HR 8762: Low-amplitude Photometric Variation in a Pre-shell Phase

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Longitude-coordinated high-precision photometry has been obtained a few weeks before the beginning of a strong Be and shell phase (1988) in HR 8762 (o And). The star showed variations of a few millimagnitudes in amplitude; i.e., just over the detection threshold. The classical 1.57-day double-wave period is still detected, showing that it probably never fades out completely, whatever the phase of the star. These variations can be interpreted as normal photospheric activity in a regular rotating B star. Although the variations of HR 8762 during our campaign were quite small, we could detect their amplitudes at a level of a few mmag.

We still have to check whether they are still "in phase" with previous photometric observations: if this is the case, it means that in the "spot" hypothesis, these (superficial?) features would remain in the same position on the photosphere, changing only in surface area and/or brightness with the star's activity. In this pre-shell phase, these variations were much smaller than their equivalent, observed two shell phases before by Guerrero and Mantegazza (1979), and they are probably the counterpart of "normal" photospheric activity in the B star HR 8762.

We still do not have any idea of the time constants involved in the beginning of the shell phases; i.e., how the 1.6-day period amplitude increases. Is it a question of a few days, hours, or even minutes? Is it progressive, or does it start abruptly? Due to the historical lack of observations around the beginning of shell phases in o And, we can set only an upper limit of 2–3 weeks, although in κ Dra (Sareyan *et al.*, in preparation), we think the "oscillation" could start in a few days. If we accept the "spot" and rotation model, this means that the inhomogeneities appear in a few rotations, last for several months, and disappear (progressively? see λ Eri) in a few weeks.

Of course, such behaviour must be tested in each case, as probably all Be variables do not behave in the same manner around the start and end of their shell phases. Continuous monitoring is needed at these phases, in order to determine the time constants involved in the increase and decrease of the photometric amplitude.

References:

Guerrero, G., Mantegazza, L., 1979, A&A 36, 471

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