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PHOTOELECTRIC PHOTOMETRY OF ρ CASSIOPEIAE

The peculiar variable star ρ Cassiopeiae (HR 9045, HD 224014, SAO 035879) was observed by two observatories using photoelectric photometers. Observations covered the period of time from December 1987 through February 1989. This paper represents a follow-up of photometric data on the same star presented in earlier bulletins (Leiker, et al., 1988 and Leiker and Hoff, 1987).

ρ Cas is a supergiant (F8pIA) star (Percy & Keith, 1985). ρ Cassiopeiae was discovered to be a variable in 1900 by Louise D. Wells (Pickering 1901). Much of the time this star was confined to a brightness between 4.1m and 5.1m (Bailey, 1978). Between August 1945 and June 1947 ρ Cas decreased in brightness more than a magnitude (Gaposchkin, 1949). After it recovered from this minimum, ρ Cas continued its irregular variation in brightness of 4.1m and 5.1m (Leiker 1987).

ρ Cas was observed by Leiker and Hoff at the University of Northern Iowa (UNI) Hillside Observatory from May 1988 until January 1989. A 0.4 meter Cassegrain telescope and a STARLIGHT-1 photon counting photometer with standard B and V filters was used. HR 9010 (HD 223173, SAO 35761, K3 II, V = 5.51 m, B-V = 1.65) was used as the comparison star. These delta magnitudes are not corrected for color or extinction. Standard deviation (σ) was calculated in the usual manner. Table 1 lists the ΔV and ΔB magnitudes. Figure 1 displays the visual data obtained by both Leiker, Hoff, and Milton. Figure 2 is a graphical representation of the blue data presented in Table 1.

Milton observed ρ Cas from December 1987 to February 1989 using a 0.2 meter Schmidt-Cassegrain telescope with a pulse counting photoelectric photometer. HR 9010 was used as the comparison star. Table 2 lists V delta magnitudes corrected for color and extinction. Milton's data is also displayed in Figure 1. Standard deviation was calculated in the usual manner. Milton also observed τ Cassiopeiae (HR 9008, HD 223165, SAO 35763, K1 III, V = 4.87 m) as a check star. The check star delta magnitudes are corrected only for extinction.

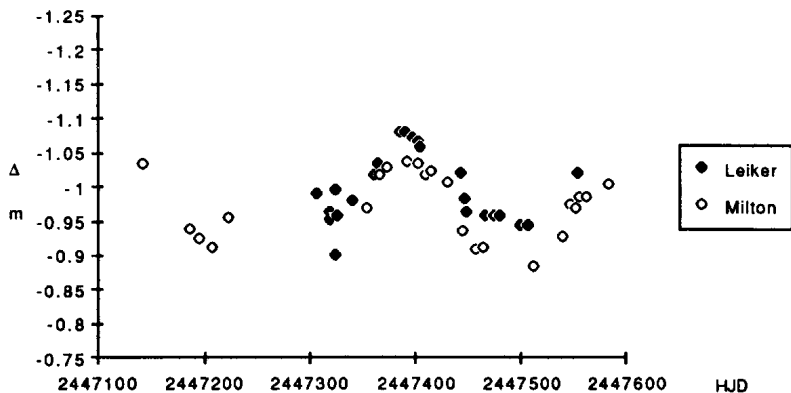


Figure 1. ΔV magnitudes of ρ Cas obtained by Leiker, Hoff, and Milton

Table I. ΔV and ΔB magnitudes of ρ Cas obtained by Leiker and Hoff

HJD	V Mean	σ	#	HJD	B Mean	σ	#
2447306.652	-0.990	0.029	3	2447306.6629	-1.204	0.015	3
2447317.663	-0.963	0.007	3	2447317.6744	-1.208	0.005	3
2447318.648	-0.951	0.008	3	2447318.6605	-1.203	0.007	3
2447323.646	-0.902	0.043	3	2447323.6669	-1.246	0.014	3
2447323.707	-0.995	0.008	3	2447338.6670	-1.252	0.016	3
2447324.688	-0.958	0.067	3	2447359.6585	-1.320	0.006	3
2447338.654	-0.980	0.018	3	2447363.7012	-1.335	0.003	3
2447359.648	-1.017	0.034	3	2447384.6295	-1.380	0.018	3
2447363.691	-1.034	0.012	3	2447385.6315	-1.407	0.012	3
2447384.616	-1.079	0.009	3	2447389.6327	-1.394	0.003	3
2447385.619	-1.079	0.009	3	2447397.6708	-1.390	0.009	3
2447389.610	-1.079	0.005	3	2447401.7315	-1.380	0.021	3
2447397.658	-1.071	0.004	3	2447404.7234	-1.400	0.032	3
2447401.717	-1.066	0.002	3	2447445.6452	-1.280	0.028	3
2447404.711	-1.059	0.002	3	2447448.5911	-1.264	0.006	3
2447442.626	-1.022	0.031	2	2447465.5758	-1.251	0.007	3
2447445.634	-0.982	0.004	3	2447473.7037	-1.256	0.006	3
2447448.576	-0.964	0.007	3	2447479.5335	-1.244	0.001	3
2447465.566	-0.959	0.004	3	2447498.7143	-1.229	0.003	3
2447473.693	-0.958	0.012	3				
2447479.521	-0.958	0.002	3				
2447497.522	-0.945	0.010	3				
2447498.702	-0.944	0.003	3				
2447506.522	-0.944	0.008	3				
2447553.545	-1.020	0.008	3				

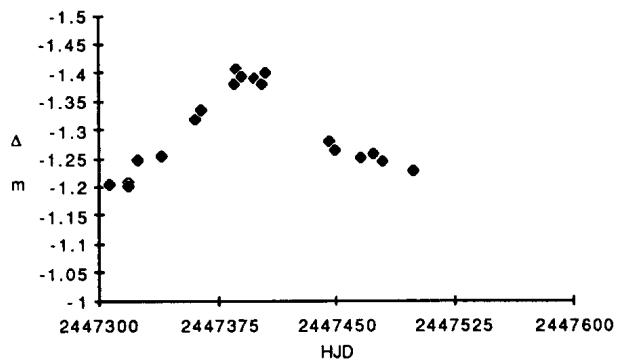
Figure 2. ΔB magnitudes of ρ Cas obtained by Leiker and Hoff

Table II. ΔV magnitudes of ρ Cas obtained by Milton

HJD	V Mean	σ	#	Check
2447141.831	-1.033	0.012	3	-0.703
2447185.723	-0.938	0.015	3	-0.665
2447193.654	-0.925	0.003	3	-0.688
2447206.666	-0.912	0.003	3	-0.666
2447222.665	-0.956	0.008	3	-0.700
2447352.845	-0.970	0.010	3	-0.679
2447365.787	-1.018		1	
2447372.845	-1.028	0.013	3	-0.674
2447392.819	-1.037	0.001	3	-0.689
2447401.757	-1.033	0.006	3	-0.685
2447408.816	-1.017	0.006	3	-0.673
2447415.696	-1.022	0.007	3	-0.670
2447430.667	-1.007	0.003	3	-0.680
2447444.685	-0.936	0.005	3	-0.675
2447457.649	-0.909	0.004	3	-0.672
2447464.664	-0.912	0.003	3	-0.686
2447510.692	-0.884	0.009	3	-0.689
2447538.651	-0.927	0.042	3	-0.665
2447545.692	-0.973	0.008	3	-0.691
2447551.688	-0.969	0.008	3	-0.692
2447555.660	-0.985	0.002	3	
2447562.668	-0.984	0.004	3	-0.690
2447582.675	-1.005	0.017	3	-0.661

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References:

- Bailey, J. (1978). Rho Cassiopeiae, 1964-1975. Journal of the British Astronomical Association. **88**, (4), 397-401.
- Gaposchkin, S. (1949). Rho Cassiopeiae. Harvard College Observatory Bulletin. Number 919, 18-19.
- Leiker, P. S. and Hoff, D. B. (1987). Photoelectric photometry of Rho Cassiopeiae. Information Bulletin on Variable Stars. Number 3020.
- Leiker, P. S. (1987). A review of photometric research on ρ Cassiopeiae, including photoelectric observations obtained at the University of Northern Iowa. Unpublished Master's Thesis. University of Northern Iowa. Cedar Falls, Iowa, USA.
- Leiker, P. S., Hoff, D. B., Nesbella, J., Gainer, M., Milton, R., & Pray, D. (1988). Photoelectric photometry of ρ Cassiopeiae. Information Bulletin on Variable Stars. Number 3172.
- Percy, J. R., & Keith, D. W. (1985). The quasi-cepheid nature of Rho Cassiopeiae. Madore, B. F. Cepheids: Theory and Observations. University of Cambridge Press.
- Pickering, E. C. (1901). Sixty-four new variable stars. Harvard College Observatory Circular. Number 54.