

Circular polarimetry of V1082 Sgr: an extraordinary long-period magnetic cataclysmic variable

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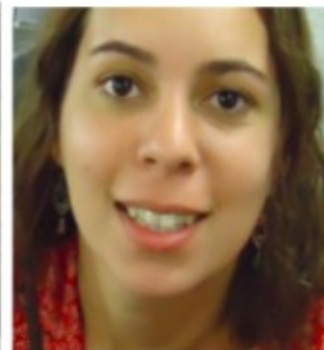
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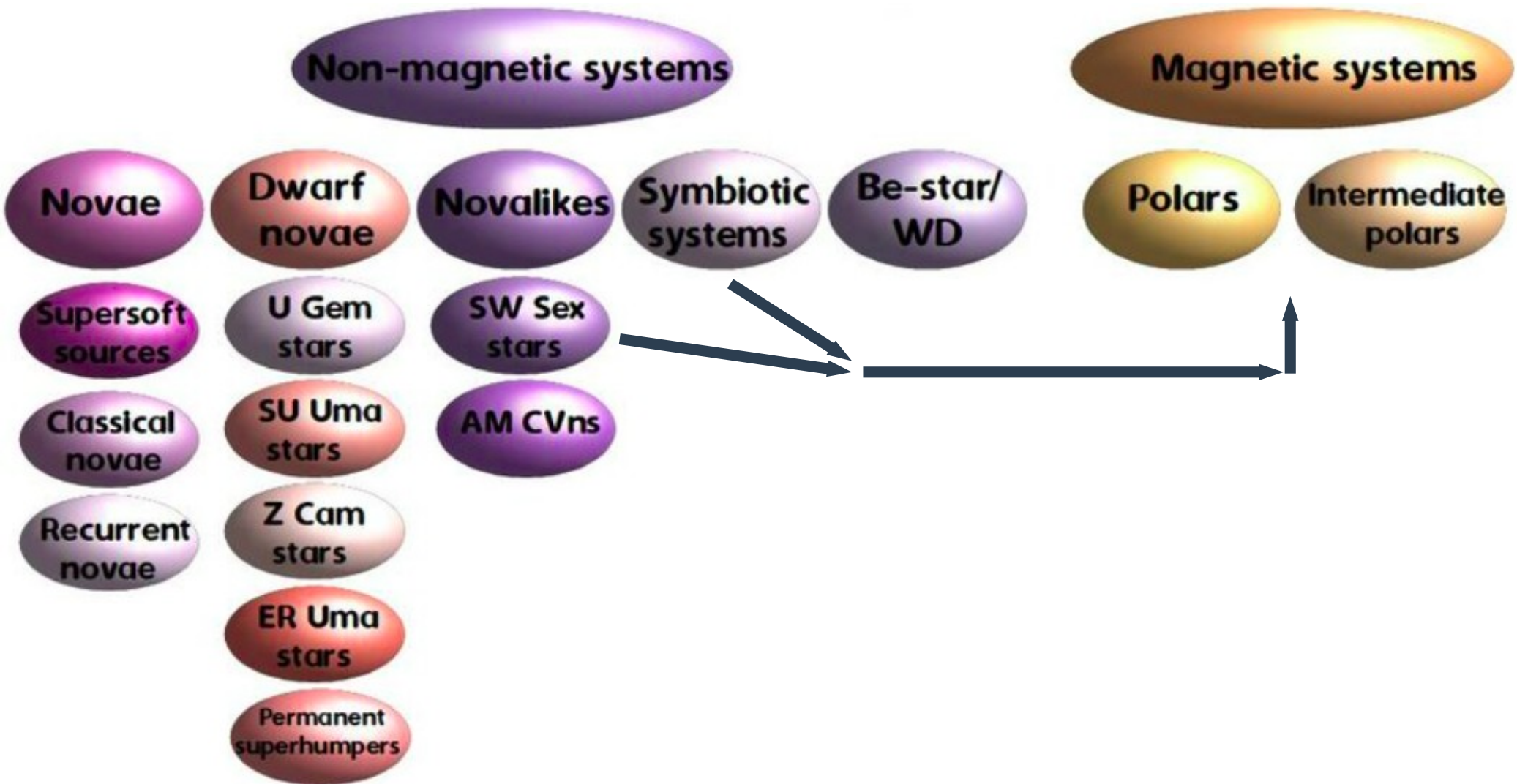


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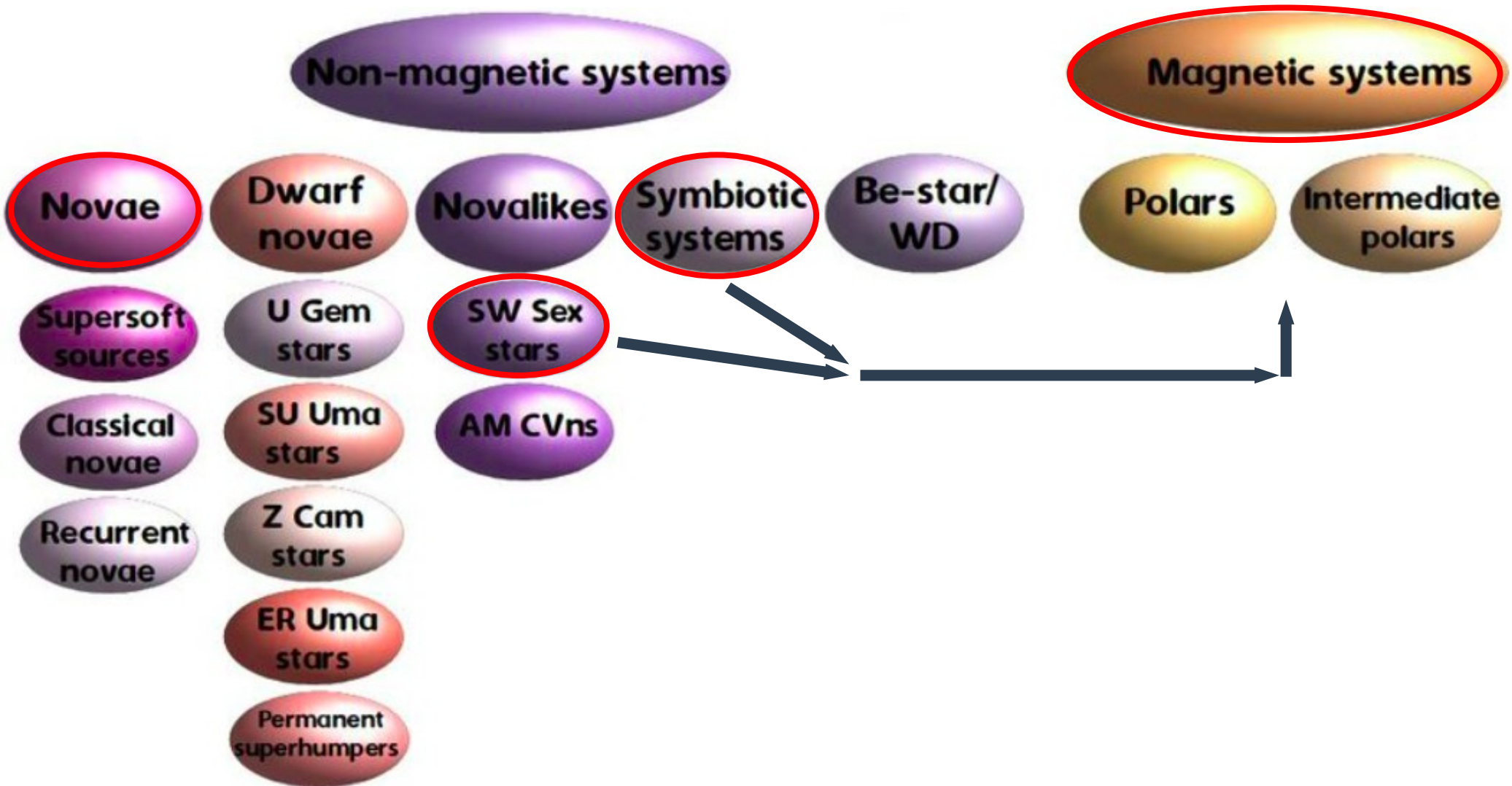


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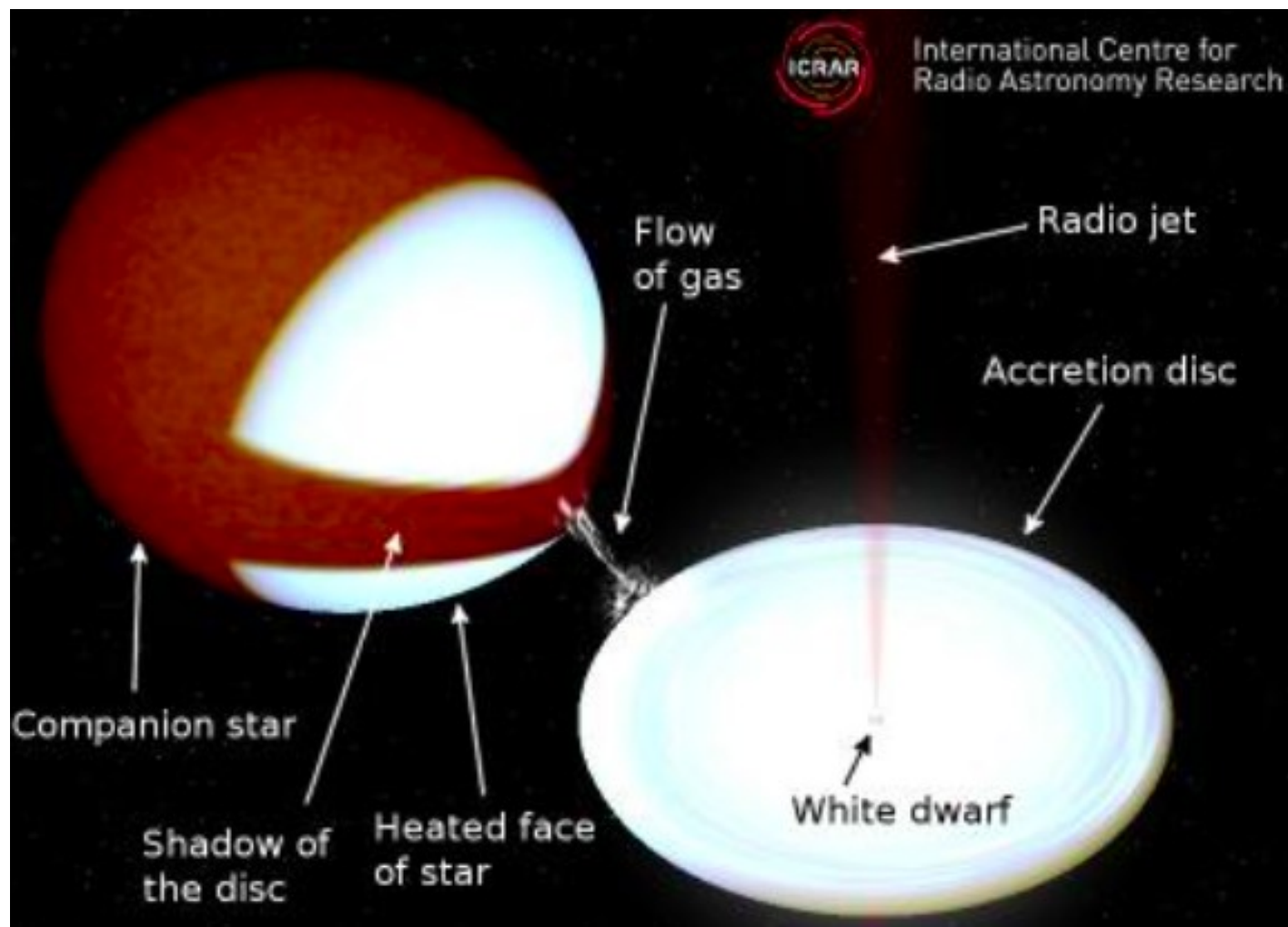
The family of accreting white dwarfs



The family of accreting white dwarfs

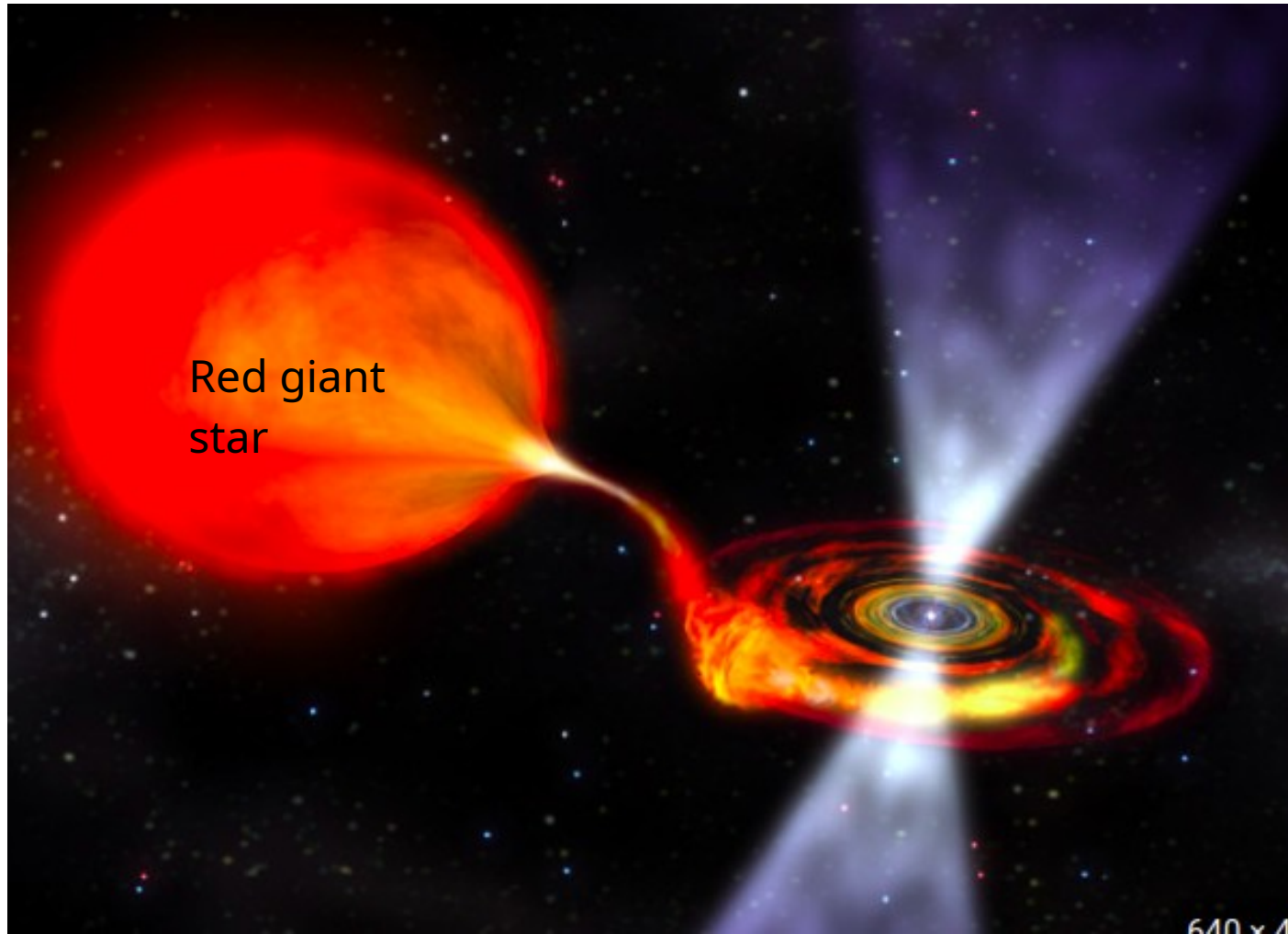


White dwarfs in binary systems



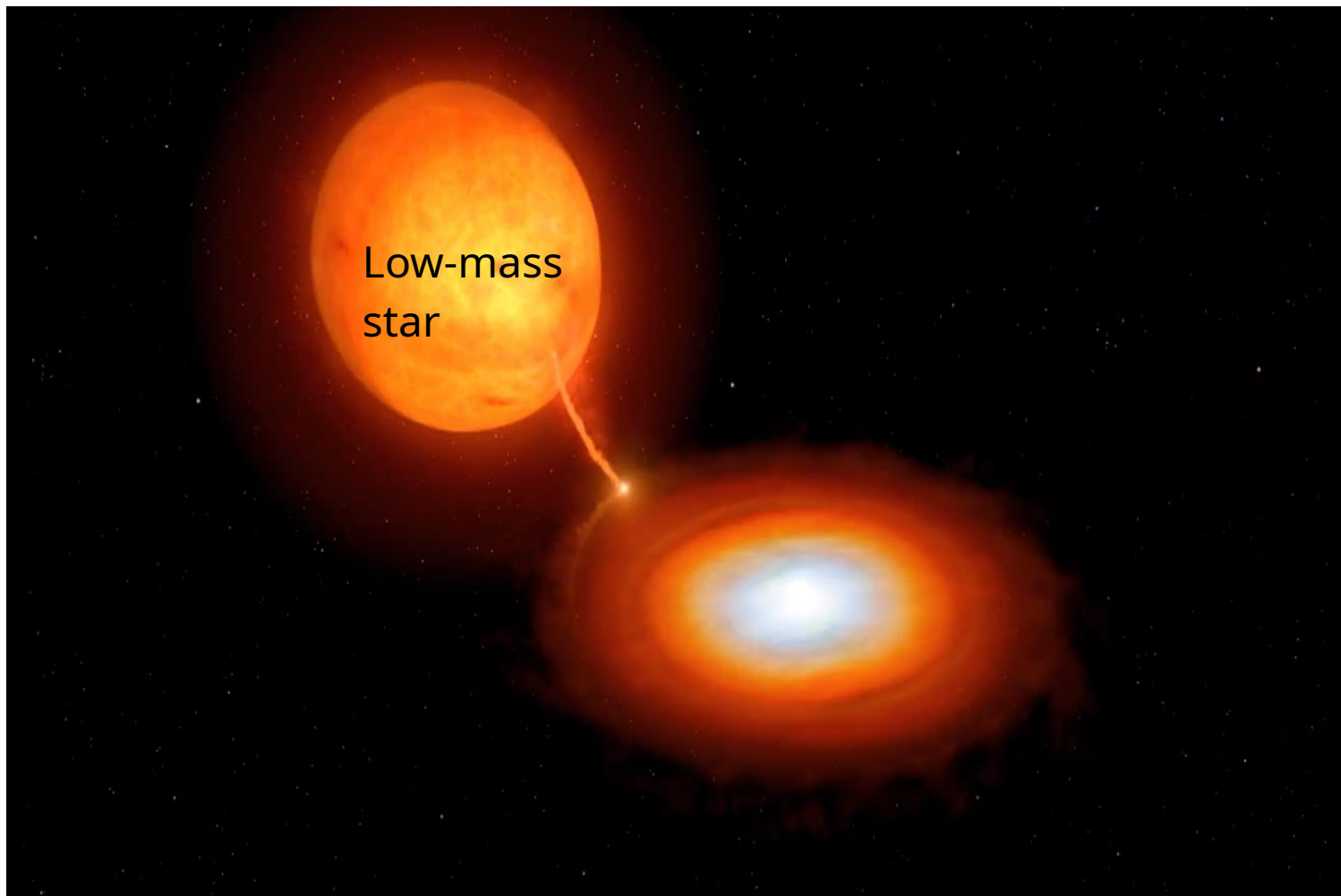
Source: J. Miller-Jones, 2023
(<https://www.eurekaalert.org/multimedia/531475>)

Symbiotic stars



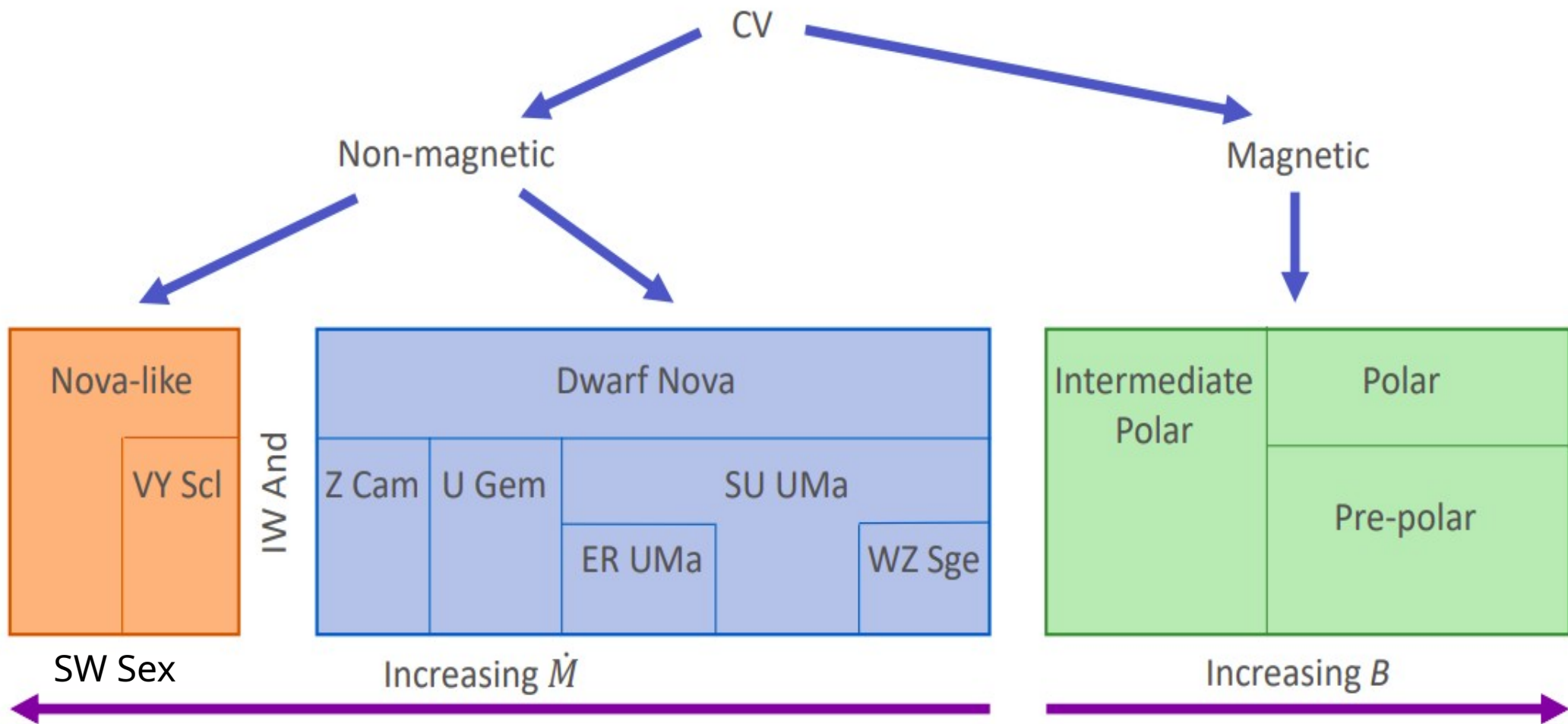
Source: Garlick M., 1998 and 2002.
(<http://www.space-art.co.uk/>)

Cataclysmic Variables



Source: Garlick M., 1998 and 2002.
(<http://www.space-art.co.uk/>)

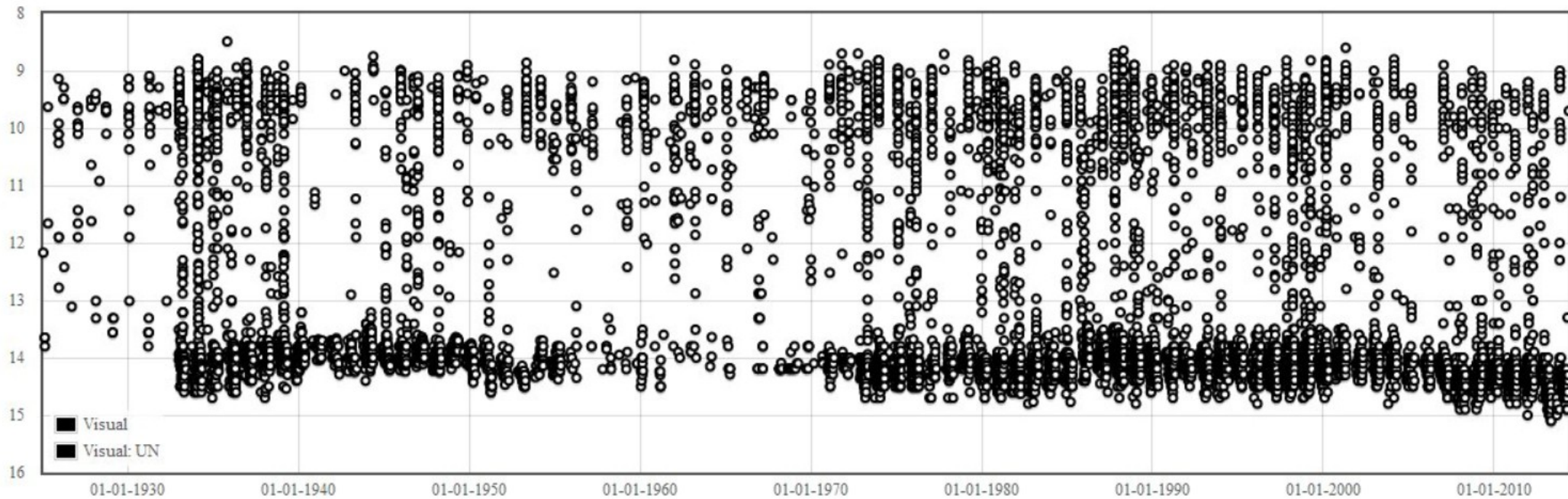
Cataclysmic Variables



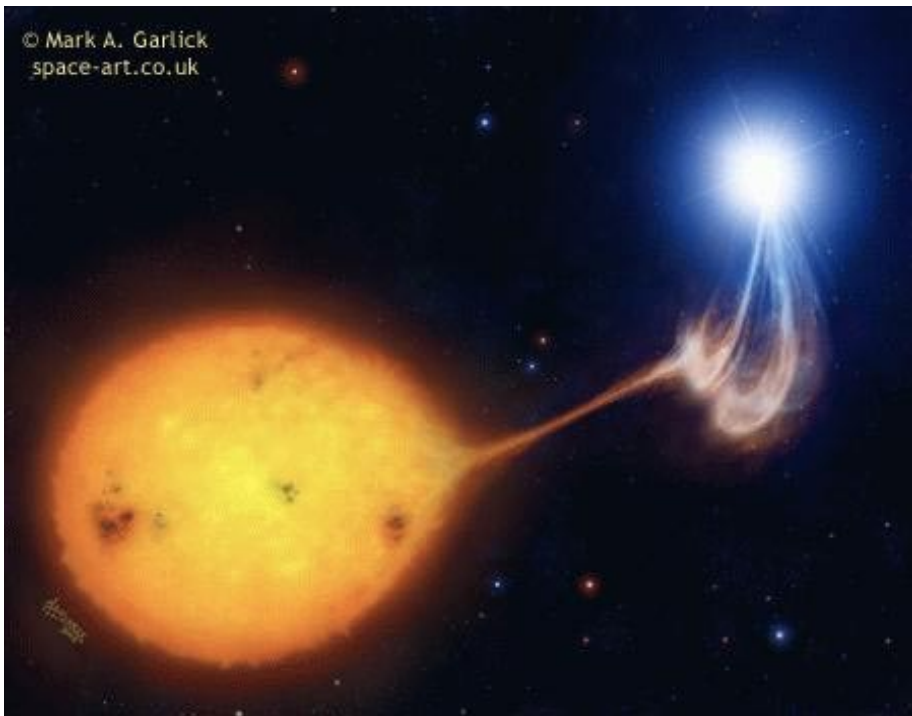
Cataclysmic Variables



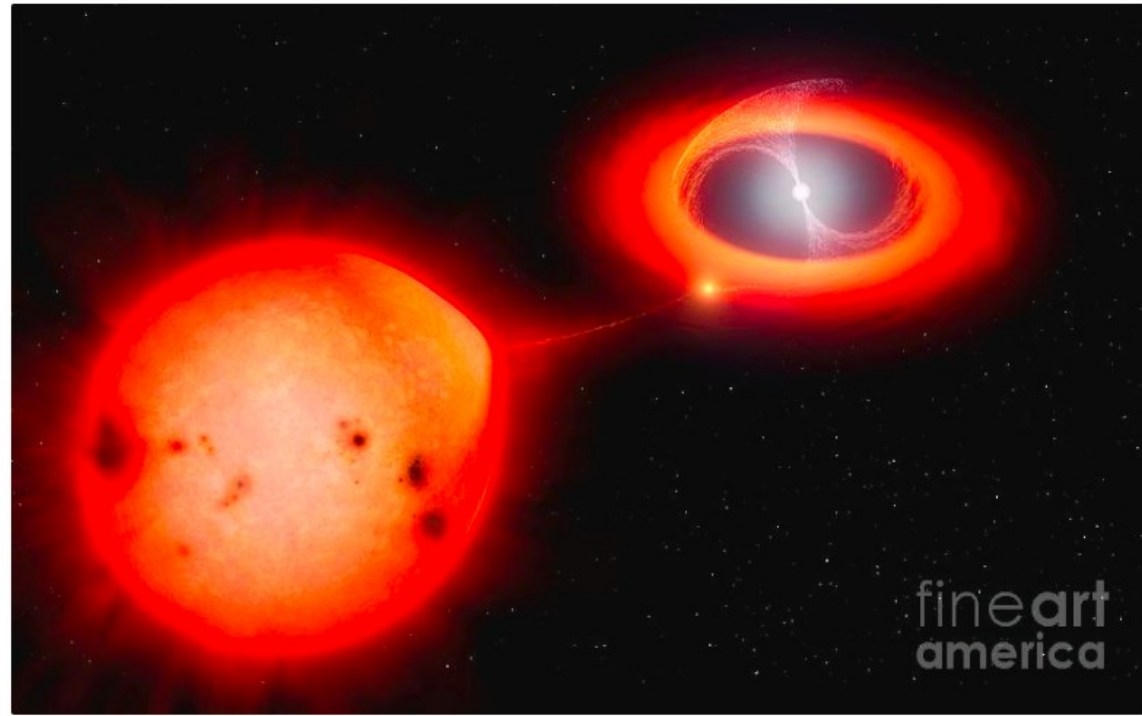
Light Curve for U GEM



Magnetic Cataclysmic Variables



Polar
10 - 250 MG



Intermediate polar
1 - 10 MG

Source: Garlick M., 1998 and 2002.
(<http://www.space-art.co.uk/>)

Magnetic Cataclysmic Variables

Optical emission

Indirect evidence:

- Fotometry: surveys CRTS, ZTF, Vera C. Rubin Observatory LSST (future)
 - Intrinsic flux variability;
 - Transitions between two states of brightness.
- Spectroscopy
 - Presence of emission lines: $H\beta$ e He II 4686Å.

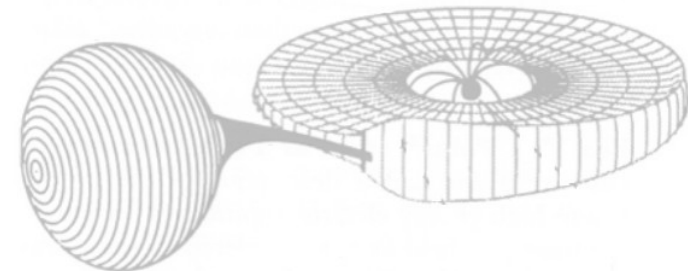
Direct evidence:

- Polarimetry
 - Non-zero and variable circular polarization;
 - White dwarf rotation coherent sign.

X-ray emission

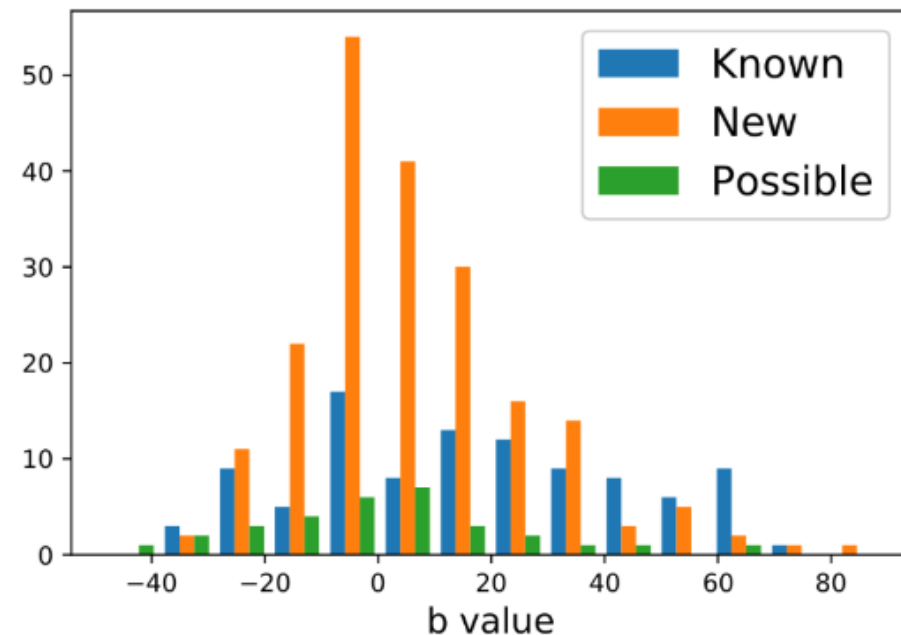
Direct evidence:

- White dwarf rotation coherent sign.

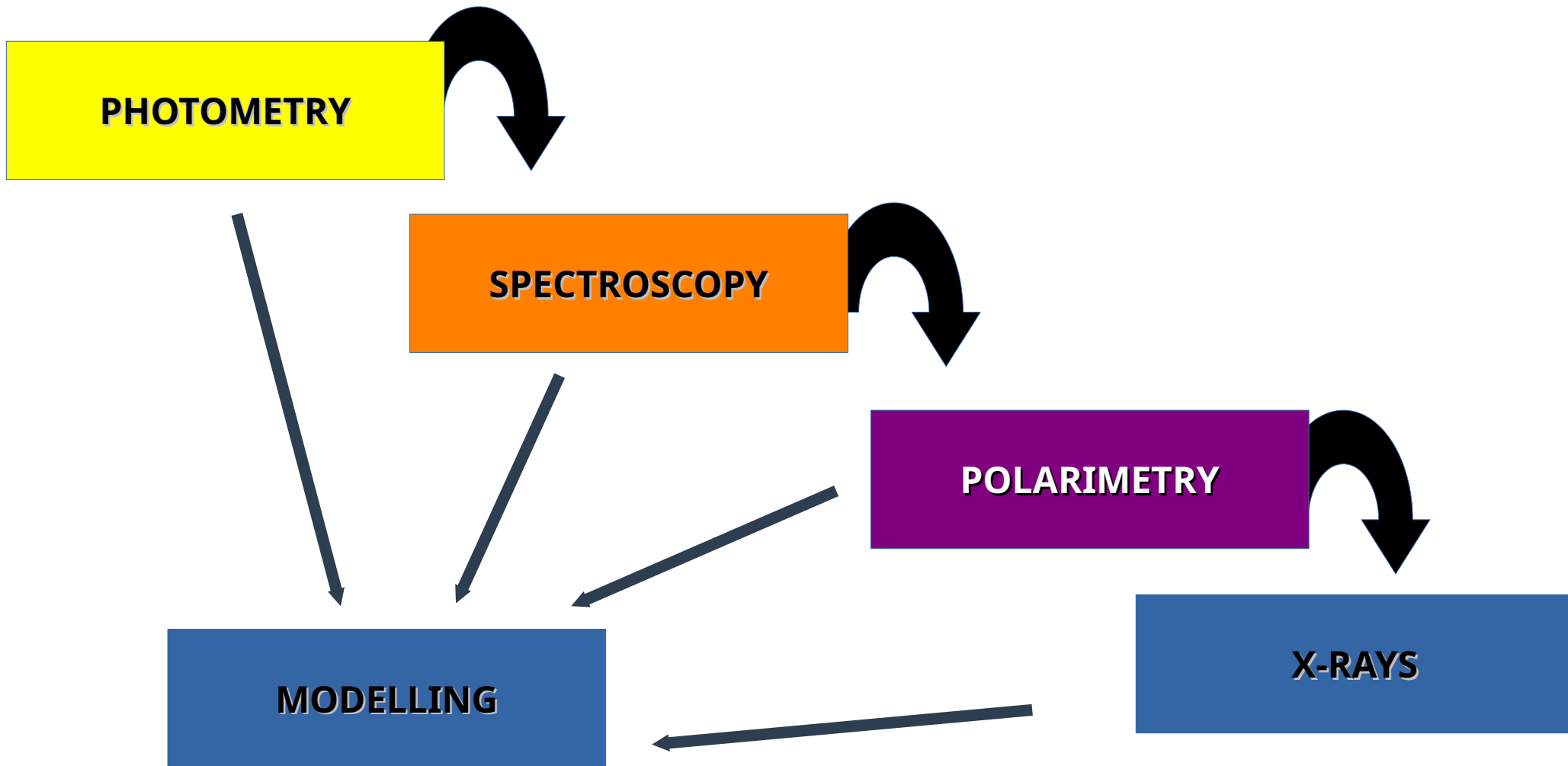


Magnetic Cataclysmic Variables

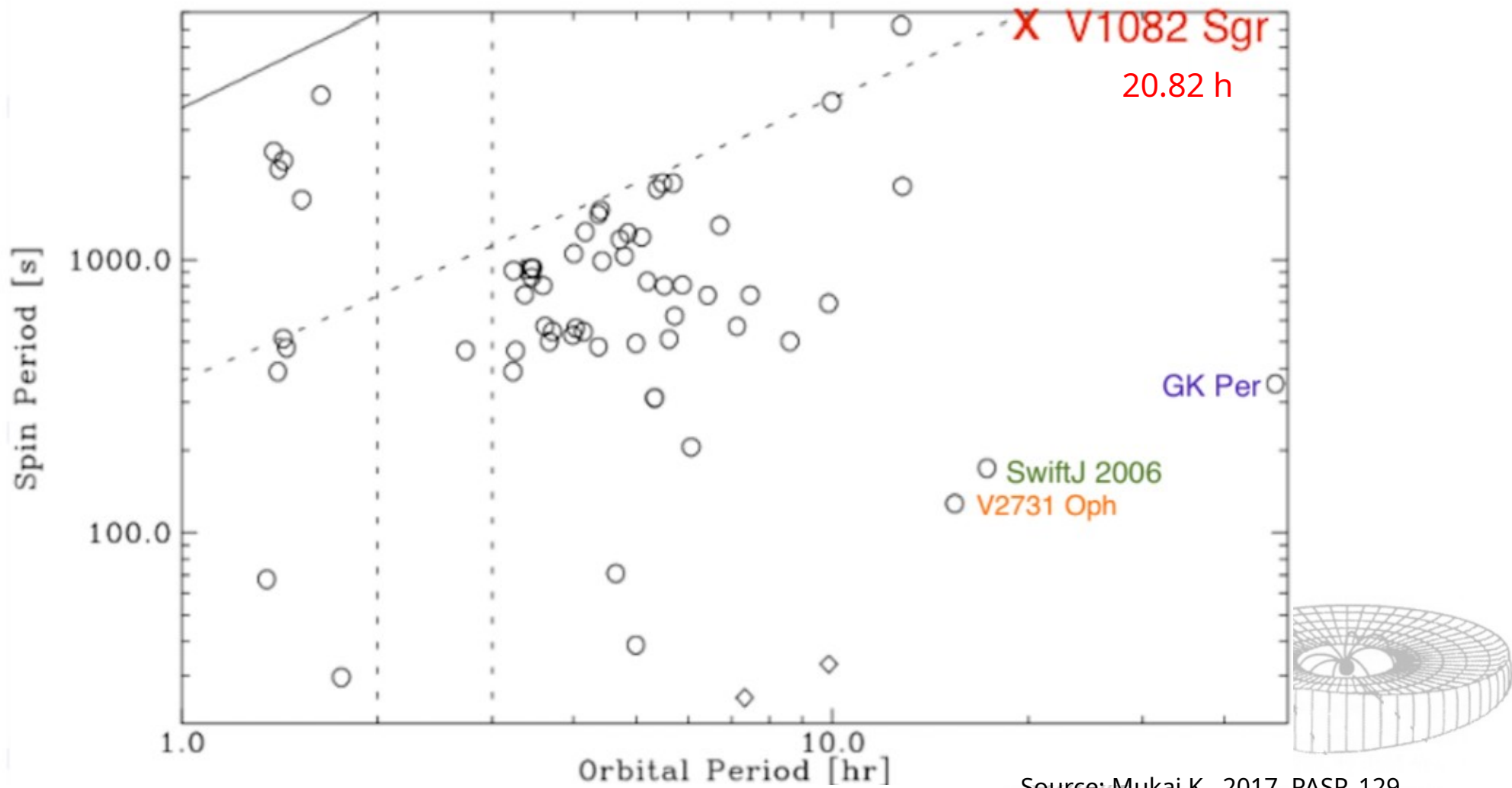
- SDSS survey: Szkody et al. (2002, 2003, 2004, 2005, 2006, 2007, 2009, 2011) discovered 285 objects, of which approximately 13% are magnetic.
- CRTS survey: Oliveira et al. (2017, AJ, 153, 1440), 13 new MCVs.
- CRTS and SSDS surveys: Szkody et al. (2018, AJ, 155, 28) published 4 systems are likely polars; one is an eclipsing SW Sex star below the period gap; 1 is likely an IP; and 2 are dwarf novae.
- ZTF survey (Szkody et al., 2019):
 - 100 objects were identified as previously known;
 - 207 systems are good CV candidates;
 - 30 are possibly Cvs;
 - 2 are possibly MCVs.



Magnetic Cataclysmic Variables



V1082 Sgr: long-period cataclysmic variable



V1082 Sgr: Circular Polarimetry

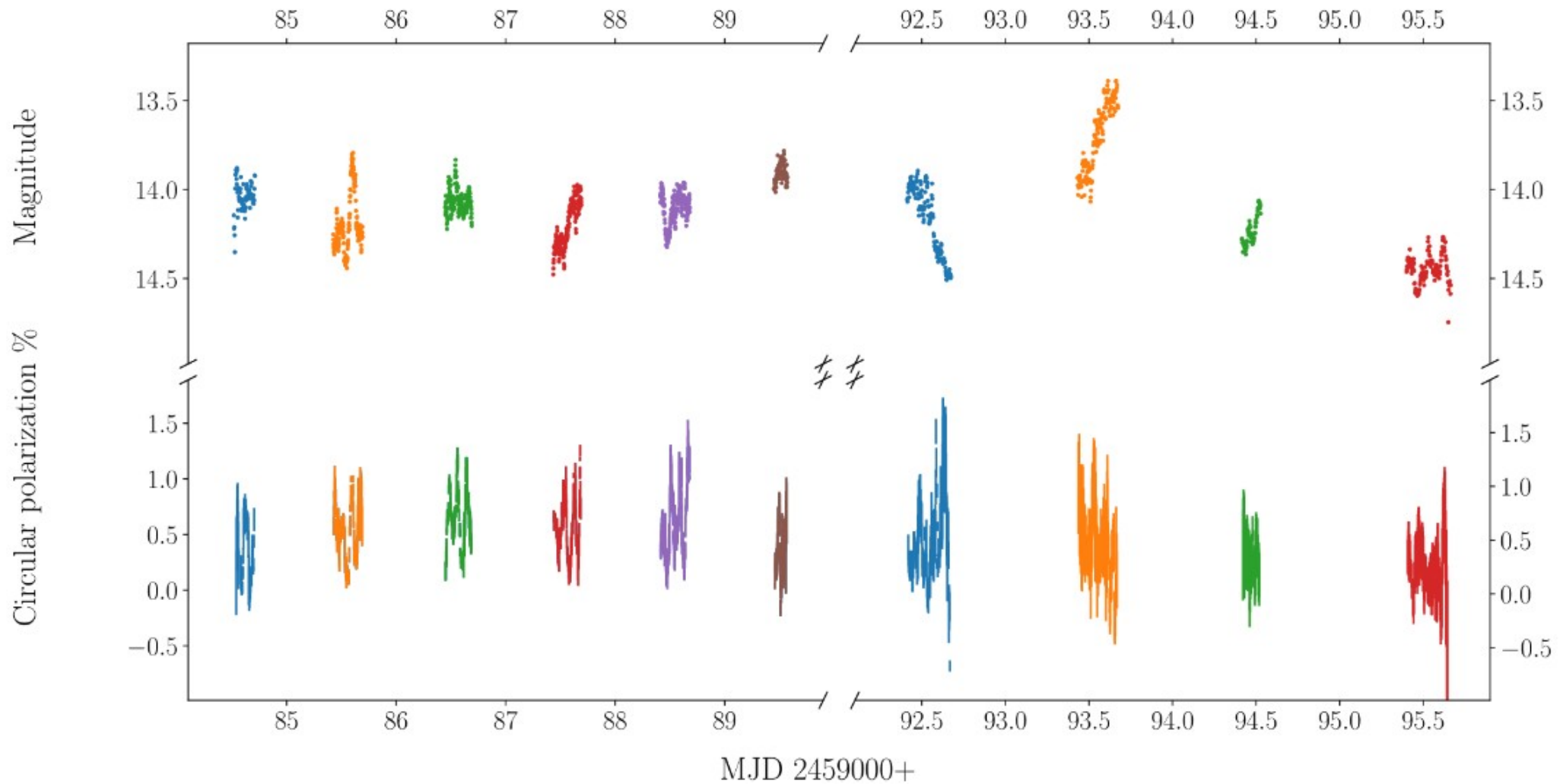


Magalhães et al, 1996, ASPC, 97, 118

Table 1. Summary of the observations.

Date Obs.	Exp. time (s)	Time span (h)	Mean mag. (mag)
2020 Aug 22	200	4.5	14.0 ± 0.3
2020 Aug 23	120	6.2	14.2 ± 0.2
2020 Aug 24	120	5.6	14.1 ± 0.1
2020 Aug 25	120	5.9	14.2 ± 0.1
2020 Aug 26	100	6.1	14.1 ± 0.1
2020 Aug 27	130	2.8	13.9 ± 0.1
2020 Aug 30	150	6.1	14.2 ± 0.2
2020 Aug 31	150	5.7	13.7 ± 0.2
2020 Sep 01	150	2.6	14.2 ± 0.1
2020 Sep 02	150	6.1	14.5 ± 0.1

V1082 Sgr: Circular Polarimetry



V1082 Sgr: Circular Polarimetry

A&A proofs: ma

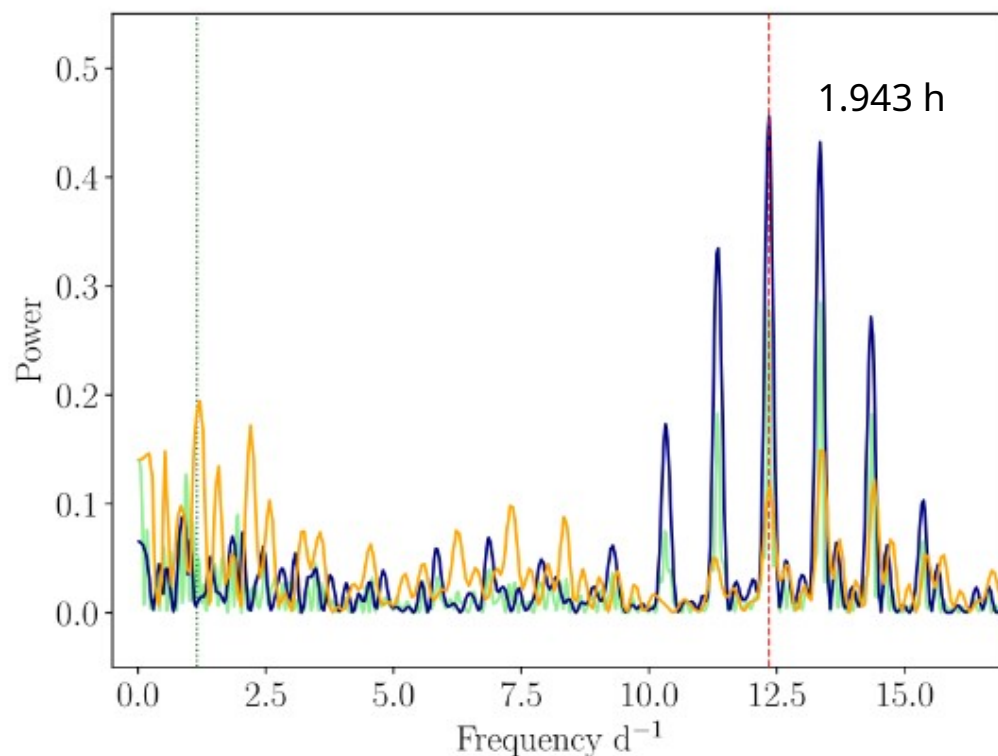
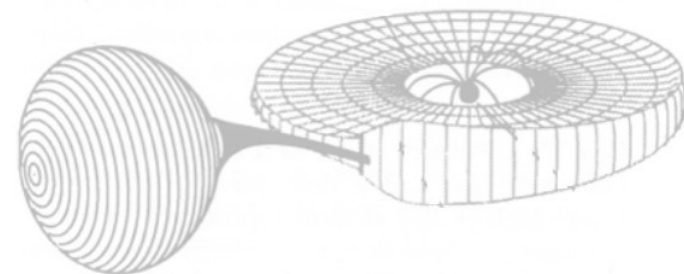


Fig. 3. Power spectra of circular polarization curves before de-trending. The dark blue line corresponding to the LS periodogram of block A; the orange is for block B, and the light green corresponds to the entire data set. The vertical green dotted line indicates the orbital frequency. Note, it is detected only in block B. The spin frequency is marked with a dashed red line.



V1082 Sgr: Circular Polarimetry

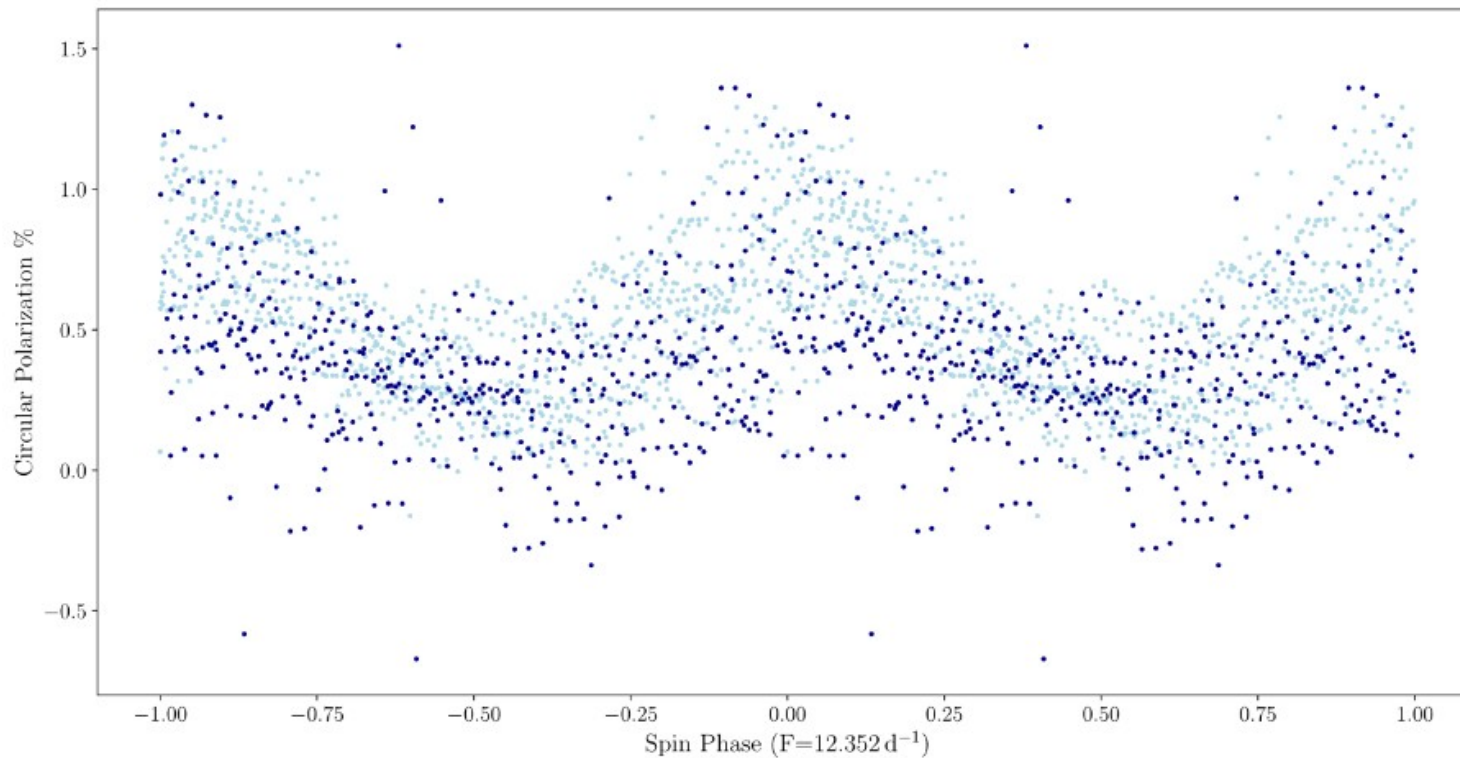


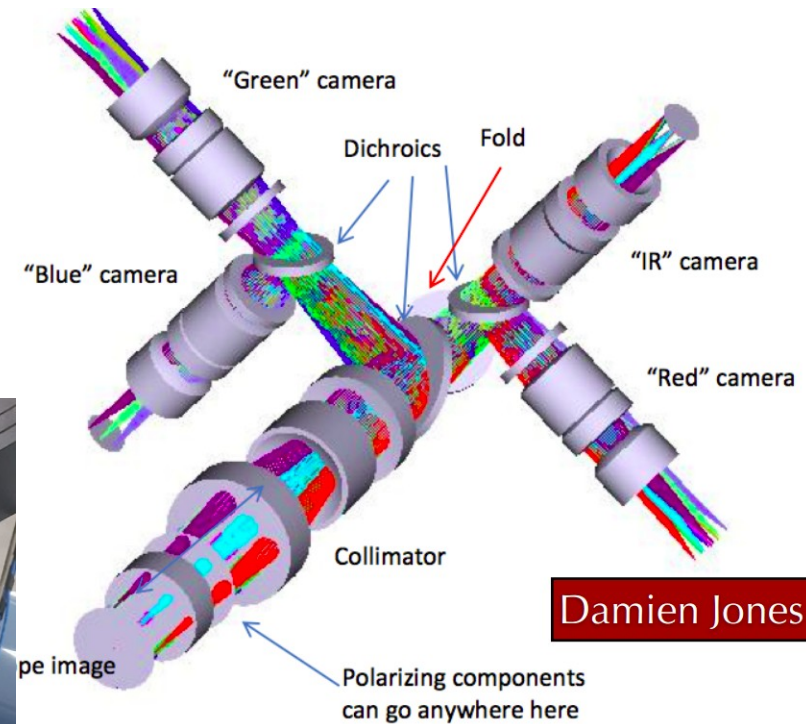
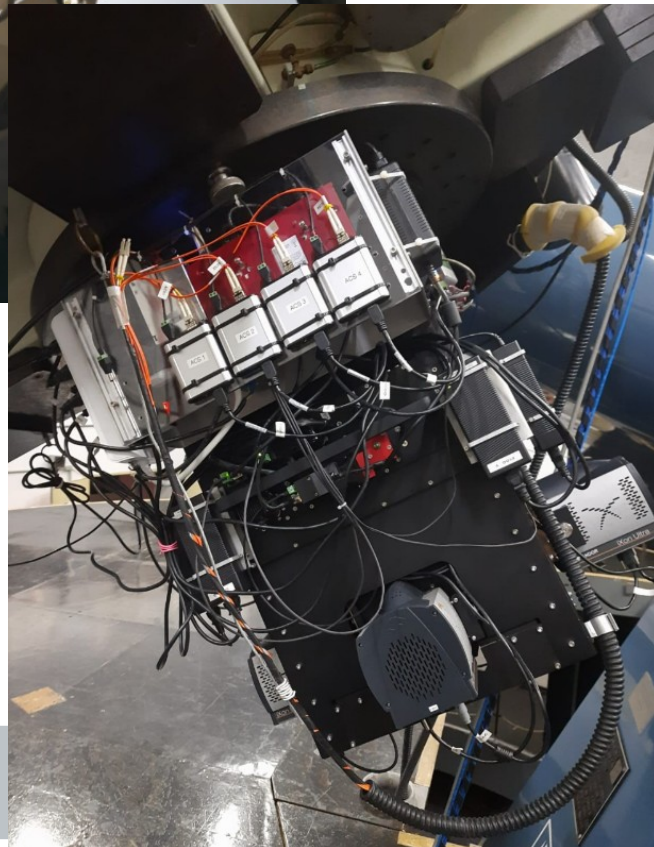
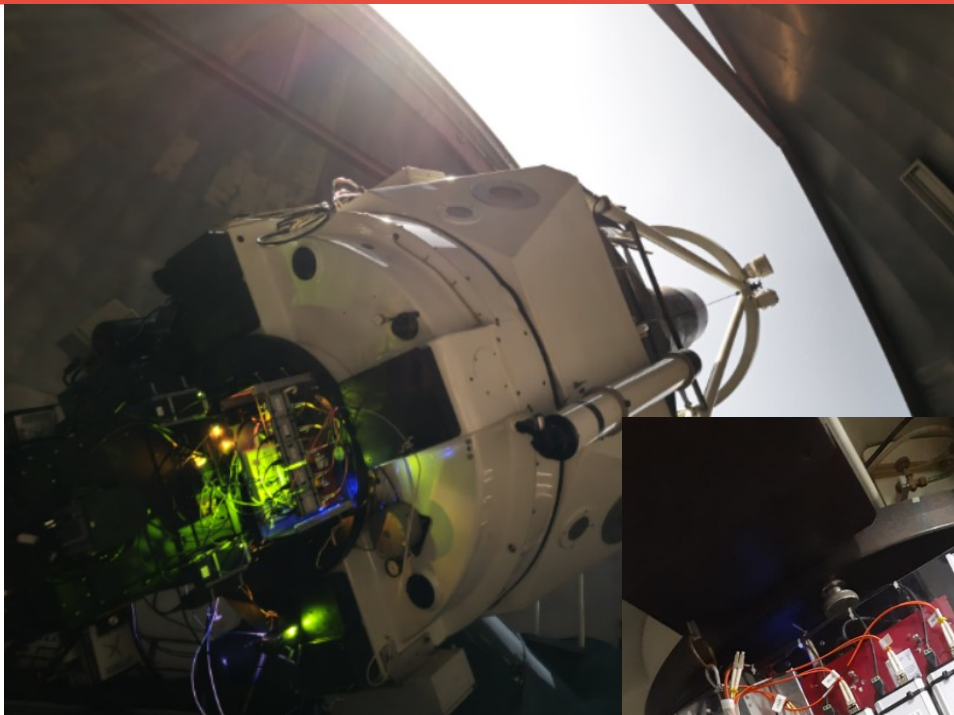
Fig. 6. The circular polarisation periodic variability folded with the 1.943 h spin period of the magnetic WD in V1082 Sgr. Two sets of data (sample A & B) with different trend removal are plotted with light and dark shades of blue respectively.

Conclusions: work in progress

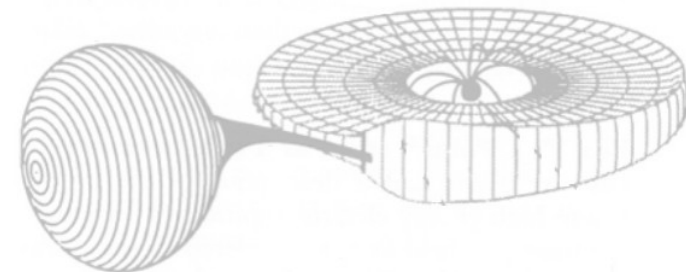
- **V1082 Sgr is an intermediate polar.**
- **The white dwarf spin period is 1.9 h.**
- **Circular polarimetry amplitude is about 0 to +1% (one pole).**
- **We will finish the X-ray light curve reduction of XMM-Newton and Swift.**
- **We will use the SPARC4 from OPD/LNA/MCTI-Brazil.**



Simultaneous Polarimeter and Rapid Camera in 4 bands (SPARC4)

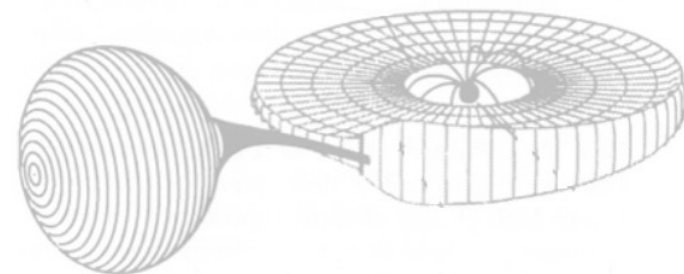


Rodrigues+ 2012



Simultaneous Polarimeter and Rapid Camera in 4 bands (SPARC4)

- Interacting binaries: multi-band light and polarization curves.
- Pulsating stars: multi-band light curves.
- Circumstellar envelopes: multi-band polarimetry.
- Star forming regions: multi-band polarimetry.
- Stellar populations and open cluster: multi-band light curves.
- Solar system studies: multi-band light curves.
- Exoplanets: multi-band light and polarization curves.



Thanks!!!!

