightness.

If we assume that the two spot groups observed till early 1985 merged to form the current single spot group, then what we observe in II Peg at present is the end-phase of a spot cycle. A decade of photometry of II Peg shows that the system is one of the most spot active binaries exhibiting single or multiple spot groups at different latitudes and changes occur within a short time scale. Simultaneous photometric and spectroscopic observations over a few consecutive cycles are needed to infer the activity in this system.

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