



Optical Studies of Two Cataclysmic Variables RBS 0490 and SDSS J075939.79+191417.3

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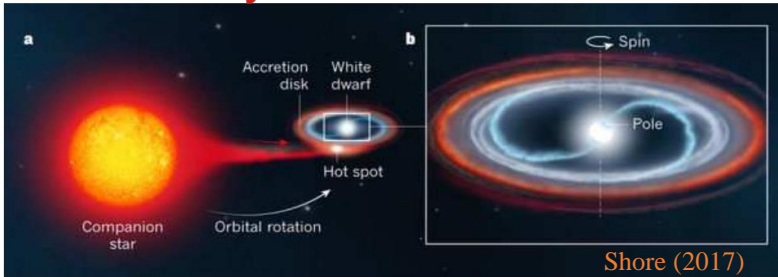
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Cataclysmic Variables



● **RBS 0490**

● **SDSS J075939.79+191417.30**

RBS 0490

- ❑ Distance $\rightarrow 320 \pm 11$ pc (Bailer-Jones 2021).
- ❑ RBS 0490 \rightarrow detected during the ROSAT all-sky survey.
- ❑ Spectral features \rightarrow Strong Balmer emission lines, whereas He II emission lines \rightarrow weak (Schwope et al. (2002).
- ❑ Ambiguous period $\rightarrow 46$ min (Thorstensen et al. 2006).
- ❑ Single-peaked emission lines and moderate strength of He II $\lambda 4686$ (Thorstensen et al. 2006).
- ❑ WISE light curves \rightarrow provisionally suggested it as a polar (Harrison & Campbell 2015).

SDSS J075939.79+191417.30

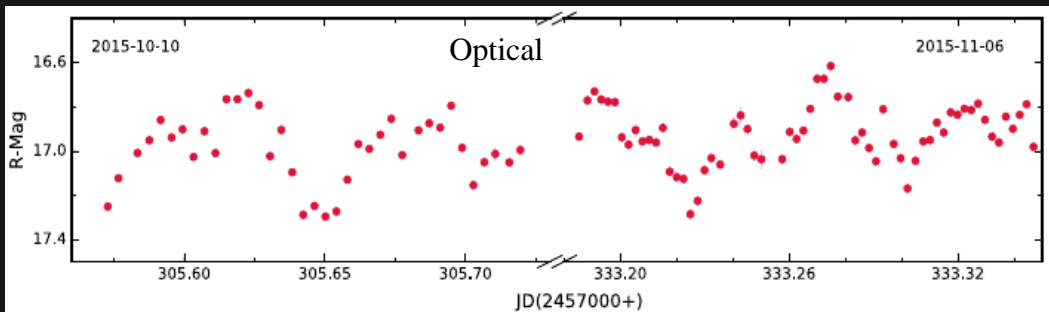
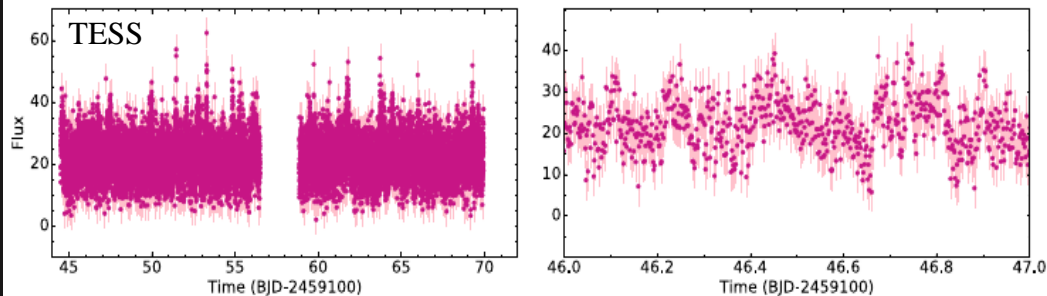
- ❑ Distance $\rightarrow 1873 \pm 535$ pc (Bailer-Jones 2021).
- ❑ Identified as a CV by Szkody et al. (2006) based on the optical spectrum obtained during the Sloan Digital Sky Survey (SDSS).
- ❑ The SDSS spectrum \rightarrow Strong Balmer emission lines and He II ($\lambda 4686$)/H $_{\beta}$ EW ratio of 0.2.
- ❑ SDSS Spectrum \rightarrow Stronger He II ($\lambda 4686$) than most dwarf novae but not quite up to the values of magnetic CVs.

Motivation –

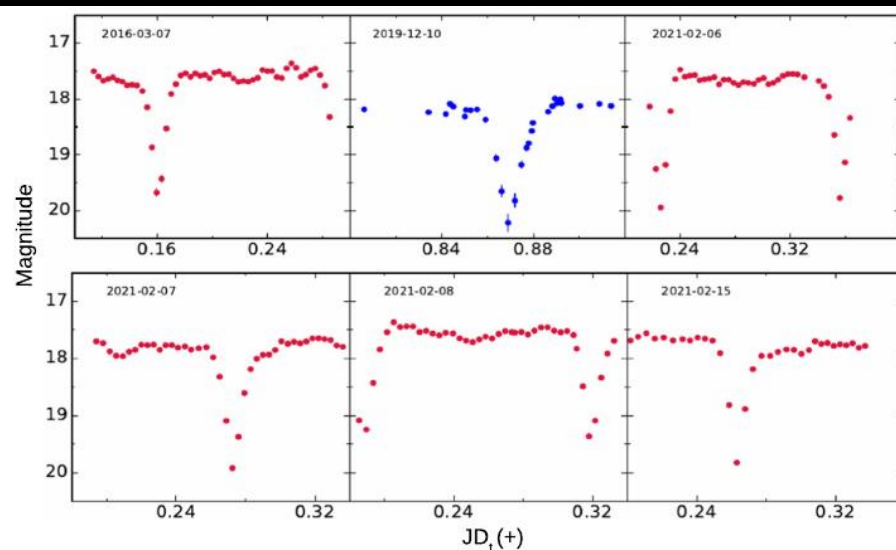
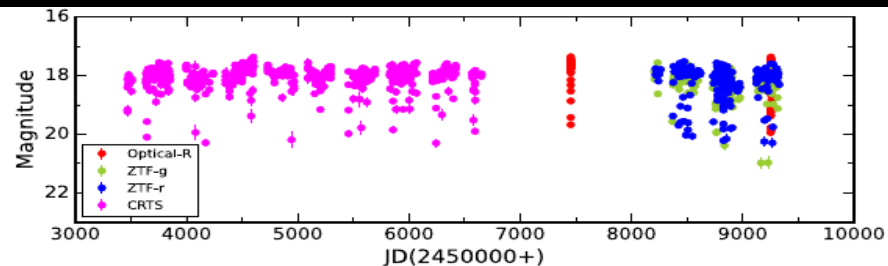
- *To investigate their basic defining characteristics and making use of various attempts to characterize these two CVs into their proper class using optical photometric and spectroscopic observations.*

Light Curves

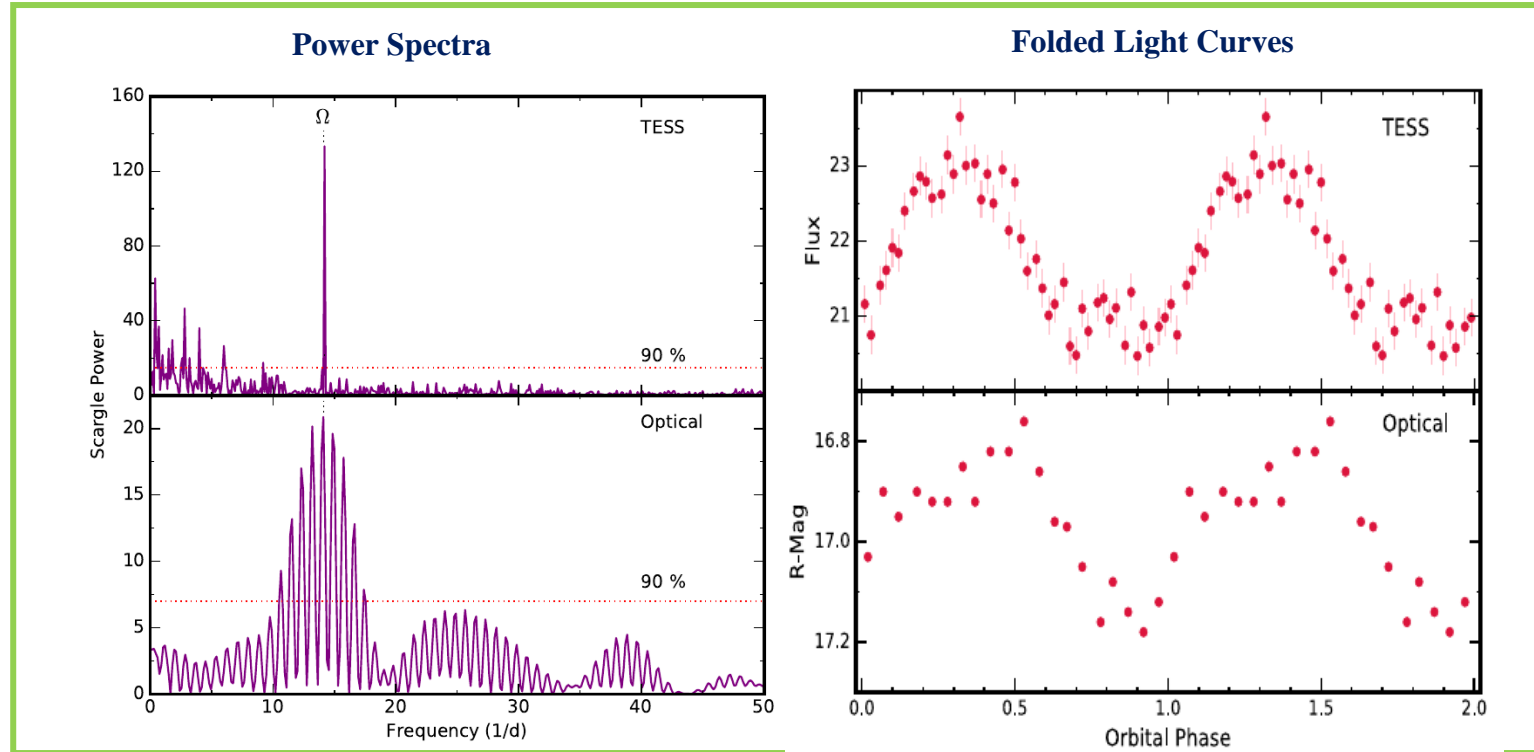
RBS 0490



SDSS J075939.79+191417.30

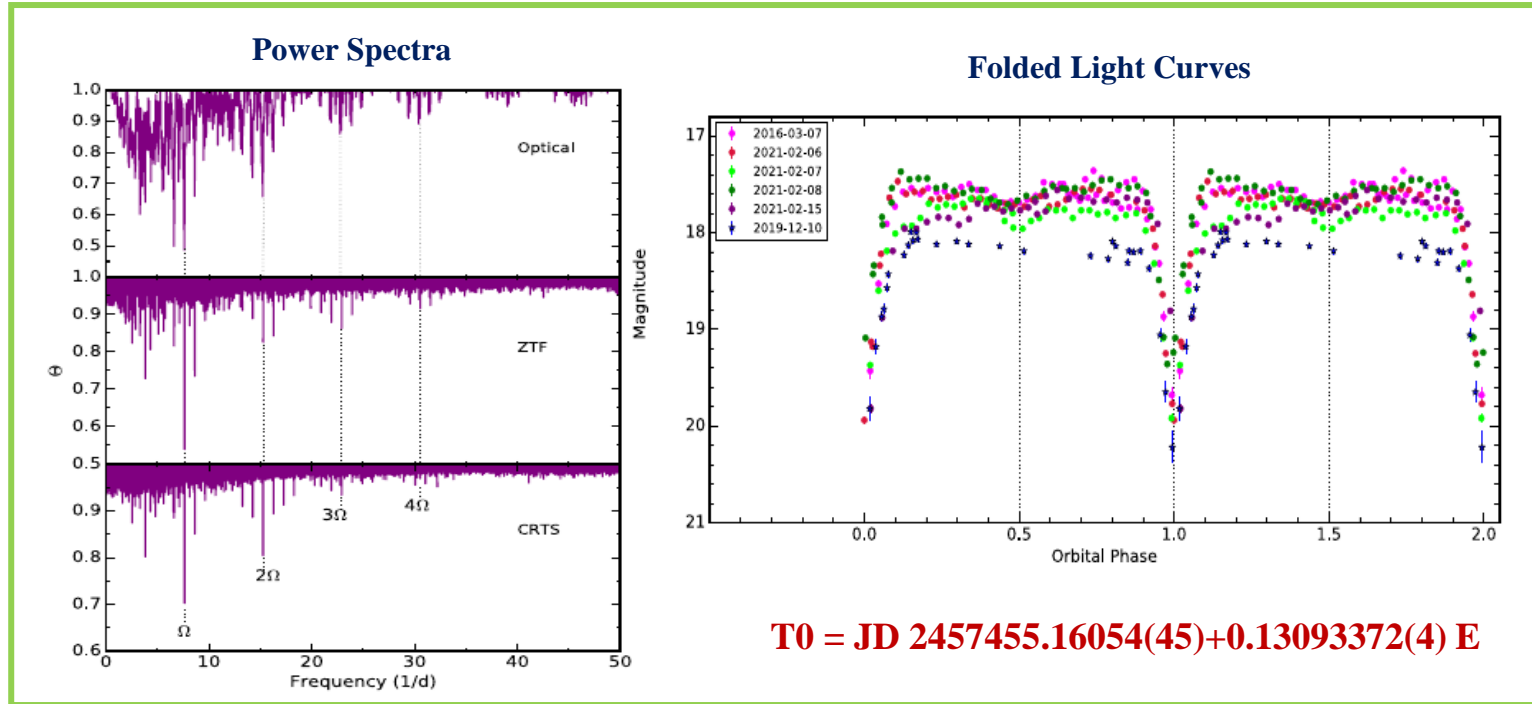


Power Spectra and Folded Light Curves: RBS 0490



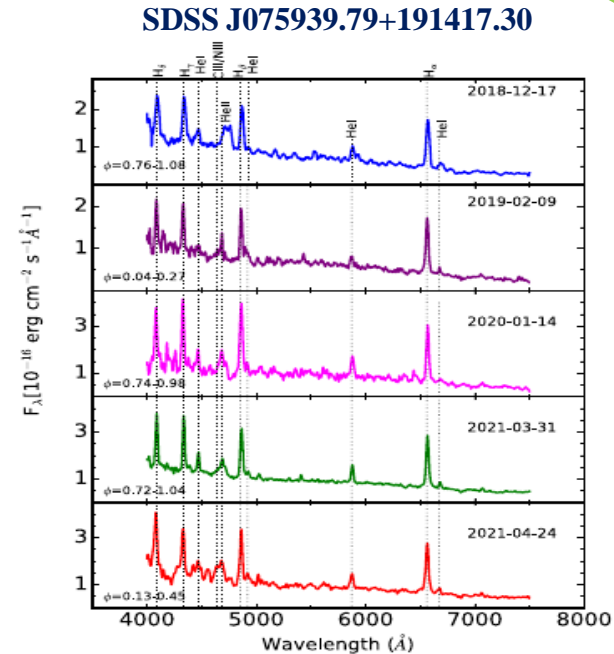
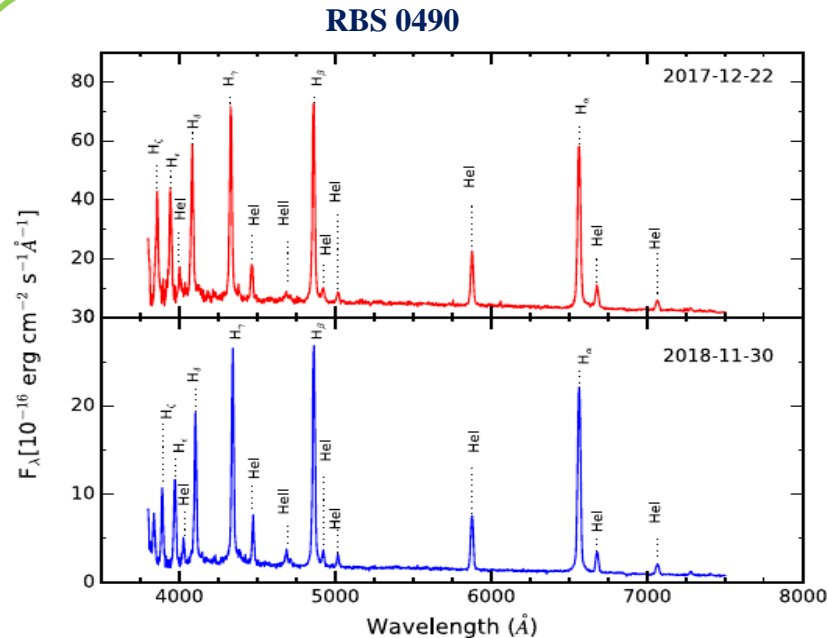
- ❖ *Orbital period of RBS 0490 provisionally suggested $P_{\Omega} \rightarrow 1.689 \pm 0.001$ hr*
- ❖ *The variability observed in RBS 0490 \rightarrow seems to favour a second fainter pole or emission from an independent second accretion region.*
- ❖ *The absolute value of G- band magnitude $\rightarrow +9.9$ mag*

Power Spectra and Folded Light Curves: SDSS J075939.79+191417.30



- ❖ *Orbital period of SDSS J075939.79+191417.3 $P_\Omega \rightarrow 3.14240928(96)$ hr*
- ❖ *The presence of long-duration eclipse features \rightarrow indicates that eclipses might be due to occultation of an accretion disk and bright spot.*
- ❖ *Using Eggleton (1983) relation and observed eclipse morphology, orbital inclination is estimated as 78°*
- ❖ *The absolute value of G- band magnitude $\rightarrow +6.5$ mag*

Optical Spectra: RBS 0490 and SDSS J075939.79+191417.30



- Balmer emission lines → strong and single-peaked
- He II ($\lambda 4686$) → Moderate strength
- For magnetic CVs → $\text{EW}[\text{He II } (\lambda 4686)/\text{H}\beta] \geq 0.4$ and $\text{EW}(\text{H}\beta) \geq 20 \text{ \AA}$ (Silber et al. 1992).
- $\text{H}\beta(\text{EW}) > 20 \text{ \AA}$ and He II ($\lambda 4686$)/ $\text{H}\beta$ EW ratio of ~ 0.1

- Balmer emission lines → strong and single-peaked
- Balmer decrement → flat
- He II ($\lambda 4686$) → Very weak
- He II ($\lambda 4686$)/ $\text{H}\beta$ EW ratio of ~ 0.2

Take Away -

RBS 0490 :

- ❖ *Orbital period of RBS 0490 provisionally suggested $\rightarrow 1.689 \pm 0.001$ hr*
- ❖ *The absolute value of G- band magnitude $\rightarrow +9.9$ mag*
- ❖ *The variability observed in RBS 0490 \rightarrow seems to favour a second fainter pole or emission from an independent second accretion region.*
- ❖ *Optical Spectra \rightarrow weaken its chance to be magnetic or may imply the low magnetic strength of the WD*

SDSS J075939.79+191417.30:

- ❖ *Orbital period $\rightarrow 3.14240928$ (96) hr*
- ❖ *The absolute value of G-band magnitude $\rightarrow +6.5$ mag*
- ❖ *The presence of long-duration eclipse features \rightarrow indicates that eclipses might be due to occultation of an accretion disk and bright spot.*
- ❖ *Orbital inclination $\rightarrow 78^\circ$*
- ❖ *Optical Spectra \rightarrow weak high-ionization emission lines \rightarrow Non-magnetic nature.*





Thank You !!