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THE 1986 LIGHT CURVE OF II Peg

II Peg (=BD+27^{0}4662 = HD 224085 = SAO 91578) is a bright RS CVn-type single-line spectroscopic system. This very interesting spotted binary has been photometrically observed at Catania since 1979 (Rodono' et al., 1980).

We present the UBV differential observations carried out during the period 5 September - 10 November 1986, on 23 nights with a single-channel photon-counting photometer fed by a 0.91m cassegrain telescope. Our principal comparison star was BD+27^{0}4648, while BD+28^{0}4665 and BD+28^{0}4667 were observed several times on each night, as check stars. No significative variations between comparison and check stars were observed.

The observations were corrected for atmospheric extinction. Nightly mean UBV differential magnitudes (variable-comparison star) were computed with reference to several standard stars. The following values for the V magnitude and colors of the comparison star BD+27^{0}4648 were assumed: V=9.403 (Vogt, 1981), B-V=1.04, U-B=0.84 (Rodono' et al. 1986).

Mean $JD_\odot$, V magnitudes and colors of II Peg are listed in Tab.I. Orbital phases, also listed in Table I, were computed using the spectroscopic ephemeris by Raveendran et al. (1981):

$$JD_\odot = 2443030.396 + 6^d.724464\ E$$

The resulting V light curve and B-V and U-B color variations are presented in Fig.1. Typical nightly standar deviations for V, B-V and U-B data are 0.005, 0.01 and 0.02 mag., respectively.

Our observations were obtained simultaneously or immediately following those of Byrne (1986). The light curve presented in Fig.1 is rather well covered and confirm the very large amplitude of II Peg light variations in the fall 1986, and the very bright level of its light maximum. Moreover, our observations indicate a remarkable stability of the spotted area, which remained unchanged at least until the first decade of November, i.e. about half a month later than Byrne's observations.

We also obtained spot models of II Peg V light curve, assuming two spotted circular areas and using our computer code based on the analytical method outlined by **Friedemann & Gurtler** (1975) and already used by us (Rodono' et al. 1986). We adopted the following values for the parameter:

i (inclination of the star rotation axis with respect to the line of sight) = 60 degree;

μ (limb darkening coefficient) = 0.79;

Ls/Lp (luminosity ratio between the secondary and the primary component of the system) = 0.0, i.e., invisible secondary star;

Vo (unspotted V magnitude) = 7.30;

Ts (photosperic temperature) = 4600 K;

Tspot (spot temperature) = 3300 K.

Table I

Photometric observations of II Peg

$JD_{\odot}$ 2446000.0+	PHASE	V	B-V	U-B
678.6186	.5299	7.748	1.04	0.73
680.6360	.8299	7.490	1.00	0.72
682.5482	.1142	7.355	0.99	0.69
683.5527	.2636	7.443	1.01	0.68
685.6036	.5686	7.791	1.04	0.72
686.6010	.7169	7.754	1.04	0.79
688.5695	.0097	7.322	0.98	0.67
689.5734	.1590	7.388	0.99	0.67
708.5279	.9777	7.328	0.99	0.68
709.5107	.1239	7.384	1.01	0.70
710.4757	.2674	7.461	1.00	0.67
712.4323	.5583	7.756	1.05	0.75
714.5658	.8756	7.395	0.99	0.72
716.5659	.1730	7.405	1.01	0.68
730.4752	.2415	7.437	1.00	0.65
731.5346	.3991	7.536	1.02	0.73
735.4854	.9866	7.324	1.00	0.70
736.4825	.1349	7.383	1.01	0.73
737.4332	.2762	7.438	1.01	0.72
742.4673	.0249	7.325	1.00	0.71
743.4572	.1721	7.401	1.01	0.71
744.4498	.3197	7.469	1.01	0.72
745.4810	.4730	7.638	1.03	0.74

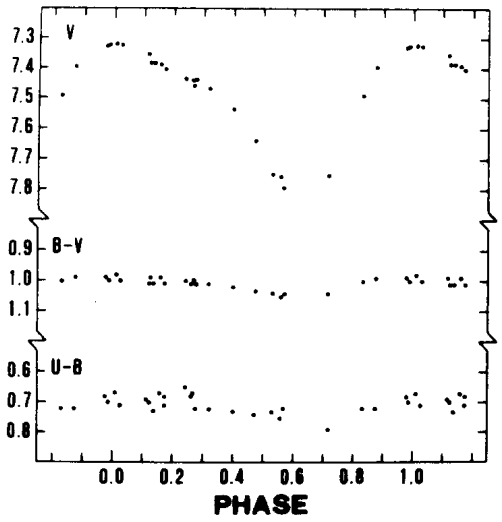

Figure 1

V, B-V and U-B light curves of II Peg obtained at Catania Observatory during the period September - November 1986. Phases were computed from the ephemmeris given by Raveendran et al. (1981): JDo = 2443030.396 + 6.724464E.

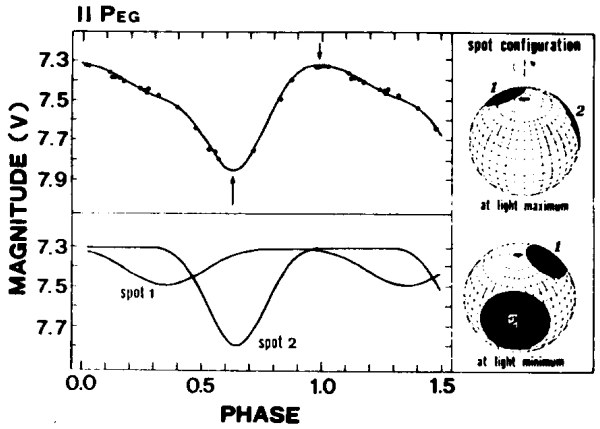

Figure 2

Results of two-spot model fit for the observed light variations (upper panel). The bottom panel shows the contribution of each spot, arrows indicate the phase of light maximum (↓) and light minimum (↑); the corresponding spot configurations are presented on the right hand panel.

The resulting latitudes for the two spots are 58 and 9 degrees. The radii are 23 and 37 degrees respectively. The two spots are 105 degree apart in longitude (Figure 2).

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