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SEMI-REGULAR BEHAVIOR FOR THE SUPERGIANT RHO CAS

The F8 yellow supergiant Ia-0 star Rho Cas undergoes mass-loss episodes with accompanying changes in brightness, spectrum and radial velocity. Sheffer & Lambert (1986) have suggested that the star undergoes semi-regular pulsation of the atmosphere with a dominant radial pulsation mode of about 500 days. Boyarchuk et al. (1988) noted that at the beginning of 1986, the spectrum of the star changed dramatically: TiO bands and other characteristics of late stars appeared. This change was accompanied by a light minimum.

Photometrically, Rho Cas is well observed. Recent magnitudes have been published by Leiker & Hoff (1987), Leiker et al. (1988), Leiker et al. (1989a), Leiker & Hoff (1990) and Halbedel (1988). This paper reports on more recent unpublished magnitudes obtained by Halbedel at the Corralitos Observatory, and combines all recent observations into a light curve for the previous 6 years.

All observations were made with the 0.6-m. telescope of the Corralitos Observatory and its single channel uncooled photon-counting photometer equipped with an EMI 9924A tube. The comparison stars utilized were HD 223173 ($V=5.510$; $B-V=+1.650$) and Tau Cas ($V=4.867$; $B-V=+1.116$). These stars were stable to within 0.016 in V and 0.018 in $B-V$.

It has been suggested by Leiker & Hoff (1988) and Leiker et al. (1989b) that Tau Cas is itself a variable star: indeed it appears in the New Catalogue of Suspected Variable Stars. However, as previously observed by the

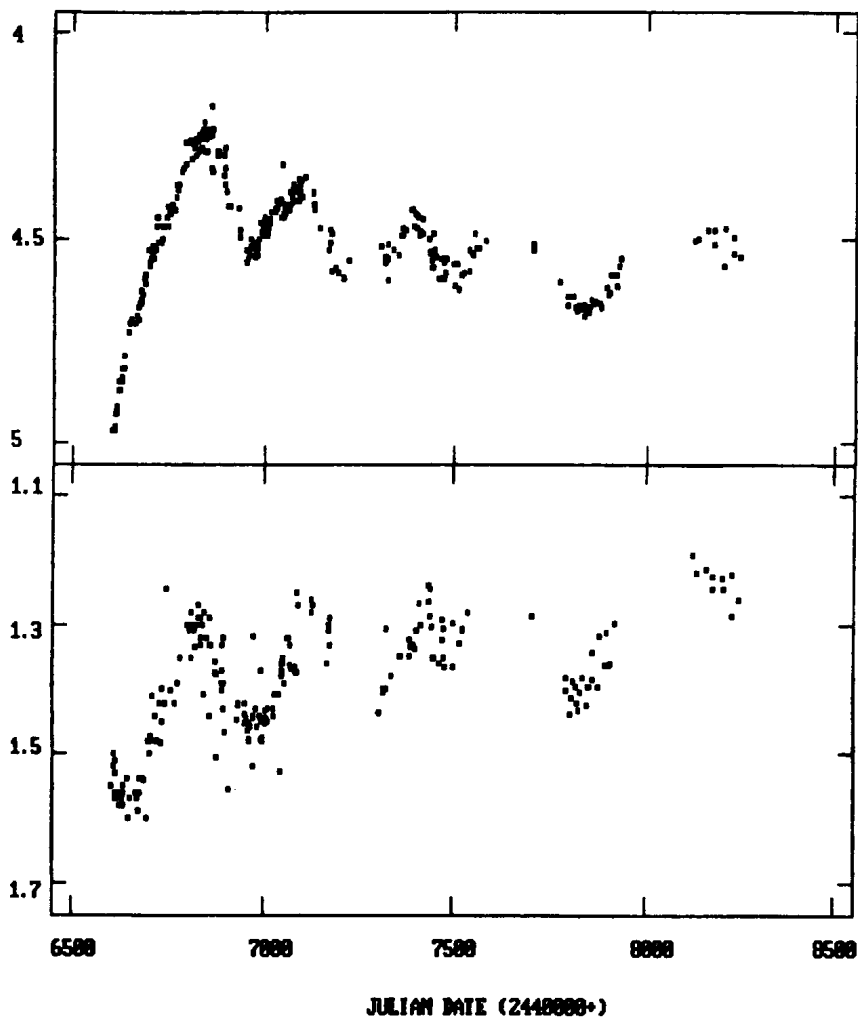


FIGURE 1: MAGNITUDES AND COLORS FOR RHO CAS. THE TOP DIAGRAM SHOWS V MAGNITUDE, THE BOTTOM B-V.

author (Halbedel, 1989), no such variation can be confirmed. On the basis of 59 measures over the JD range 2446994-8244, this conclusion is reaffirmed: the average standard errors about the mean for Tau Cas were 0.012 in V magnitude and 0.015 in B-V. If variability exists, it is below the level

TABLE 1: MAGNITUDES FOR RHO CAS

JD (2440000+)	V	B-V	JD (2440000+)	V	B-V
7411.90069	4.485	+1.266	7810.74583	4.669	+1.387
7412.78888	4.456	1.301	7818.75139	4.678	1.396
7435.87916	4.533	1.263	7827.74971	4.673	1.405
7436.75069	4.539	1.239	7835.70139	4.692	1.382
7437.72083	4.553	1.244	7861.60486	4.662	1.342
7440.76458	4.574	1.286	7878.64374	4.669	1.317
7441.72569	4.540	1.302	7896.61250	4.640	1.313
7470.69930	4.599	1.292	7915.59513	4.617	1.298
7472.69305	4.558	1.324	7917.59236	4.591	1.297
7475.66041	4.588	1.307	8122.81875	4.508	1.191
7501.68611	4.618	1.297	8133.83541	4.500	1.219
7516.61874	4.591	1.329	8159.78611	4.481	1.215
7525.61944	4.586	1.306	8176.69028	4.517	1.225
7526.60763	4.586	1.310	8178.72639	4.479	1.244
7540.59027	4.528	1.282	8201.68263	4.568	1.227
7703.91458	4.515	1.286	8204.61111	4.474	1.245
7790.76528	4.643	1.400	8225.62917	4.498	1.286
7793.82639	4.666	1.381	8228.64097	4.538	1.222
7806.79444	4.642	1.412	8244.63819	4.544	1.262

that can be detected with this system. Therefore, it was continued in usage as a comparison star for Rho Cas.

The newly obtained, thusfar unpublished values for Rho Cas are detailed in Table 1. Figure 1 represents all the magnitudes published in the papers previously cited as well as the new values from Table 1. There is surprisingly little scatter when one considers the multiplicity of sources. The behavior of the star is characterised by an initial brightening, followed by semi-regular cycles with possibly gradually decreasing maxima. The color changes are in phase with the V mag behavior. The star blues as it brightens and reddens as it fades. At any rate, of late Rho Cas appears to be following semi-regular behavior with an approximate cycle time of 400-420 days. Since the star has been known to

undergo outbursts in the past, it will be of interest to follow its behavior in the future. It will continue to be observed at the Corralitos Observatory indefinitely.

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REFERENCES

- Boyarchuk, A.A., Boyarchuk, M.E., & Petrov, P.P. 1988, in Proc. Soviet-Finnish Astro. Meeting, eds. U.Hanni & I. Tuominen (Tartu)
- Halbedel, E.M. 1988, IBVS No. 3171
- Halbedel, E.M. 1989, IBVS No. 3394
- Leiker, P.S. & Hoff, D.B. 1987, IBVS No. 3020
- Leiker, P.S. & Hoff, D.B. 1988, IBVS No. 3176
- Leiker, P.S. & Hoff, D.B. 1990, IBVS No. 3490
- Leiker, P.S., Hoff, D.B., Nesbella, J., Gainer, M., Milton, R., & Pray, D. 1988, IBVS No. 3172
- Leiker, P.S., Hoff, D.B., & Milton, R. 1989a, IBVS No. 3345
- Leiker, P.S., Hoff, D.B., & Tuttle, M.M. 1989b, IBVS No. 3341
- Sheffer, Y. & Lambert, D.L. 1986, PASP, 98, 914