Photometric study of the light curves of two new WZ Sge-type dwarf novae: SDSS J054630.83+624625.4 and SDSS J135301.62+052200.3

Viktoriia Krushevska[1,2], Sergey Shugarov[1], Yurii Andriiv[3], Karol Petrík[4], Maksym Andreev[2,5], Pavol Dubovský[6]

[1]*Astronomical Institute of the Slovak Academy of Sciences, Tatranska Lomnica, Slovakia*
[2]*Main astronomical observatory of National Academy of Sciences of Ukraine, Kyiv, Ukraine*
[3]*Taras Shevchenko National University of Kyiv, Kyiv, Ukraine*
[4]*M.R. Stefanik Observatory and Planetarium, Hlohovec, Slovakia*
[5]*ICAMER, NAS of Ukraine, Kyiv, Ukraine*
[6]*Vihorlat Observatory, Humenne, Slovakia*

# SDSS J054630.83+624625.4 (ASASSN-24ah)   # SDSS J135301.62+052200.3

The superoutbursts of **J0546 and J1353** was first recorded on January and February, 2024, resp. We performed multicolor photometry on two Zeiss-600 telescopes: AI SAS, Tatranská Lomnica and Hlohovec Observatory (only J0546).
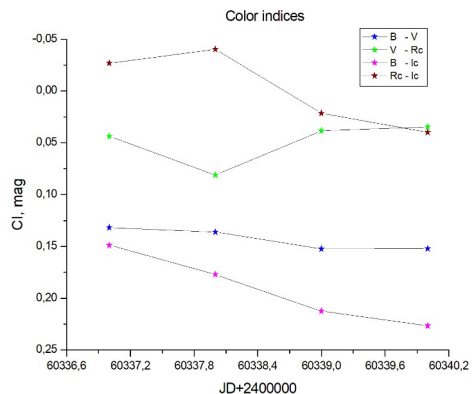
We calculated the average stellar magnitudes for the night in each band and also calculated the color indices. The figures point out their change over time - a slight increase in the values, which indicates the reddening. This behavior is typical for dwarf novae.
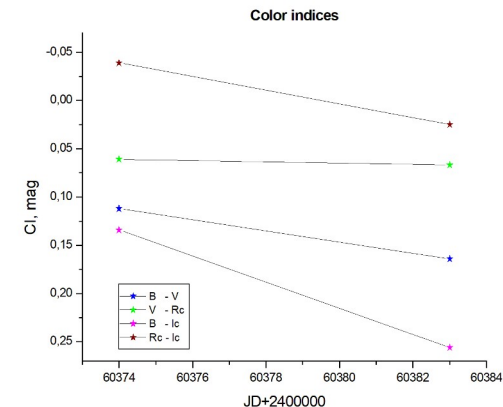
With our data and ones taken from the AAVSO database, we constructed the light curves.
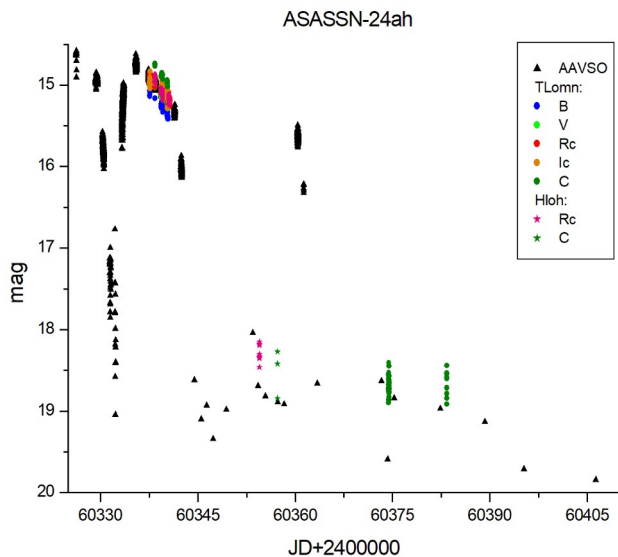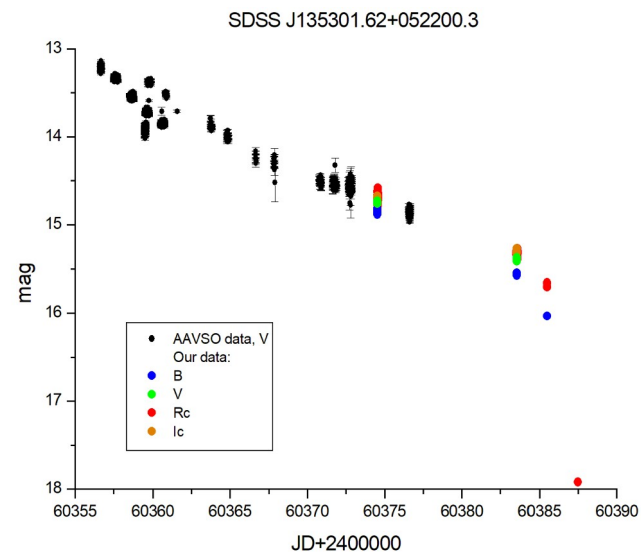

System **J0546** has several features: a sharp dip during the outburst plateau stage, and a single rebrightening after the brightness decline.

The outburst amplitude is **A > 5^m.5**.

The peculiarity of the light curve of system **J1353** is a smooth brightness decline, and then a dramatic drop. Without rebrightenings.
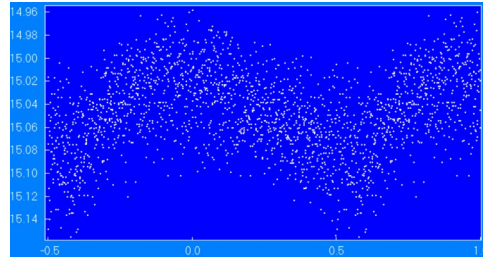
The outburst amplitude is **A > 5^m**.

SDSS J054630.83+624625.4 (ASASSN-24ah)

We found the average period
of ordinary superhumps:

$P_{ord} = 0^d.060104$

The average amplitude: $A_{ord} = 0^m.07$

We calculated period deviations from the obtained value P_{ord} and constructed O–C diagram. Then we determined the rate of period change $P_{dot} = 0.20(7)\cdot10^{-5}$ and plotted the obtained values on the graph of the distribution P_{dot} versus P_{ord} (red dot) for dwarf novae of the SU UMa and WZ Sge type stars.
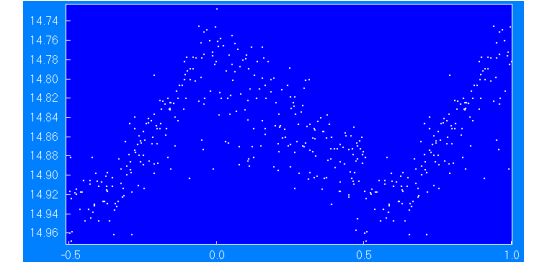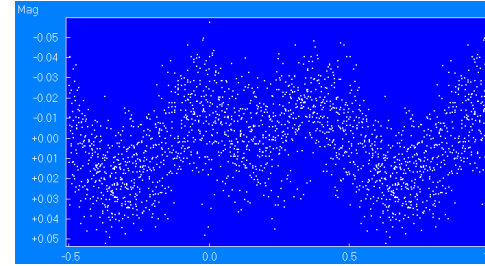Our result is also typical for stars of these types.
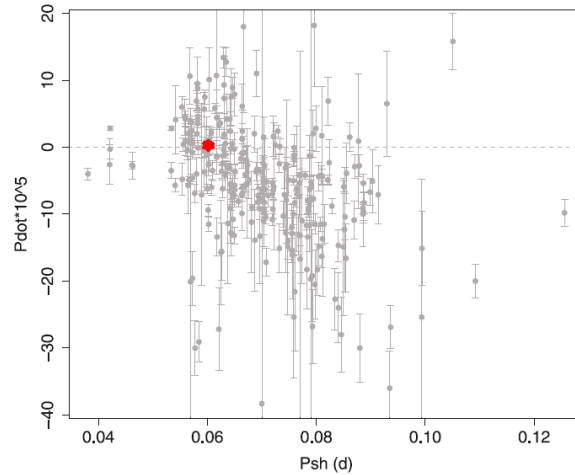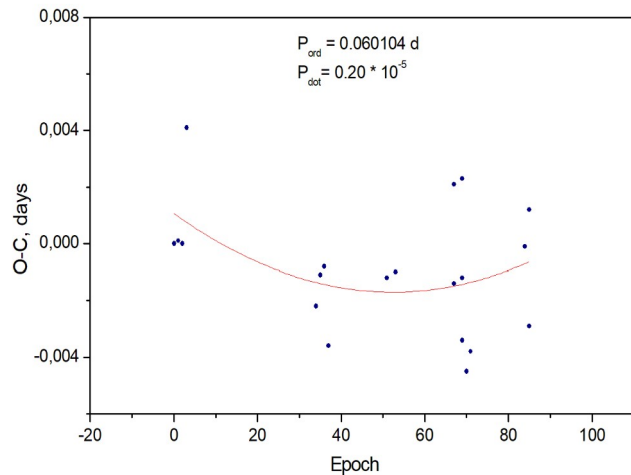
(From Kato, T. et al., 2009, PASJ, 61, 395).

SDSS J135301.62+052200.3

The star clearly exhibits early (with characteristic double wave) and ordinary superhumps. We determined their periods and average amplitudes:

$P_{ear} = 0^d.058895$, $A_{ear} = 0^m.04$ $P_{ord} = 0^d.059509$, $A_{ord} = 0^m.12$

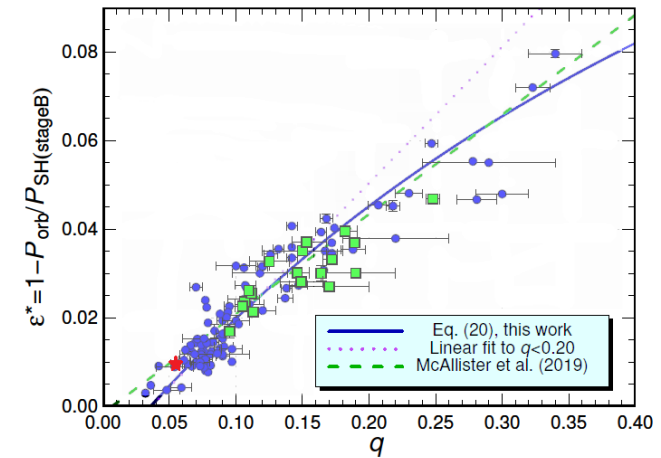

Knowing P_{ear} and P_{ord}, we can obtain the mass ratio of the system components $q = M_{RD} / M_{WD}$.

From the formula:
$\varepsilon = 0.16q + 0.25q^2$, where ε is the fractional superhump excess and $\varepsilon = (P_{ord}/P_{ear}) - 1$ we find $\varepsilon = 0.01$.
So $q = 0.057$.

The obtained values (red dot) are typical for WZ Sge type stars.

(From Kato, T. 2022, arXiv:2201.02945)

Conclusions

For two new cataclysmic systems SDSS J054630.83+624625.4 and SDSS J135301.62+052200.3 we estimated the main parameters.

The obtained values correspond to the initial assumption that these systems belong to the WZ Sge-type stars.

	A	P_{ord}, d	A_{ord}	$P_{dot}, \cdot 10^{-5}$	P_{ear}	M_2/M_1
J0546	$> 5^m.5$	0.060104	$0^m.07$	0.20	---	---
J1353	> 5	0.059509	$0^m.12$	---	0.058895	0.057