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PHOTOELECTRIC OBSERVATIONS FOR TWO MISCLASSIFIED VARIABLES: AF CRUCIS AND CG SAGITTARII ARE NOT CEPHEIDS

The present note addresses the status of two stars that are identified as Cepheid variables in the fourth edition of the *General Catalogue of Variable Stars*: AF Crucis and CG Sagittarii.

Grayzeck (1978a) found the star AF Cru to be a Cepheid variable with the elements:

$$\text{Max JD}_{hel} = 2441786.576 + 9.297 \times \text{E}.$$

Its V magnitude was found to vary in brightness between 9.75 and 10.10 (Grayzeck 1978b). However, the shape of its light curve is very asymmetric, which is unusual for a classical Cepheid of that period.

Gerasimovic (1927) found CG Sgr, discovered previously by Bailey (1924), to be a long-period Cepheid variable with the elements:

$$\text{Max JD} = 2414127 + 64.1 \times \text{E}.$$

In order to examine the light curves of both stars in greater detail, we observed them photoelectrically at the South African Astronomical Observatory in April-May 1997 using the 50-cm telescope. A total of 29 VR_c measurements were obtained for AF Cru (Table 1), and a total of 43 $V(RI)_c$ measurements were obtained for CG Sgr (Table 2), the accuracy of the individual data being near $\pm 0\overset{\text{m}}{.}01$ in all filters.

It is readily seen that our observations for CF Cru do not satisfy the elements given by Grayzeck and that the star appears not to be varying. A search of the literature revealed that AF Cru was discovered by Uitterdijk (1936) as an eclipsing variable with the elements:

$$\text{Min JD}_{hel} = 2424988.959 + 1.895669 \times \text{E},$$

and a short eclipse duration of $D = 0\overset{\text{d}}{.}06$. Figure 1 illustrates that our observations do not conflict with Uitterdijk's elements. Our data suggest that AF Cru is indeed an eclipsing variable, although we have no measurements near the times of eclipses.

Regarding Grayzeck's (1978b) observations, they do not satisfy Uitterdijk's elements. Our attempts to find a new period using both the present and Grayzeck's observations were unsuccessful.

During the observing run for CG Sgr it was found that the star's brightness varied on a time scale of hours not days, in direct conflict with the elements of Gerasimovic. Although the light amplitude is comparable to that of certain RR Lyrae and δ Scuti variables, the time scale of variability appears to be too small for an object of the RR Lyrae class. It appears that CG Sgr may be a δ Sct star. Our attempts to find new elements for it were unsuccessful.

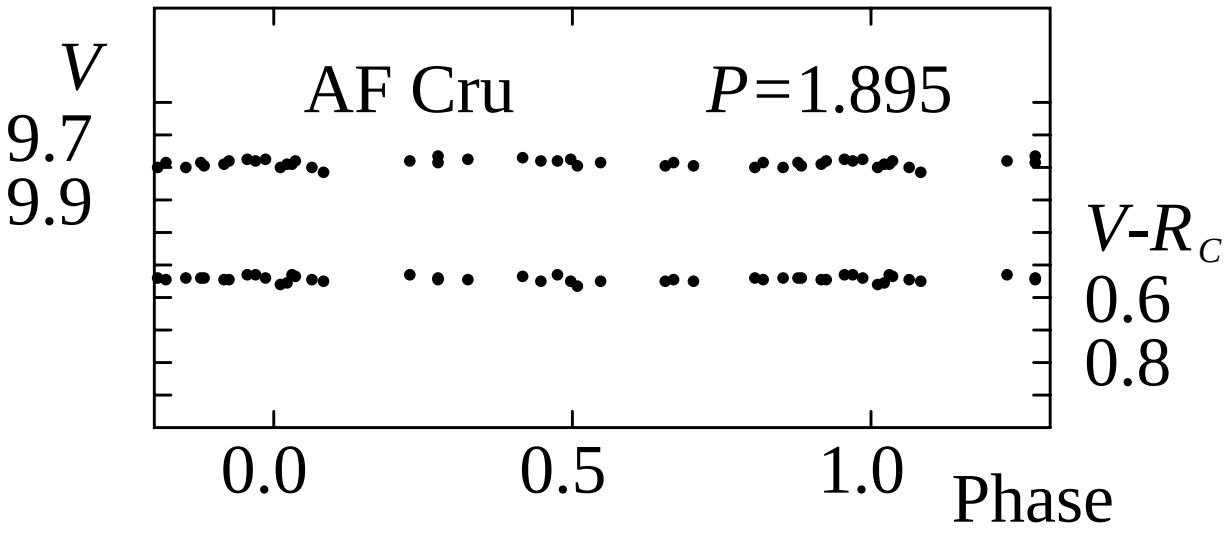

Figure 1

Table 1. VR_c observations of AF Cru

JD_{hel} 2450500+	V	$(V-R)_c$	JD_{hel} 2450500+	V	$(V-R)_c$
41.5860	9.771	.530	78.4412	9.783	.545
42.5988	9.790	.557	79.4437	9.772	.546
68.4660	9.786	.550	80.3507	9.772	.543
70.3868	9.779	.541	80.4086	9.769	.529
72.3457	9.785	.549	80.4347	9.774	.528
73.3404	9.771	.527	82.3603	9.769	.538
73.4321	9.759	.542	82.4283	9.781	.554
74.4629	9.776	.544	82.4573	9.770	.534
75.3275	9.777	.538	83.3326	9.769	.547
75.4246	9.765	.542	83.3538	9.785	.564
76.3313	9.790	.539	83.4255	9.780	.547
76.4218	9.793	.539	84.3438	9.784	.529
76.4791	9.786	.537	84.4066	9.793	.544
77.4913	9.761	.532	84.4412	9.806	.548
78.3662	9.778	.538			

Table 2. VR_c observations of CG Sgr

JD_{hel} 2450500+	V	$(V-R)_c$	$(V-I)_c$	JD_{hel} 2450500+	V	$(V-R)_c$	$(V-I)_c$
72.6293	13.269	1.324	3.046	82.5683	13.459	1.389	3.184
73.6060	13.321	1.353	3.097	82.5976	13.342	1.315	3.037
74.5403	13.262	1.287	3.042	82.6161	13.392	1.353	3.107
74.5990	13.249	1.262	3.015	82.6462	13.429	1.354	3.128
75.5009	13.439	-	3.171	82.6632	13.536	1.417	3.224
75.5846	13.278	1.314	3.029	83.4406	13.497	1.383	3.196
76.5477	13.408	1.389	3.155	83.4440	13.509	1.395	3.192
76.6278	13.273	1.313	3.052	83.4682	13.350	1.342	3.075
77.5546	13.394	1.361	3.136	83.4944	13.543	1.417	3.226
77.6532	13.269	1.310	3.027	83.5598	13.437	1.343	3.114
78.5327	13.488	1.440	3.226	83.6174	13.512	1.423	3.186
78.5982	13.249	1.306	3.026	84.4385	13.620	1.461	3.285
78.6539	13.318	1.357	3.093	84.5003	13.498	1.377	3.189
79.4584	13.457	1.398	3.200	84.5366	13.523	1.417	3.228
79.5264	13.454	1.402	3.184	84.5503	13.446	1.396	3.161
79.5827	13.356	1.374	3.116	84.5676	13.502	1.408	3.201
80.4432	13.490	1.416	3.217	84.5897	13.475	1.424	3.180
80.4777	13.477	1.415	3.206	84.6065	13.443	1.354	3.138
80.5876	13.404	1.392	3.142	84.6243	13.373	1.325	3.102
80.6375	13.347	1.333	3.089	84.6386	13.614	1.457	3.308
82.4762	13.547	1.442	3.238	84.6541	13.369	1.313	3.080
82.5515	13.564	1.443	3.262				

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