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PHOTOGRAPHIC PHOTOMETRY OF BL LACERTAE

BL Lacertae was first observed and classified as an optical variable by Hoffmeister (1929). Independently VRO 42.22.01 was observed by MacLeod et al. (1965). In 1968 Schmidt identified BL Lac with the radio source VRO 42.22.01. Since 1968 MacLeod et al. (1971) have been monitoring this variable source at 2.8, 3.75, and 4.5 cm. With the available photographic data, Shen and Usher (1970) report a range in photographic magnitude of 12.4-16.4 for BL Lacertae and that the light curve shows no periodicity. Photoelectric studies by Racine (1970) and by Milone (1972) show irregular rapid variability. Day-to-day variations usually amount from $0^m.1$ to $0^m.3$. Milone (1972) reported a variation of $0^m.4$ in four minutes. The spectrum of BL Lac reveals one doubtful spectral feature and the distance to the object is essentially unknown (Oke et al. 1969). Bertaud et al. (1973) have constructed a light curve for the period of June, 1968 - January, 1971. A correlation between the color index B-V and the magnitude is reported.

Photographic photometry has been obtained for BL Lacertae with the 102-cm Ritchey-Chretien reflector at Prairie Observatory of the University of Illinois. Plates were taken at the f/7.6 Cassegrain focus at irregular intervals during each observing season from September, 1969 to September, 1972. Plate-filter combinations were used to give approximate U, B, and V magnitudes. Kodak 103a-D emulsion behind a Schott GG11 filter (V), Kodak IIa-O, 103-O, or Ia-O emulsion behind a Schott GG13 filter (B), and Kodak IIa-O or 103a-O emulsion behind a Schott UG2 filter (U) were used to obtain the magnitudes. These plates were measured with an Astro Mechanics iris photometer. The photoelectric sequence of Bertaud et al. (1969) was used for forming calibration curves. The internal plate accuracy is approximately ± 0.05 magnitudes for all three colors.

Table I contains for each observations: the Julian date to hundredths of a day, and the U, B, or V magnitude. These 1969

Table I

UBV Photometry of BL Lacertae

JD	U	B	V	JD	U	B	V
2440485.72		15.05		2441161.74	15.68	15.88	14.66
2440504.71		15.04		2441164.72		15.34	
2440504.73			14.20	2441176.85		15.40	
2440825.71		14.59		2441236.59			15.03
2440825.74			13.63	2441236.63		16.22	
2440834.82		14.87		2441236.69	17.08		
2440834.84			13.86	2441262.60		16.08	
2440858.74			14.00	2441262.64			14.50
2440875.72		14.82		2441269.61		16.43	
2440875.75	15.32			2441269.65			15.24
2440875.80			13.87	2441278.56		16.06	
2440878.63			13.82	2441504.78		15.68	
2440885.65		14.85		2441504.80			14.62
2440885.76	15.88			2441541.76			14.69
2440885.79			13.89	2441541.79		15.83	
2440889.63	16.88			2441547.75			14.77
2440895.61		15.87		2441547.77		16.03	
2440896.60	17.15			2441558.59			14.60
2440896.63			14.78	2441558.61		15.85	
2440896.77		15.91		2441570.75			14.13
2440907.58		15.88		2441570.77		15.30	
2440907.62	15.68			2441577.65		15.72	
2440911.59			13.84	2441577.66			14.93

and 1970 observations support those of Bertaud et al. (1973) and in a few cases supplement certain portions of the light curve not observed by them. The observations obtained during the 1971 and 1972 observing seasons show the same type of irregular behavior observed in the past. Our observations show a B-V, V relation that is consistent with those of others (Bertaud et al. 1973). Our observations introduce more scatter into this relation since our B-V was derived photographically.

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References:

Bertaud, C., Dumortier, B., Véron, P., Wlerick, G., Adam, G., Bigay, J., Garnier, R., and Duruy, M. 1969, Astr. and Ap. 3, 436.

Bertaud, C., Wlerick, G., Véron , P., Dumortier, B., Bigay, J., Paturel, G., Duruy, M., and Saevsky, de, P. 1973, Astr. and Ap. 24, 357.

Cannon, R.D., Penston, M.V., and Brett, R.A. 1971, M.N.R.A.S.152,79.

Dupuy, D., Schmidt, J., McClure, R., Bergh, van den, S., and Racine, R. 1969 Ap.J. (Letters) 156, L135.

Hoffmeister, C. 1929, A.N. 236, 233.

MacLeod, J.M., Andrew, B.H., Medd, W.J., and Olsen, E.T. 1971, Ap. Letters 9, 19.

MacLeod, J.M., Swenson, G.W., Yang, K.S., and Dickel, J.R. 1965,A.J. 70, 756.

Medd, W.J., Andrew, B.H., Harvey, G.A., and Locke, J.L. 1972,Mem.R. Astr.Soc. 77,109.

Milone, E.F.,1972, Pub.A.S.P. 84, 723.

Oke, J.B., Neugebauer, G., and Becklin, E.E. 1969, Ap.J.(Letters) 156,L41.

Racine, R. 1970, Ap.J.(Letters) 159, L99.

Schmidt, J.L. 1968, Nature 218, 663.

Shen, B.S.P., and Usher, P.D. 1970, Nature 228, 1070.

Tritton, K.P., and Brett, R.A. 1970, The Observatory 90, 110.

Visvanathan, N. 1969, Ap.J. (Letters) 155, L133.