

## NSV 07340, a New RR Lyrae Variable with Equidistant Triplet of Frequencies

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<b>Star Name:</b>	NSV 07340, TYC 3060 01159 1, 1SWASP J15545855+424610.4, NSVS 5177040, NSVS 5225507		
<b>Coordinates (J2000):</b>	15 54 58.55, +42 46 10.5		
<b>Variability type:</b>	RRC;	<b>Limits, System:</b>	10.97–11.56 (WASP mag); 11.32–11.64 (R, NSVS); <b>Spectrum:</b> A2
<b>Period:</b>	0.317152 d;	<b>Epoch:</b>	JD 2454189.697

### Remarks:

The variable was discovered by Zinner (1936), but the nature of its variability remains unknown to date.

We analyzed all available observations of NSV 07340 from the [NSVS/ROTSE-I](#) (Wozniak et al. 2004) and [SuperWASP](#) (Butters et al. 2010) online public archives. Three frequencies, the first-overtone mode accompanied by two additional almost equidistant oscillations, were found both in NSVS and WASP data:

	WASP Period, day	WASP Semi-amplitude, mag	NSVS Period, day	NSVS Semi-amplitude, mag
f1	0.317152	0.139	0.31711	0.105
f2	0.320340	0.066	0.32034	0.053
f3	0.314355	0.038	0.31435	0.040

$$f3-f1 = 0.028 \text{ c/d}, f1-f2 = 0.031 \text{ c/d}.$$

Note that we used not all 9007 but 8700 SuperWASP observations because of a number of erroneous data points, some of them possibly due to bad weather conditions during parts of nights in the WASP observational set. One more period, 29.79 days (that appears in the power spectra along with several 1-day aliases, at frequencies about 2, 3 and 4 c/d, see the bottom spectrum for WASP observations in the Figure), probably results from variable sky background brightness due to Moon phases.

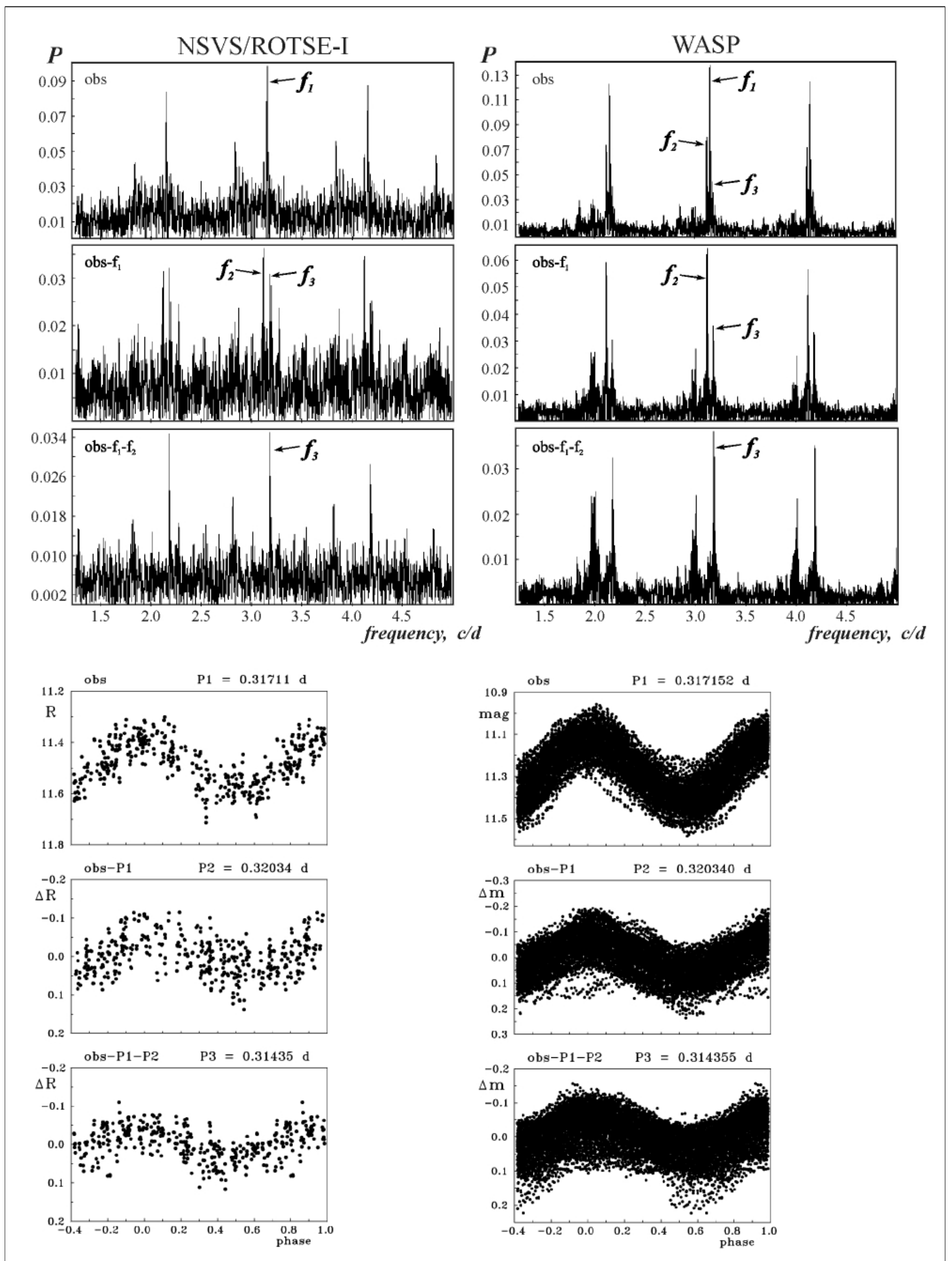
Similar peculiar RR Lyrae variables have been known in the LMC (Alcock et al. 2000); a star of the same kind has been recently reported in the Galaxy (Khruslov 2010). The probable origin of the frequency triplet is excitation of two non-radial oscillations in a close vicinity of the first-overtone mode.

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### References:

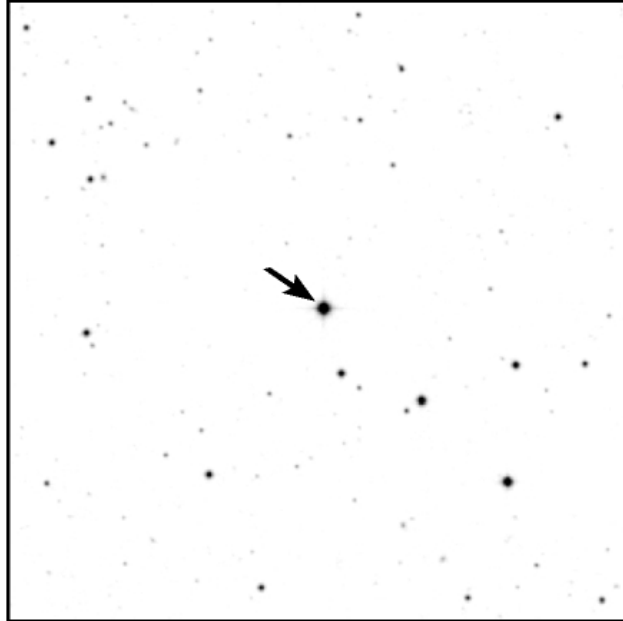
- Alcock, C., Allsman, R., Alves, D.R., et al., 2000, *Astrophys. J.*, 542, 257  
Butters, O.W., West, R.G., Anderson, D.R., et al., 2010, *Astron. and Astrophys.*, 520, L10  
Khruslov, A.V., 2010, *Perem. Zvezdy Prilozh.*, 10, No. 32  
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Zinner, E., 1936, *Astron. Nachr.*, 258, 315

### Light Curve



The power spectra and the phased light curves plotted based on the NSVS/ROTSE-I data (left panels) and on the WASP data (right panels).

# NSV 07340



POSS II red 10'x10'