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POLARIMETRIC OBSERVATIONS OF R CORONAE BOREALIS STARS

In Table 1 are listed multicolor polarimetric observations of R Coronae Borealis obtained during a recent descent to light minimum. The filters used have been described in the literature (Coyne and Gehrels 1967, Coyne, Gehrels and Serkowski 1974) and for R CrB the effective wavelengths are as follows: U(0.37 microns), B(0.44), G(0.52), O(0.66), R(0.85), I(0.97). The observations were obtained with the 152-cm Catalina and 225-cm Kitt Peak telescopes of the University of Arizona using a rotating half-wave plate polarimeter coupled to a Nova computer. The position angles,  $\theta$ , are given in equatorial coordinates and differential magnitudes are given with respect to HD 147169 ( $V=9^m.06$ ,  $U-B=+0^m.03$ ,  $B-V=+0^m.42$ ).

Although we were not able to observe up to the time of visual light minimum, the variation of polarization and flux support the "discrete cloud" model proposed to explain our previous polarimetric observations which extended through a minimum of R CrB (Coyne and Shawl 1973). In particular within a period of 22 days (MJD 42089-42111) the ratio of the polarization in the Ultraviolet to that in the Blue changes from 1.1 to 1.4. This means, according to the model of Coyne and Shawl (1973) that in this short period of time there was a decrease by a factor of about 1.5 in the mean radius of the graphite particles causing the polarization. This could be due either to a growth of grains or to a local redistribution of existing grains in the circumstellar region of R CrB.

Scattered observations of various other R CrB stars are given in Table II. There appears to be nothing outstanding in the wavelength dependence of the polarization at the epochs observed. In fact, except for the rather steeper drop in the ultraviolet part of the polarization curve for SU Tau, the measured polarizations appear to be interstellar.

Table I. Polarimetric Observations  
of R CrB

Date (MJD)	Filter	P (10 <sup>-2</sup> )	e (10 <sup>-4</sup> )	θ (deg)	Δm *
42089	U	4.04	17	100	2.04
	B	3.71	5	76	2.22
	O	1.58	11	179	0.73
	R	1.12	11	177	0.77
	I	0.77	23	174	0.71
42090	U	3.92	8	9	2.24
	B	3.35	5	179	2.66
	G	2.62	4	178	2.36
42095	B	5.08	7	10	2.64
	R	1.08	15	7	0.66
42101	U	5.43	21	11	2.27
	G	4.50	6	9	2.37
42102	R	1.26	19	6	0.69
	I	1.42	48	8	0.49
42107	U	5.69	13	9	2.72
	B	5.17	9	9	2.78
	G	3.28	11	8	2.19
42111	R	0.77	87	169	0.65
	U	5.80	34	8	2.90
	B	4.23	6	10	2.55
	G	2.43	10	10	2.10
	O	0.51	58	178	0.55
	R	0.23	29	170	0.35

\* Δm = m(R CrB) - m(HD 147169).

Table II. Polarimetric Observations  
of Other R CrB Stars.

Star	Date (MJD)	Filter	p (10 <sup>-2</sup> )	e (10 <sup>-4</sup> )	θ (deg)
SU Tau	41576	U	1.20	14	168
		B	1.81	6	162
		G	2.16	7	164
		R	1.53	8	171
		I	1.62	13	174
XX Cam	41319	N	2.76	11	129
		U	2.63	5	130
		B	2.85	3	128
		G	2.91	5	127
		O	2.78	7	128
Rho Cas	41587	R	2.10	5	128
		I	1.76	8	131
		O	1.43	2	55
		R	1.13	3	56
		I	0.96	4	56
41614	U	1.26	3	54	
	B	1.37	1	55	
	G	1.43	1	54	

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