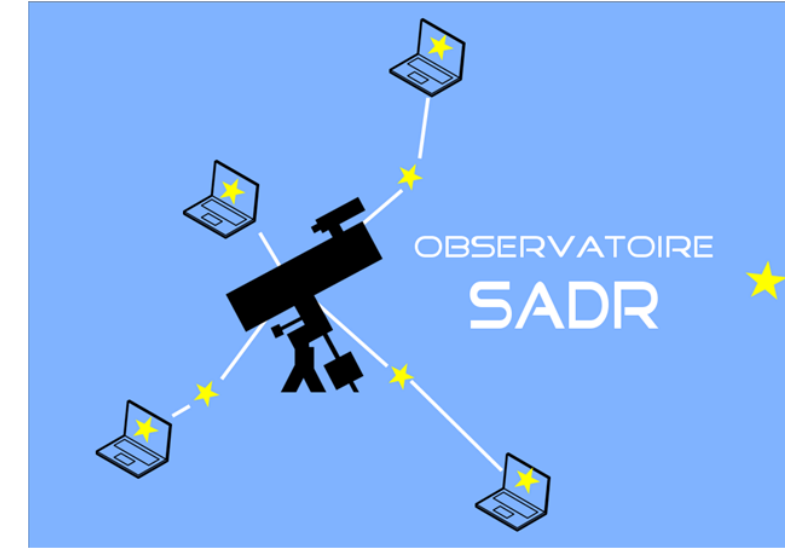


GEOS RR Lyr Database

GEOS Groupe Européen d'Observation Stellaire



RR Lyrae UV Hor by SADR Observatory

Traverse. P (1,2); Virlichie. J-L (1,2); Roy. H (1,2); Le Borgne. J-F (2)

(1): SAF
(2): GEOS

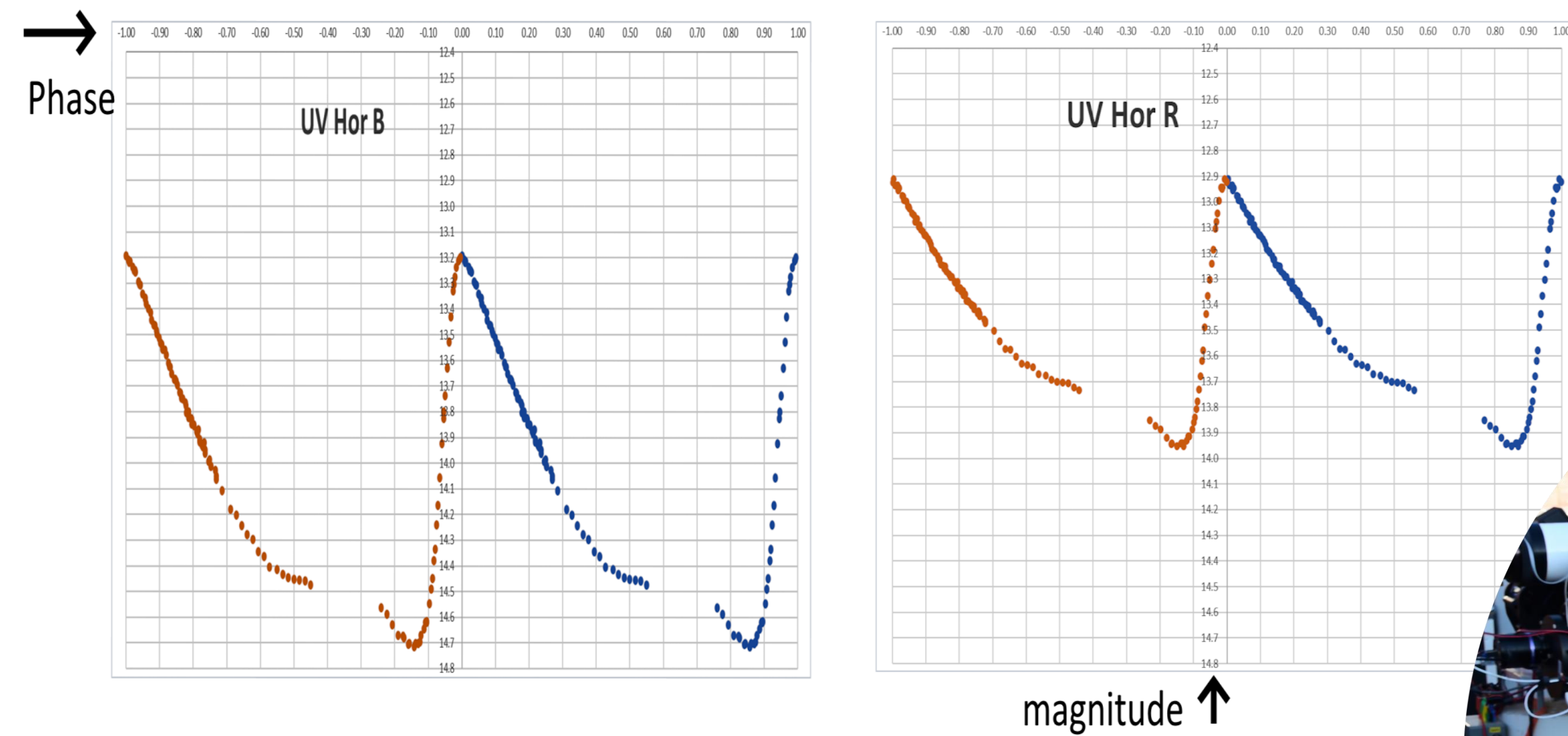


Introduction

Variable star observation is both straightforward and rewarding. With our 14" Newton in Chile we get accurate measurement of varying magnitude of RR Lyrae stars. They have a pulsation period of about 12 hours and other parameters than period can be acquired like modulation period or astrophysical parameters like metallicity. UV Hor is a "steady" RR Lyrae without modulation.

Magnitude variation

The light curve in red band (right image) show high amplitude about 1.05mag and as per expectation lower magnitude but even more important amplitude in blue band (left image), about 1.5 mag

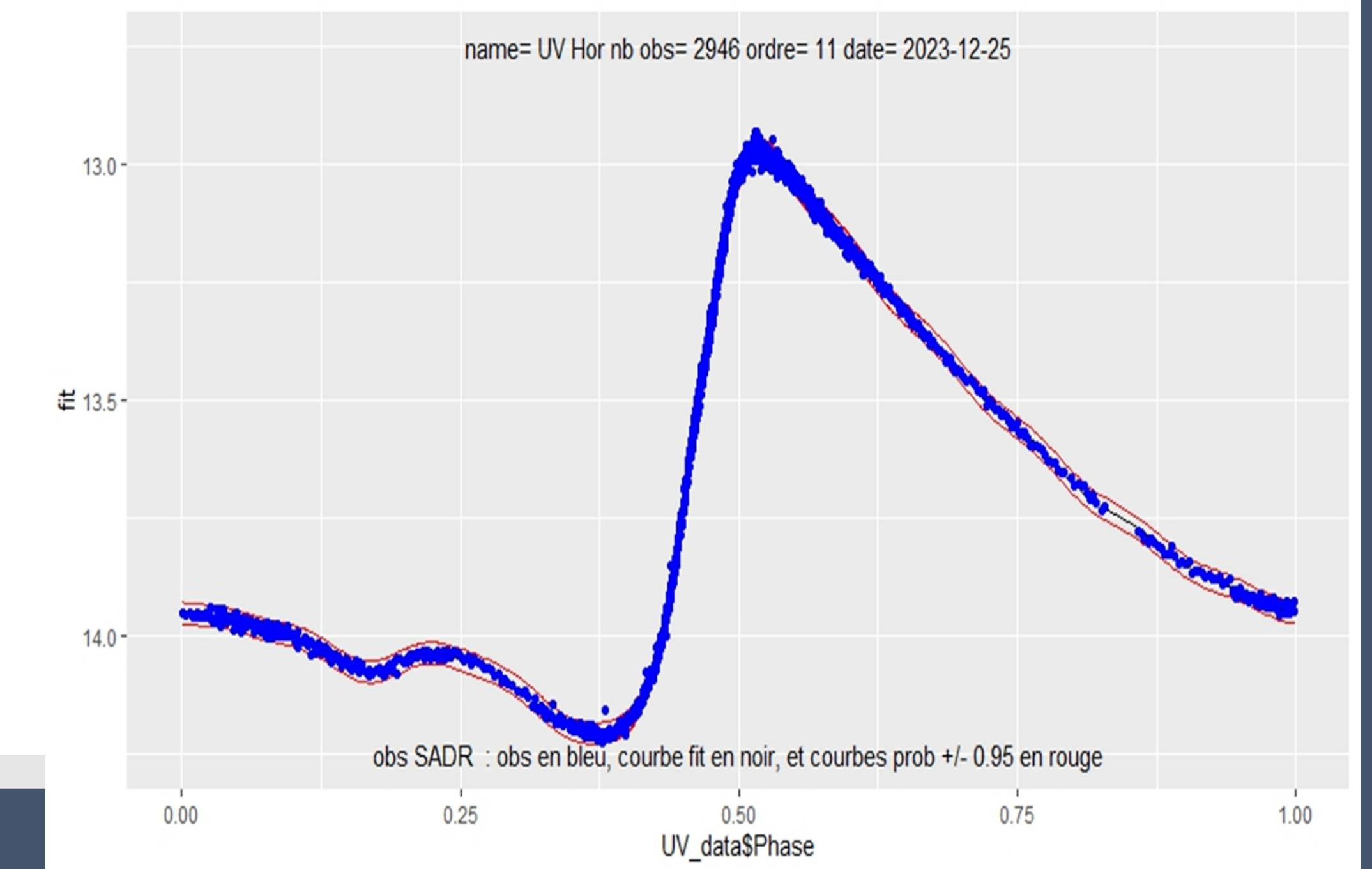


Model with Fourier decomposition

So we know the period of UV Hor, $P = 0.5646743$ d and can now use favorite tools of periodic phenomena like Fourier tools. The model of the phased light curve is a Fourier series of form sum of sin

Horizontal axis is the phase between 0 and 1 and vertical axis the magnitude.

This model is for UV Hor V band build with 2946 data. Magnitude vs phase, order number is 11. data points are in blue, fitted curve in black (difficult to see) and 95% confidence intervals curve in red.



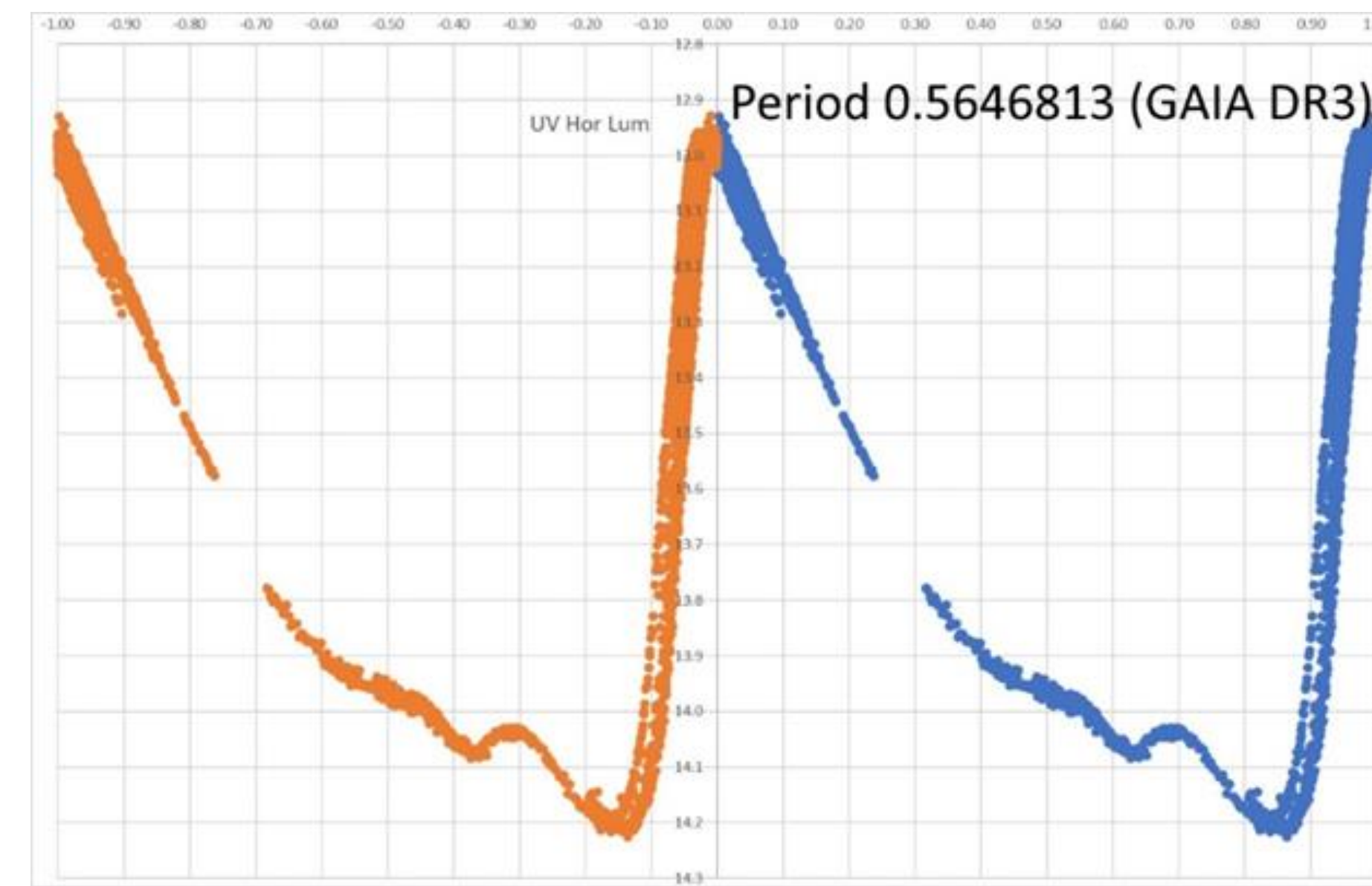
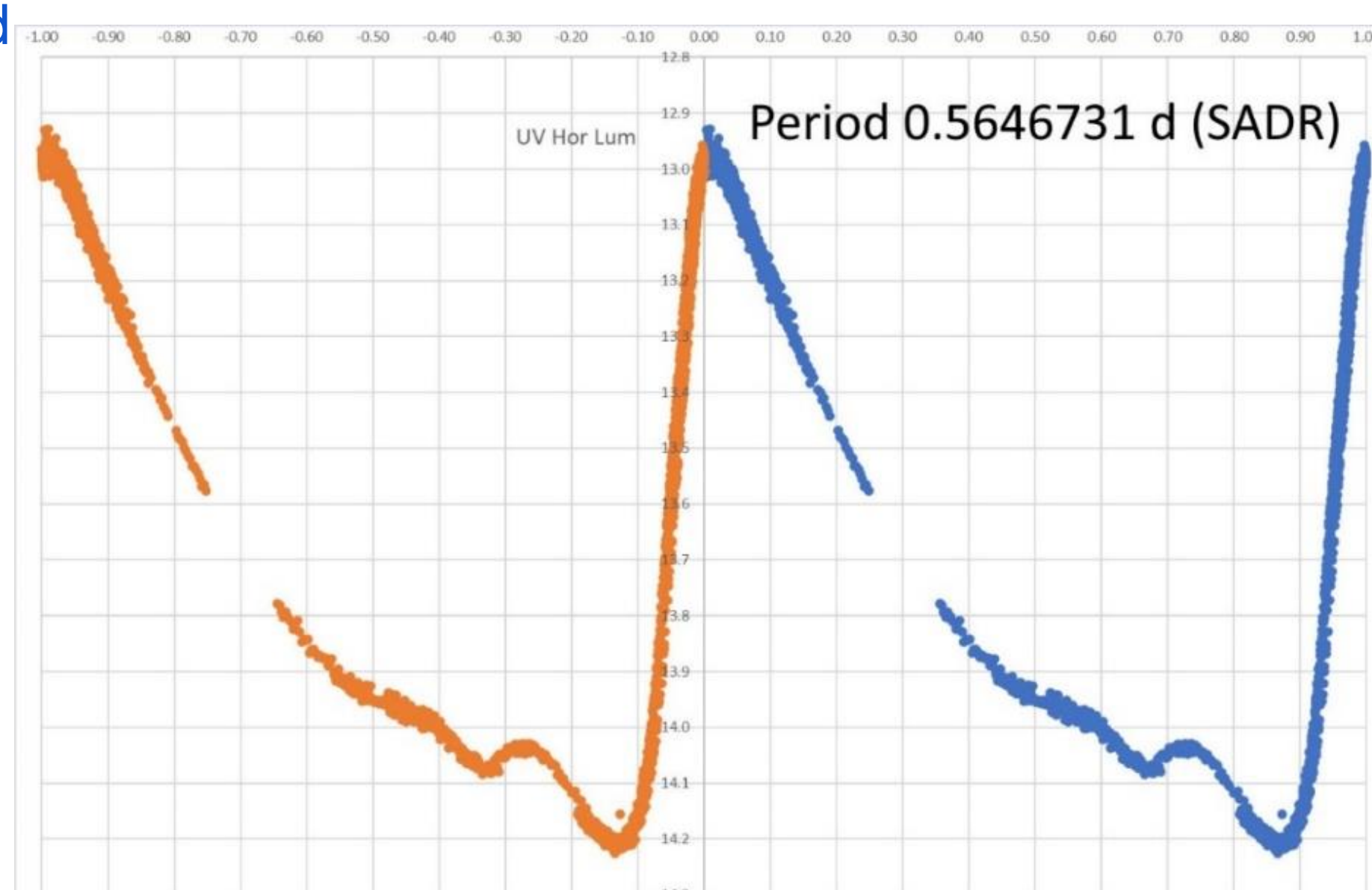
Period determination

We have data, about 3000 photometric values for this RR Lyr since 2019. We can notice just with AI tools (Animal Tools, only eyes and brain) with 2 graphs of folded light curve (in phase) for two estimated values of period, our choice for best period and the GAIA DR3 period

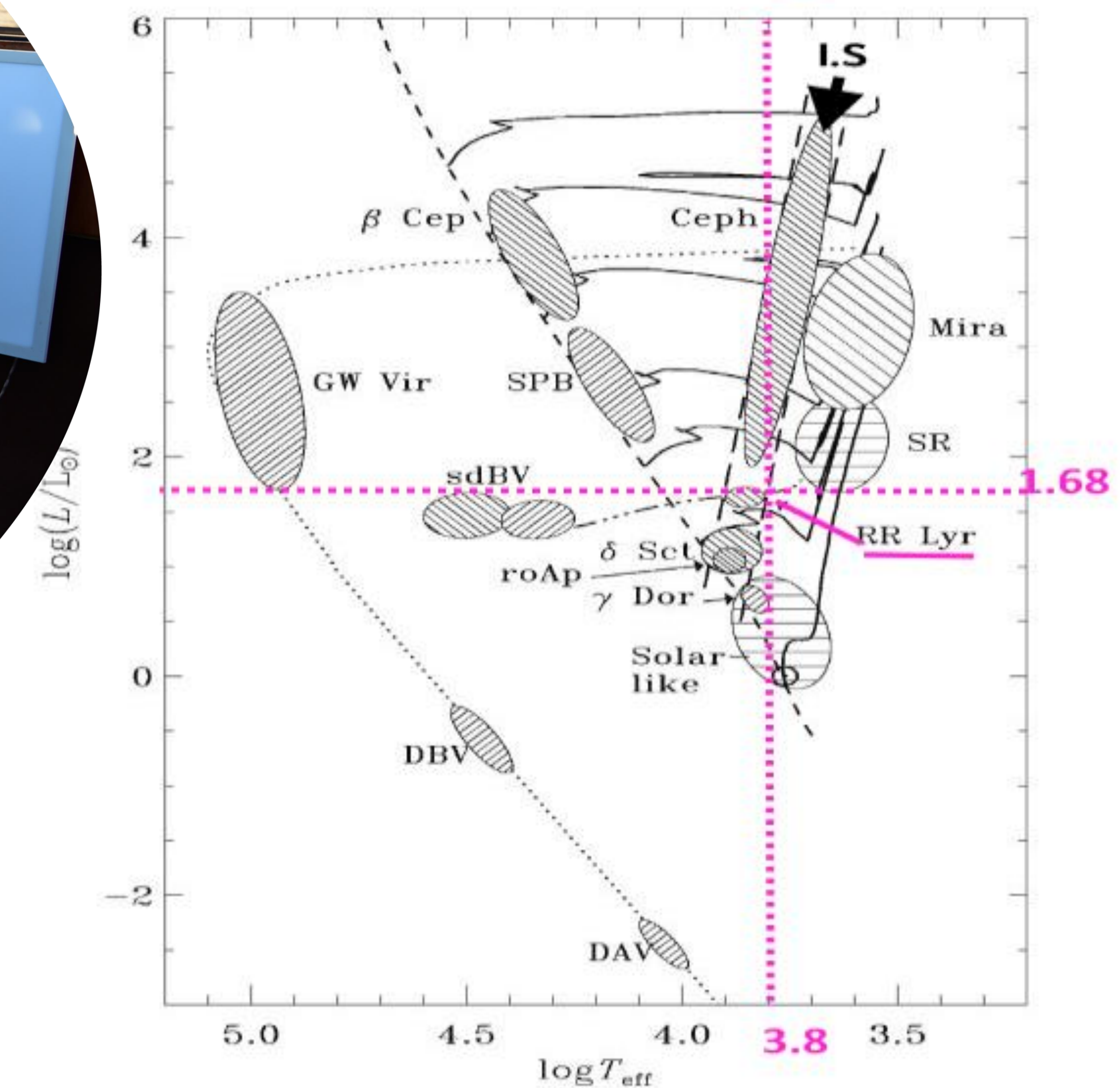
-the shape fits an RR ab type, because of the steep rise time to maximum and large amplitude. Previously we would call it a "a" type but as "a" type and "b" type both pulsate in the fundamental mode they are now together in "ab" type

-the rise time is very short, about 15% of the phase proportion and amplitude more than 1 mag

UV Hor magnitude versus phase for two periods; SADR period 0.56467431d is obviously better, thinner curve than the other period 0.5646813d



UV Hor H-R diagram



This diagram allows to quickly compare star parameters. Here with log Teff for X axis and log (Teff/Tsun) for Y axis

UV Hor Log Teff is about $\log(6000K) = 3.8$ and luminosity is about 47 times Sun luminosity so for Log value, 1.68

UV Hor is well in RR Lyrae area, in instability strip (I.S) and horizontal branch

Conclusion : This example of observation show that RR Lyrae survey is both enjoyable and useful, even with moderate level of equipment. Our data come from SADR Observatory (X03) operated by J-L Virlichie & H Roy & P Traverse. This observation is part of the pro-am program GEOS RR Lyr Survey. RR Lyrae repository site: rr-lyr.irap.omp.eu/dbrr/index.php Contact: pierre.traverse@orange.fr