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PERIOD AND LIGHT CURVE OF UW GRU 10
FROM PHOTOELECTRIC OBSERVATIONS (*)

The variability of UW Gru \equiv S7704 ($\alpha_{1950.0} : 22^{\text{h}}16^{\text{m}}57^{\text{s}}$;
 $\delta_{1950.0} : -54^{\circ}48'5$) was discovered from photographic plates by
Hoffmeister (1963) who classified it as an RR Lyrae-type star with
 $12 < m < 13$.

As far as we are aware no other observations existed until now. In
the present Bulletin we give the complete photoelectric V light curve
and the period and ephemeris of the variable as they result from
three-year observations, extending over more than 2200 cycles.

First UBV observations were obtained on few nights in June
and July 1978, and July and August 1979. Unfortunately, it was not
possible to phase these observations together because of their scar-
city due to bad meteorological conditions and the commensurability
of the period with the day. However, these data appeared much valua-
ble when connected with those collected in June and July 1981 on
six good photometric quality consecutive nights. All of these obser-
vations were made at the European Southern Observatory, La Silla,
in Chile, using the 100 cm photometric telescope equipped with the
standard UBV photometer (refrigerated EMI 6256 photomultiplier,
pulse counting system, standard UBV filter set).

Additional photoelectric observations in V light were performed in
September and October 1981 at La Silla with the 70 cm Swiss teles-
cope.

(*) based on observations collected at the European Southern Obser-
vatory.

First- and second- order extinction coefficients and color-equation constants necessary to reduce the measures to the UBV system were obtained each night through observations of twelve E-region standard stars. Two comparison stars (stars A and B in Fig. 1) were frequently observed in order to check and further improve the quality of the photometry. The magnitudes adopted were finally $V = 14.24$ and $V = 13.66$ for A and B stars, respectively. So, the probable error on one observation of the variable (near $V = 13.2$) is ± 0.015 mag with the 100 cm telescope ; it is about ± 0.025 mag with the 70 cm telescope from differential observations using star B as comparison star.

The extreme U, B, and V magnitudes reached by UW Gru were

$$U_{\max.} = 12.84, U_{\min.} = 13.98$$

$$B_{\max.} = 12.75, B_{\min.} = 14.00$$

$$V_{\max.} = 12.60, V_{\min.} = 13.62$$

corresponding to the phases 0 (A5 type) and 0.87 (F5 type), respectively.

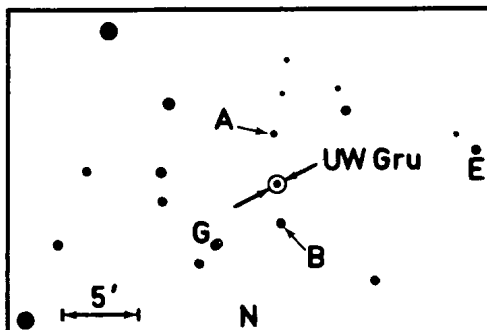


Fig. 1- Finding chart for UW Gru and the comparison stars A and B. The integrated magnitude of the anonymous object G (galaxy ?) is $V_{60''} = 14.5$.

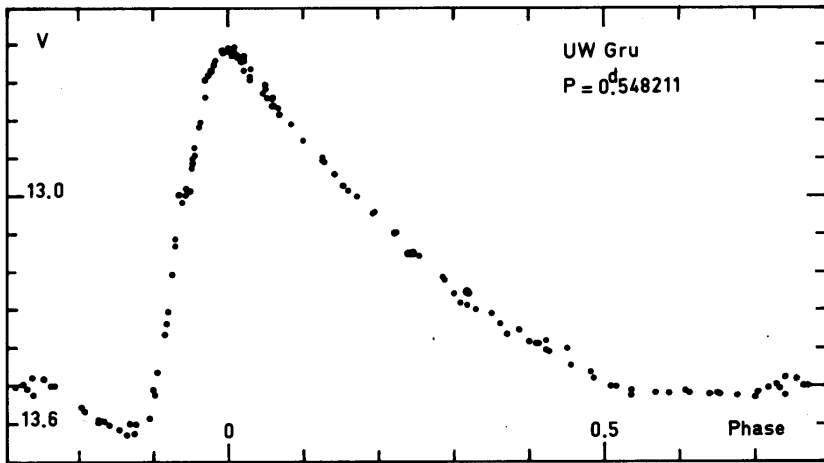


Fig. 2- V light curve for UW Gru from three-year observations phased together with P = 0.548211.

The period $P = 0.548211$ yields a good representation of the observations and the light curve shown in Fig. 2. Both the light amplitude and period appear to have remained constant over the past three years. No variations are detectable as the light curve repeats almost exactly from cycle to cycle to better than ± 0.02 V magnitude and ± 0.005 phase. The somewhat higher dispersion shown in Fig. 2 results from data obtained on few nights of lower photometric quality. The derived mean intensity expressed in magnitudes is $V = 13.22$.

The heliocentric epochs of the V maxima are given by the following elements :

$$\text{HJD}_{\text{max.}} = 2\ 443\ 689.640 + 0.548211 E.$$

According to Sturch (1966) the color excess of an RR Lyrae star can be derived from observational UBV data during the phase interval 0.5 — 0.8. The method yields $E(B-V) \approx 0.10$ for UW Gru. Adopting $A_V = 3.2 E(B-V)$ and an absolute magnitude $\langle M_V \rangle = +0.5$, one finds a distance modulus of 12.4 mag. corresponding to a distance of 3000 pc from the sun.

Thus, UW Gru appears to be a quite normal Bailey ab-type RR Lyrae star located in the halo, about 2.3 kpc below the galactic plane.

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