

## The optical micro variations of the two S Dor type stars AG Car and HR Car

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Abstract. VBLUW photometry of high precision of two S Dor type stars AG Car (in a quiescent stage) and HR Car was made in 1987 and 1988. Both stars show visual micro variations with amplitudes of  $0^m.1 - 0^m.2$  with time scales  $\bar{P} \sim 10^d$  for AG Car and  $\bar{P} \sim 20^d$  for HR Car.

### 1. Introduction

The first series of VBLUW photometry of high precision for the S Dor type star AG Car in a quiescent stage, showed that micro variations occur of the same type as for R71 in the LMC (van Genderen et al. 1988, hereafter called Paper VI). The characteristic time scale appeared to be  $\bar{P} = 13.8$ . New observations were made between December 1987 and March 1988 together with the nearby S Dor type star HR Car.

### 2. Results

The observations were conducted with the 90-cm Dutch Telescope equipped with the Walraven VBLUW photometer and is located at the ESO, La Silla, Chile.

The observational technique is described in Paper VI. For both variables we used the comparison star HDE 303311 (B9V). The average mean error ( $\frac{\sigma}{\sqrt{n}}$ ) per data point variable minus comparison star amounts to at most  $\pm 0.001$  log intensity scale.

Figure 1 shows the light curves of both variables relative to the comparison star as a function of Julian Date. The oscillations of AG Car show a time scale of  $\sim 10^d$ , which is not much different from the one found for the previous series of observations discussed in Paper VI. Even during the rise by  $\sim 0^m.15$  in the last sequence,  $\bar{P}$  stays the same. The reddening of the colours during this stage (not shown here), suggests that a new S Dor phase may be impending.

HR Car oscillates with a time scale of  $\sim 20^d$ . The total range is 0.045 (log int.). It appears that the colour variations are much larger than for AG Car and R71. Since HR Car is not quite in its minimum stage (this should be somewhere near  $V_J = 8.7$ ), it is possible that part of the colour variations originates in the circumstellar shell.

### 3. Conclusions

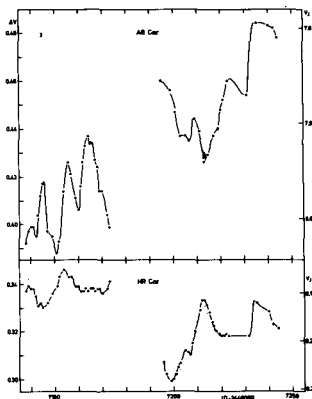
We conclude that also HR Car exhibits optical micro variations similar to AG Car, R71 and all other blue and yellow  $\alpha$  Cygni variables (but non-S Dor type stars).

The oscillations of AG Car at the end of our sequence of observations occur at a level  $\sim 0.15^m$  brighter than for the previous series. The reddening of the colours during the sudden rise suggests that a new S Dor phase with enhanced mass loss is impending. However, the time scale of the oscillations did not change appreciably. One of the purposes to observe these variables regularly, is to see what happens with the oscillations if the star starts a new phase of excessive mass loss.

### Reference

- van Genderen, A.M., Thé, P.S., Augusteijn, Th., Engelsman, E.C.  
 van der Grift, E.W., Prein, J.J., Remijn, R.L., Steeman,  
 F.W.M., van Weeren, N. 1988, *Astron. Astrophys. Suppl.* 74, 453

Figure 1



The light curves of the micro variations of AG Car and HR Car relative to the comparison star (in log intensity scale). For comparison purposes the V scale of the UBV system (with subscript J and in magnitude scale) is indicated at the right hand side.