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PHOTOELECTRIC OBSERVATION OF δ CAPRICORNI

δ Cap has been known as a single-lined spectroscopic binary of metallic-line features. The eclipsing nature of this system was first announced by Eggen (1956) from his V_E observation, which indicated a depth of 0.^m16 in visual region for the primary minimum. Wood and Lampert (1963) also observed the primary eclipse photoelectrically. However, the secondary minimum has never been published so far.

BV observations were made on thirteen nights in 1977-80 with the 8-inch refractor at the Education Centre of Kanagawa Prefecture, Japan. The photoelectric photometer was furnished with a 1P21 photomultiplier tube and two colour filters, Schott BG12+GG13 for B and Schott GG41 for V. γ Cap was used as the comparison star throughout the course of the observations. This comparison star is the same as previously used by Eggen and Wood and Lampert.

The present observations cover the primary minimum and touch the mid-secondary minimum. All the results of observations expressed in $m_V - m_C$ are given in Table I, where the phases are calculated with

$$\text{Prim. Min.} = \text{JD } 2435656.911 + 1.022768 E,$$

which has been taken from the General Catalogue of Variable Stars (1969). The observations are also plotted in Figure 1.

The depths of both minima are deduced as shown in Table II. The observed epoch of the mid-eclipse is $\text{JD}(\text{Hel}) 2443832.924$, which gives $+0.006^d$ ($E=7994$) for O-C residual from the above ephemeris. The light variation in B outside eclipses can be expressed by $\ell = 0.9811 - 0.0190 \cos 2\theta$. From the

coefficient 0.0190 for the $\cos 2\theta$ term, the ellipticity of the components can be deduced to be $z = 0.037$ according to the procedure of Russell and Merrill (1952).

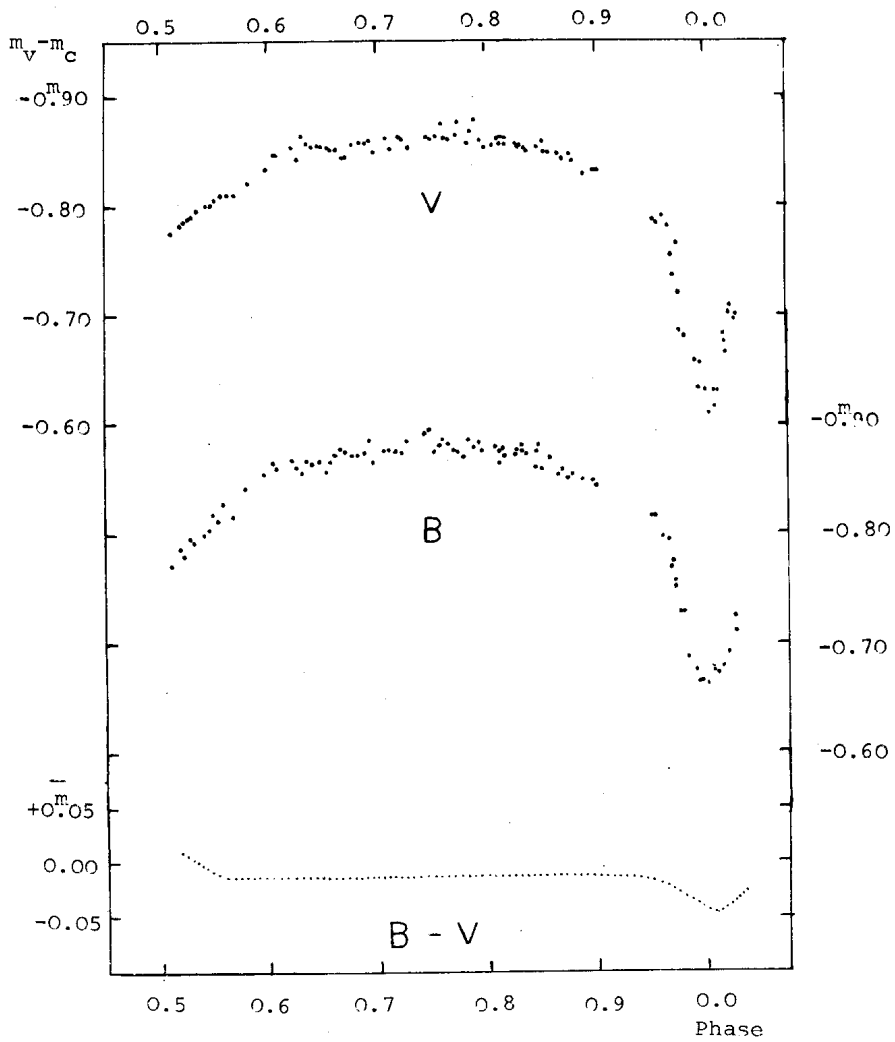


Figure 1

Table I

BV Photoelectric Observations of δ Capricorni

Date	Hel. JD 2440000+	ΔV	ΔB	Phase	
1977					
Sep. 20	3407.0590	-0.853	-0.865	0.6207	
	.0636	-0.843	-0.860	0.6252	
	.0684	-0.838	-0.855	0.6299	
	.0725	-0.856	-0.867	0.6339	
	.0769	-0.854	-0.865	0.6382	
	.0814	-0.855	-0.866	0.6426	
Nov. 27	3474.9494	-0.785	-0.815	0.9494	
	.9012	-0.783	-0.815	0.9527	
	.9082	-0.790	-0.797	0.9595	
	.9116	-0.780	-0.795	0.9629	
	.9155	-0.756	-0.770	0.9667	
	.9196	-0.736	-0.748	0.9707	
Dec. 01	3478.8796	-0.854	-0.876	0.8425	
	.8827	-0.854	-0.879	0.8456	
	.8857	-0.859	-0.860	0.8485	
	.8883	-0.850	-0.860	0.8510	
	.8910	-0.848	-0.868	0.8537	
	.9001	-0.847	-0.854	0.8626	
	.9033	-0.842	-0.860	0.8657	
	.9192	-0.847	-0.850	0.8724	
	02	3479.8848	-0.854	-0.877	0.8253
		.8886	-0.854	-0.880	0.8291
.8918		-0.852	-0.875	0.8322	
.8993		-0.851	-0.873	0.8395	
03	3480.8938	-0.855	-0.876	0.8119	
	.8979	-0.856	-0.867	0.8159	
	.9058	-0.857	-0.872	0.8236	
1978					
Oct. 23	3804.9484	-0.852	-0.855	0.6527	
	.9522	-0.850	-0.863	0.6564	
	.9562	-0.851	-0.871	0.6603	
	.9617	-0.843	-0.876	0.6657	
	.9670	-0.845	-0.875	0.6708	
	.9722	-0.856	-0.871	0.6759	
	.9778	-0.856	-0.872	0.6814	
	.9872	-0.857	-0.874	0.6856	
	.9868	-0.859	-0.885	0.6902	
	.9917	-0.850	-0.866	0.6950	
	Nov. 20	3832.8859	-0.736	-0.775	0.9682
		.8911	-0.721	-0.757	0.9733
		.8971	-0.681	-0.729	0.9792
.9057		-0.660	-0.687	0.9876	
.9102		-0.657	-0.665	0.9920	
.9166		-0.632	-0.664	0.9982	
Dec. 01	3843.8678	-0.862	-0.876	0.7057	
	.8719	-0.851	-0.877	0.7097	
	.8793	-0.861	-0.874	0.7169	
	.8828	-0.860	-0.873	0.7203	
	.8891	-0.853	-0.882	0.7265	

Table I (cont.)

Date	Hel. JD 244000+	ΔV	ΔB	Phase	
1979					
Oct. 14	4160.9633	-0.862	-0.892	0.7423	
	.9665	-0.861	-0.895	0.7454	
	.9727	-0.863	-0.876	0.7514	
	.9771	-0.876	-0.882	0.7557	
	.9807	-0.862	-0.885	0.7593	
	.9850	-0.861	-0.881	0.7635	
	.9891	-0.864	-0.876	0.7682	
	.9929	-0.876	-0.874	0.7712	
	4161.0005	-0.857	-0.870	0.7786	
	.0046	-0.869	-0.886	0.7826	
	.0085	-0.878	-0.880	0.7864	
	.0125	-0.858	-0.868	0.7904	
	.0170	-0.853	-0.874	0.7949	
	.0248	-0.856	-0.872	0.8024	
	.0289	-0.862	-0.878	0.8063	
	.0325	-0.862	-0.862	0.8099	
	.0362	-0.861	-0.878	0.8135	
	21	4167.8871	-0.776	-0.768	0.5119
		.8951	-0.784	-0.786	0.5197
		.8993	-0.787	-0.779	0.5239
.9035		-0.800	-0.794	0.5280	
.9076		-0.796	-0.792	0.5320	
.9166		-0.799	-0.798	0.5408	
.9209		-0.800	-0.802	0.5450	
.9248		-0.806	-0.817	0.5488	
.9307		-0.809	-0.812	0.5546	
.9340		-0.810	-0.828	0.5578	
.9434		-0.811	-0.815	0.5670	
.9477		-0.815	-0.825	0.5711	
.9552		-0.821	-0.842	0.5785	
.9716		-0.833	-0.853	0.5945	
.9799		-0.847	-0.864	0.6027	
.9831		-0.846	-0.859	0.6058	
Nov. 13		4190.8888	-0.610	-0.662	0.0016
		.8929	-0.617	-0.678	0.0056
		.8968	-0.632	-0.673	0.0094
	.9017	-0.674	-0.679	0.0142	
	.9057	-0.701	-0.692	0.0181	
	.9103	-0.696	-0.724	0.0252	
1980					
Sep. 29	4512.0103	-0.684	-0.728	0.9746	
	.0298	-0.638	-0.663	0.9937	
	.0578	-0.665	-0.689	0.0209	
	.0633	-0.699	-0.711	0.0264	
Oct. 04	4517.0235	-0.840	-0.854	0.8761	
	.0343	-0.830	-0.858	0.8867	
	.0433	-0.833	-0.848	0.8955	
	.0477	-0.833	-0.844	0.8998	

Table II
 Depths of the Minima in BV

	ΔB	ΔV
Primary minimum	0.217	0.147
Secondary minimum	0.114	0.090

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SHIGEO OHMORI

Education Centre of Kanagawa
 Prefecture,
 Fujisawa-City, Fujisawa 4210
 Kanagawa, 251 Japan

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