

COMMISSIONS 27 AND 42 OF THE IAU  
INFORMATION BULLETIN ON VARIABLE STARS

Number 5785

Konkoly Observatory  
Budapest  
14 August 2007

*HU ISSN 0374 – 0676*

**ASAS 122801-2328.4 - A NEW GALACTIC FIELD RRd STAR**

PILECKI, B.; SZCZYGIEL, D. M.

Obserwatorium Astronomiczne Uniwersytetu Warszawskiego, Al.Ujazdowskie 4, 00-478 Warszawa, Poland  
e-mail:pilecki@astrouw.edu.pl, dszczyg@astrouw.edu.pl

There are 27 double mode RR Lyrae (RRd) stars known in the field of our Galaxy, without including fainter objects in the Galactic Bulge or Sagittarius dwarf galaxy (Szczygiel & Fabrycky 2007, and references therein). The incidence ratio defined as a number of RRd divided by number of RRc is much lower for the Galactic field than for LMC which might suggest that there are still many RRd undiscovered.

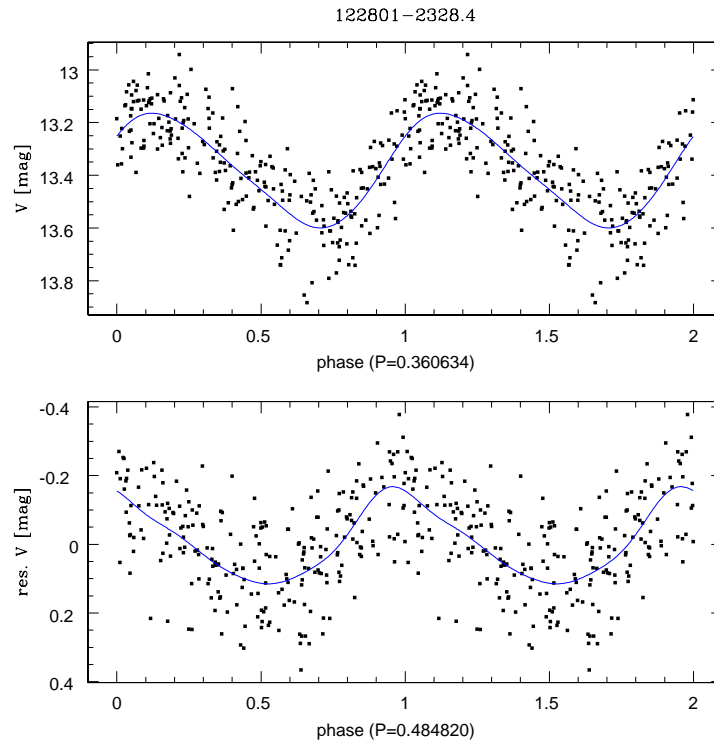
Recently there have been several attempts to search for RRd variables in the ASAS database of RR Lyrae stars, but the number of these objects is still very small. This may be a result of misclassification between some of the classes of stars with similar light curve shapes, eg. RRc and EC (Eclipsing Contact) binaries, especially at the dimmer end of the catalogue. Such a possibility is even higher for RRd stars, because ASAS uses only one period in the classification process (for details see Pojmański 2002) and another periodicity just increases apparent observational errors.

The newly discovered RRd, namely ASAS 122801-2328.4, is such a case. In the ACVS (ASAS Catalogue of Variable Stars) it is classified as EC/RRc object with the period of 0.721272 d and the maximum brightness of  $V=13.19$  mag. Multiperiodic light curve analysis of ASAS 122801-2328.4 reveals two pulsation modes with periods  $P_0 = 0.484820$  d (fundamental) and  $P_1 = 0.360634$  d (first overtone) and full amplitudes  $Amp_0 = 0.28$  mag and  $Amp_1 = 0.44$  mag. The dominant pulsation mode is the first overtone, which is the usual behaviour among double pulsators. The period ratio  $P_1/P_0 = 0.74385$  is also representative of this group of variables.

All the numbers are summarized in Table 1, and the light curves phased with both pulsation periods are shown in Figure 1. These light curves were obtained in iterative process of subtracting one mode while searching for the other. Blue (solid) lines are fits used in that process.

Table 1. Characteristics of the star ASAS 122801-2328.4

$V_{max}$ [mag]	13.19
2MASS J, H, K [mag]	12.42, 12.17, 12.10
$P_0$ [days]	0.484820
$P_1$ [days]	0.360634
$Amp_0$ [mag]	0.28
$Amp_1$ [mag]	0.44



**Figure 1.** Separated light curves for an overtone (top) and a fundamental (bottom) pulsation mode.

**Acknowledgements.** This work was supported by the MNiSW grant N203 007 31/1328.

References:

Pojmański, G., 2002, *AcA*, **52**, 397

Szczygieł, D.M., Fabrycky, D.C., 2007, *MNRAS*, **377**, 1263