

VV Cephei up-to-date

A spectroscopic Portrait
of the Eclipse 2017-19

European Variable Star Meeting

Grimbergen/Belgium

14th September 2019

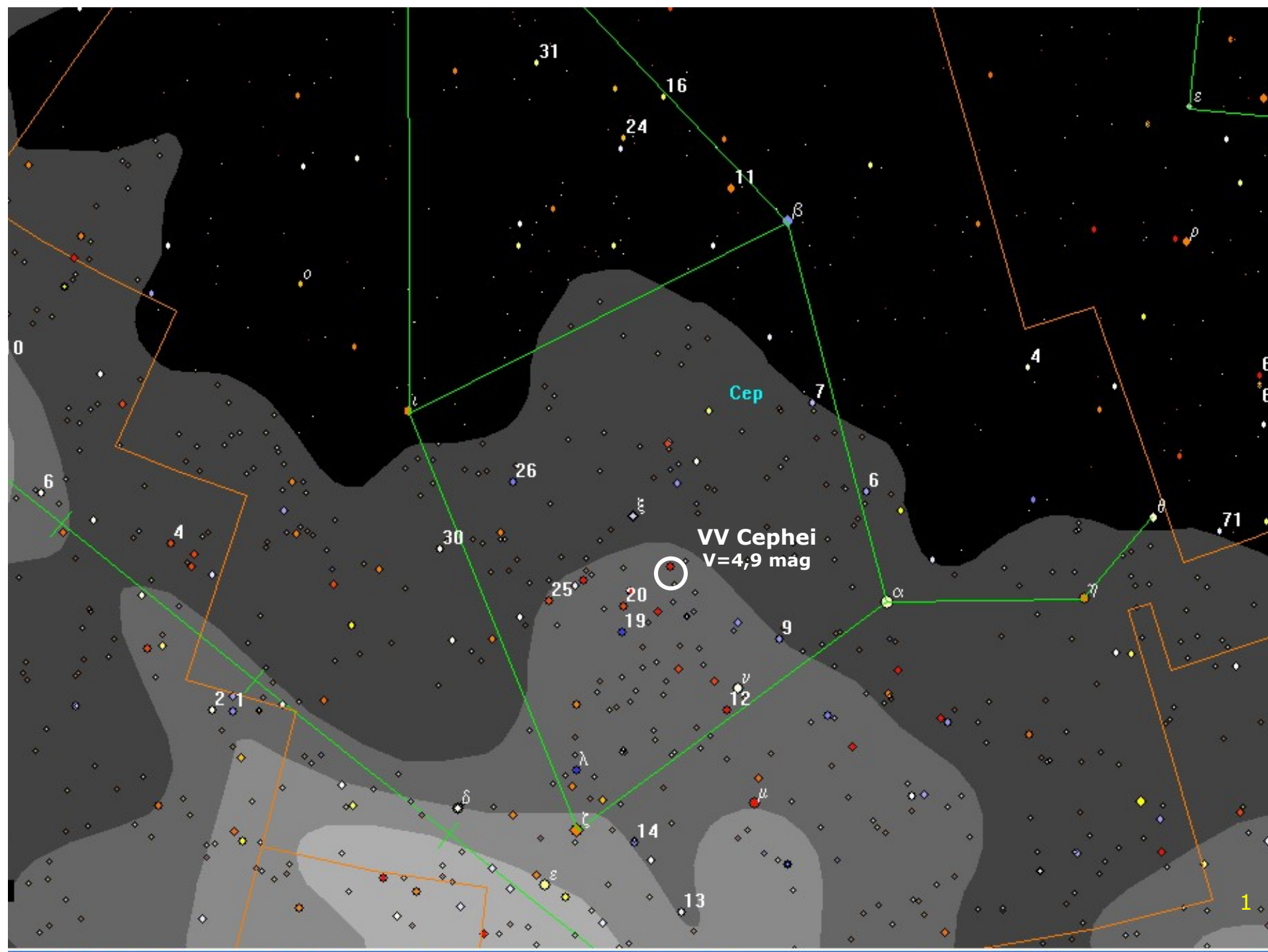
Ernst Pollmann

Internationale Arbeitsgemeinschaft **ASPA**

*Aktive **SP**ektroskopie in der **A**stronomie*

<http://www.astrospectroscopy.de>





Sonne



VV Cephei A

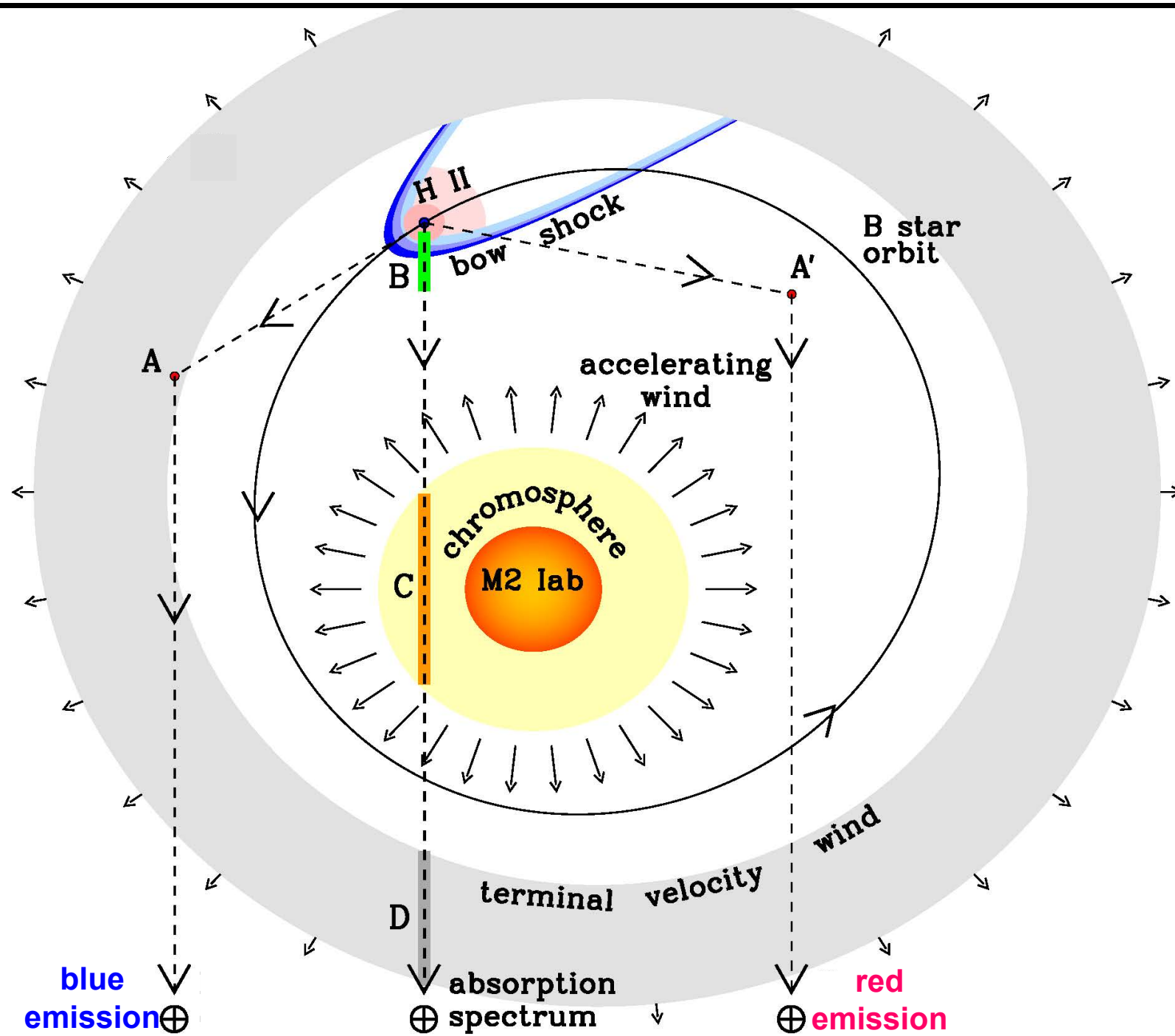


M2 lab Supergiant
20 Solar masses
1000-1800 Solar radii

The primary eclipse begins when the blue B star plus
gas disc disappears behind the M supergiant
Both stars offer the opportunity to study their outer
atmospheres

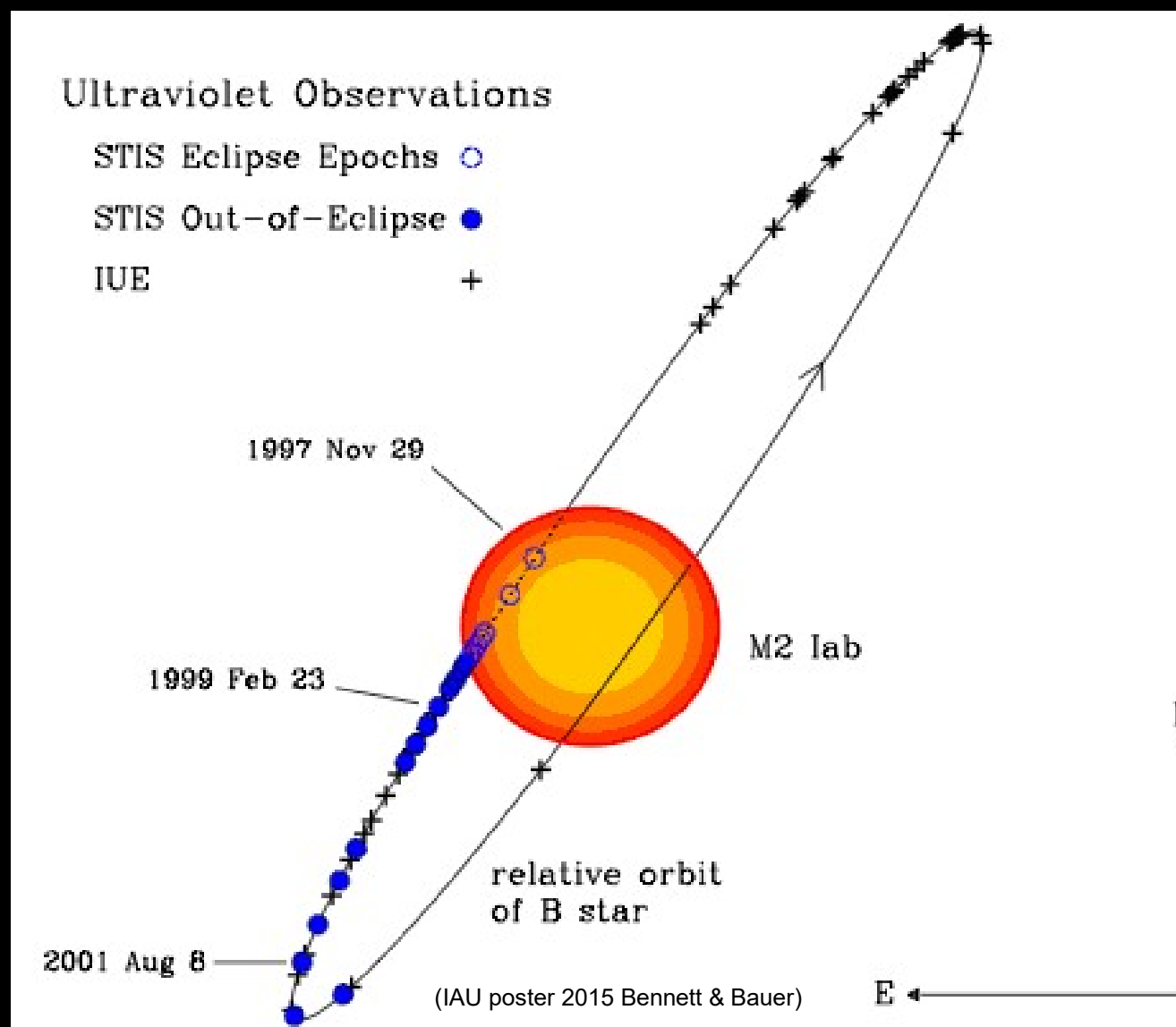
Eclipsing times
T1- 04 August 2017
T2- 27 October 2017
T0- 01 June 2018
T3- 06 February 2019
T4- 16 May 2019

Animation not to scale

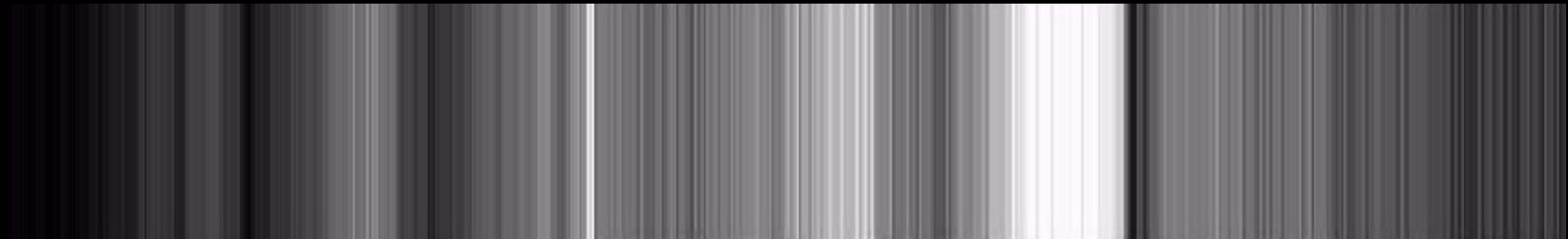


The sight of the orbit of VV Cephei in the sky

The companion's positions on 21 timestamps from STIS observations



First CCD-Spectrum from 07/1996



CrI 5785

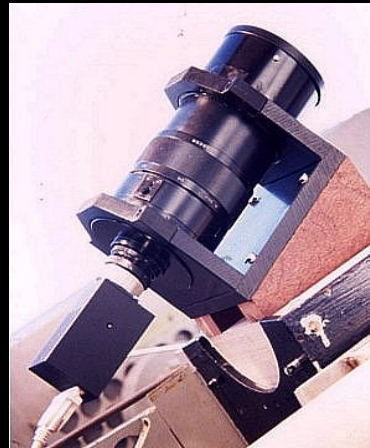
NaI 5889-5895

CaI 6161-6170

TiI 6360

H α

atm. O₂ 7640



... taken by a Maksutov Prism Spectrograph



In 2015, a photometric-spectroscopic campaign was organized by
Jeff Hopkins, Phil Bennett and myself with the goal of observing
the complete coverage for approximately 650 days from August 2017



Jeffrey L. Hopkins
Hopkins Phoenix
Observatory
Phoenix, Arizona
USA
(† 2015/07/28)

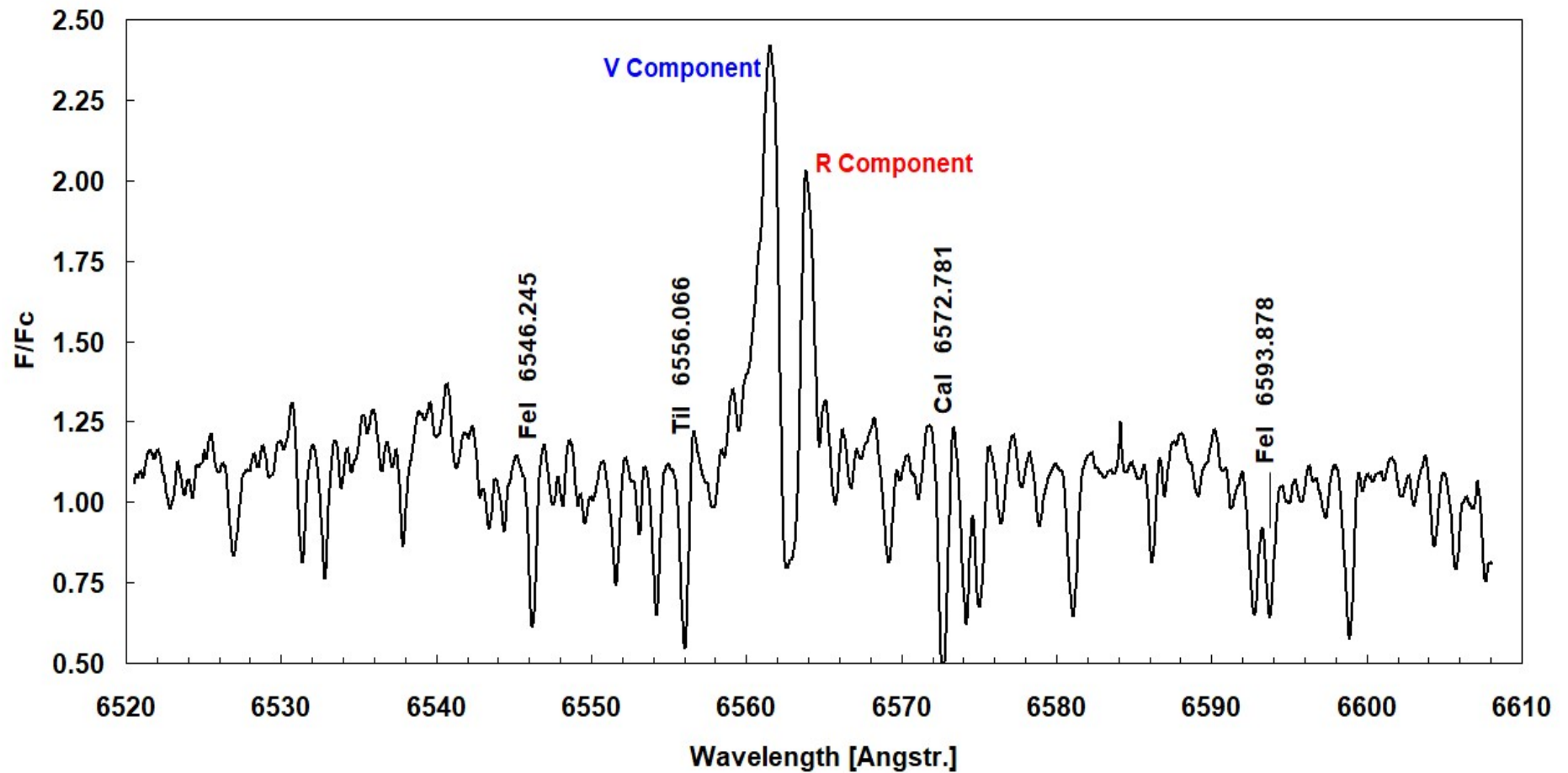


Philip D. Bennett
Department of Astronomy
and Physics
Saint Mary's University
Halifax, Canada

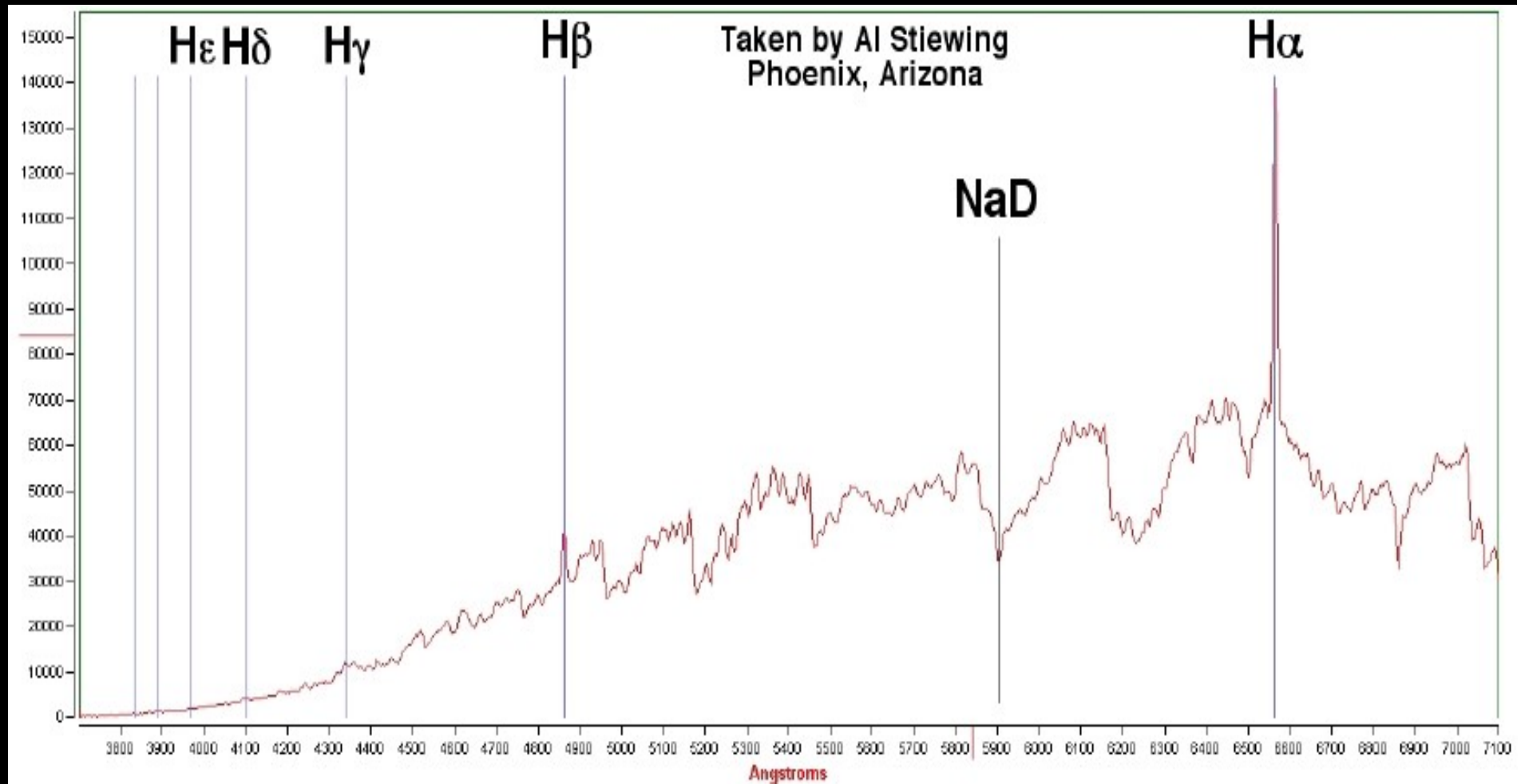
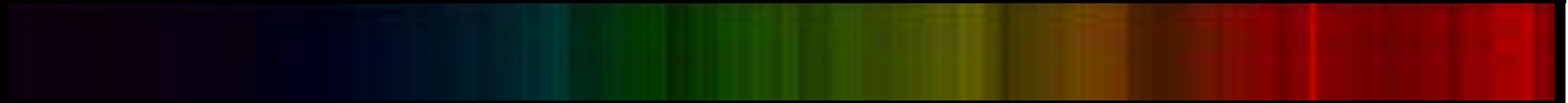


Ernst Pollmann
Working group
Active Spectroscopy
in Astronomy
Leverkusen,
Germany

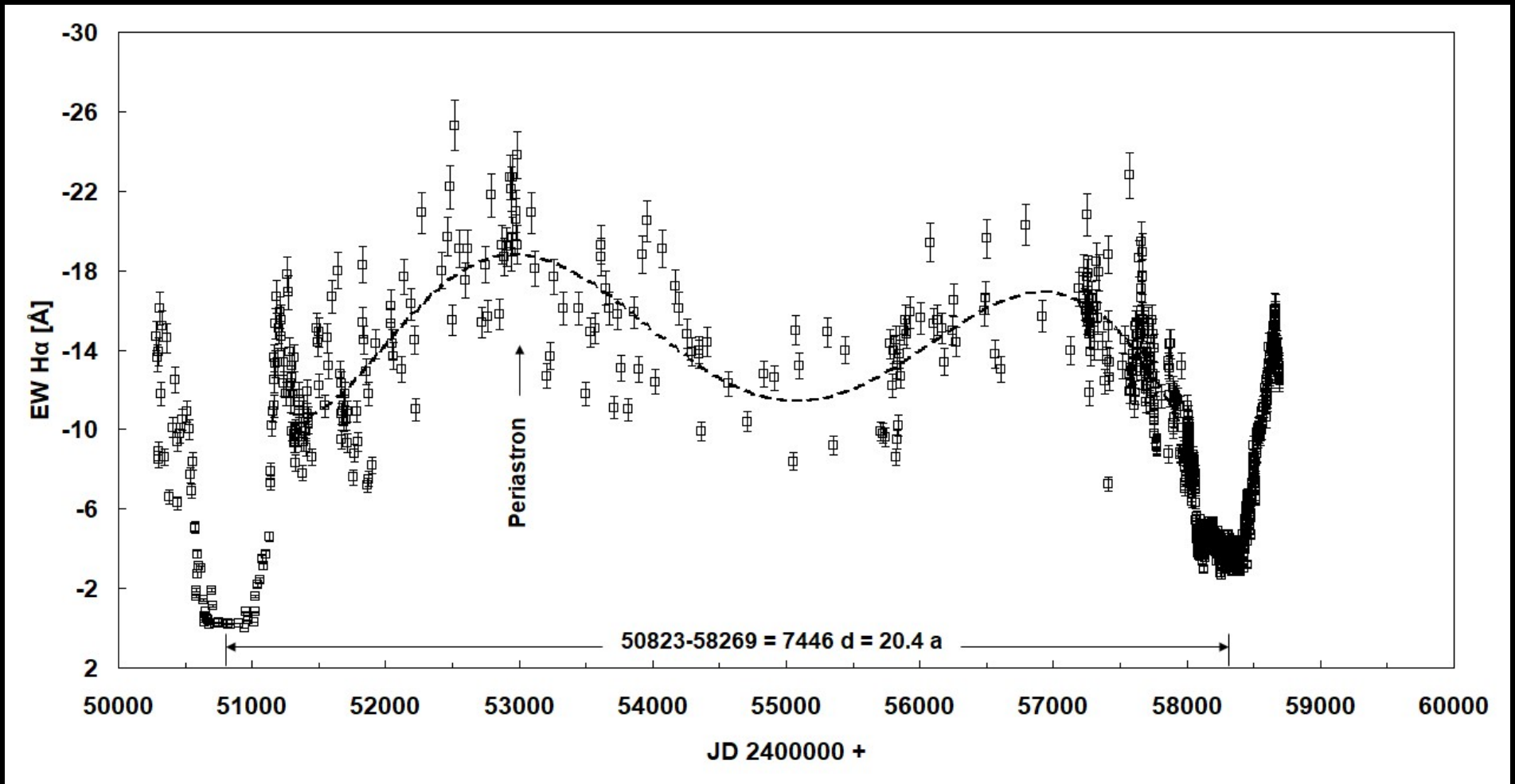
Emission of the H α double peak profiles V & R components have different origins



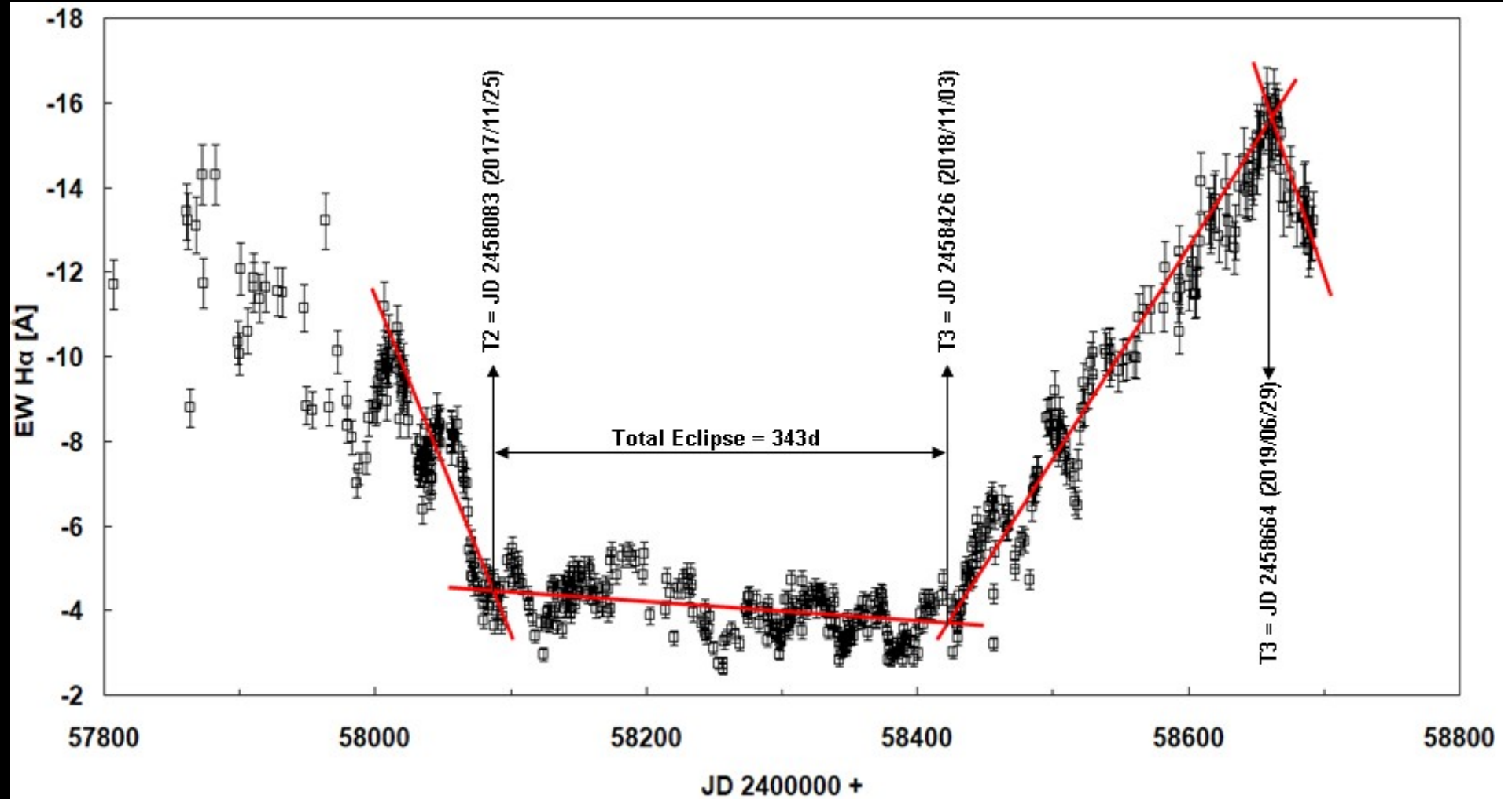
CCD spectrum of the visual spectral range
recorded with the spectrograph ALPY 600
Exposure time 180 sec

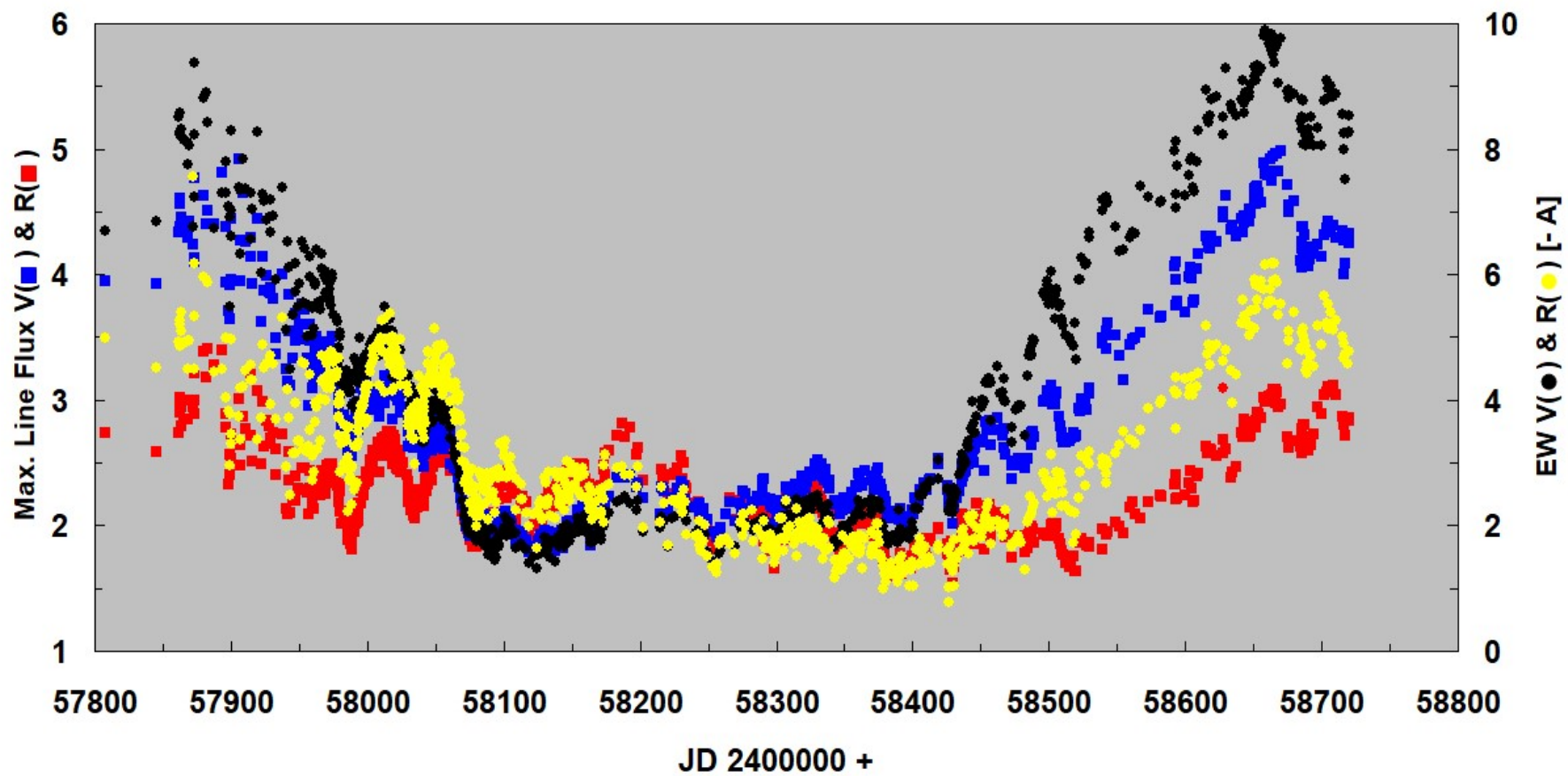
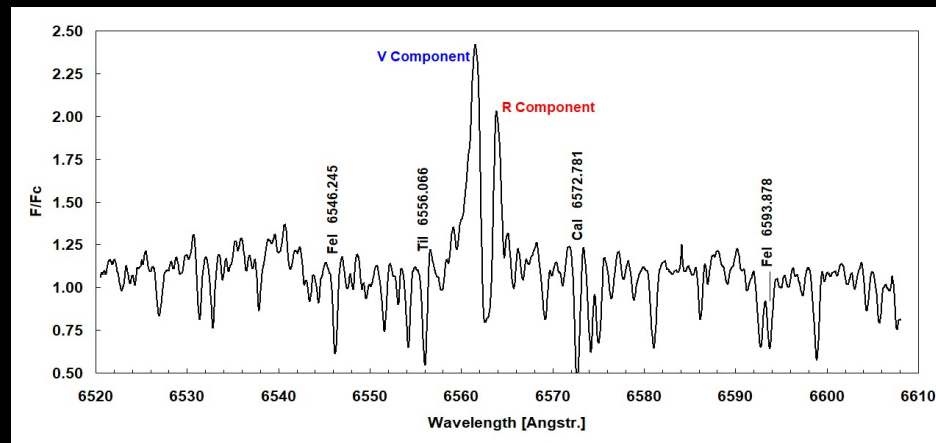


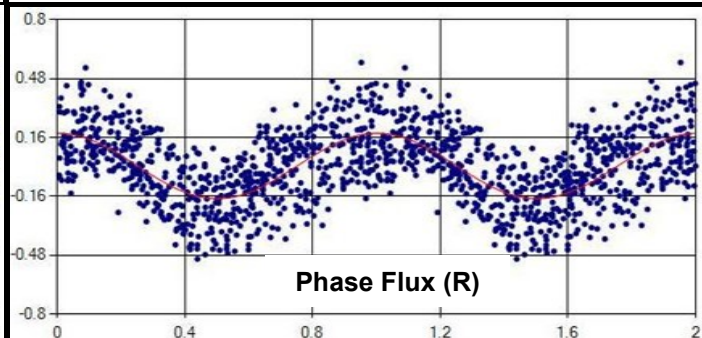
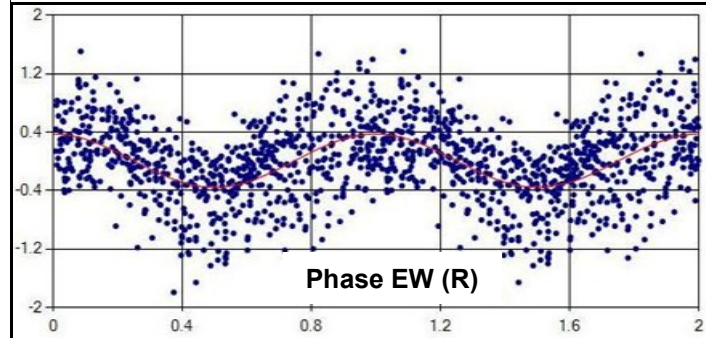
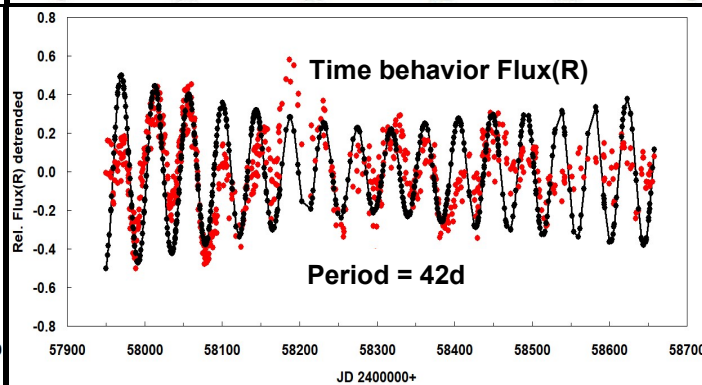
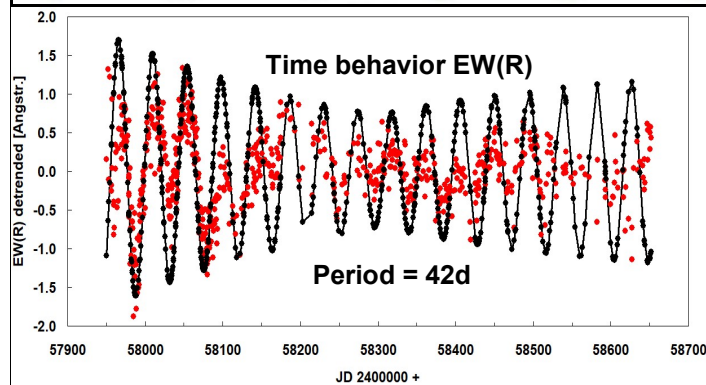
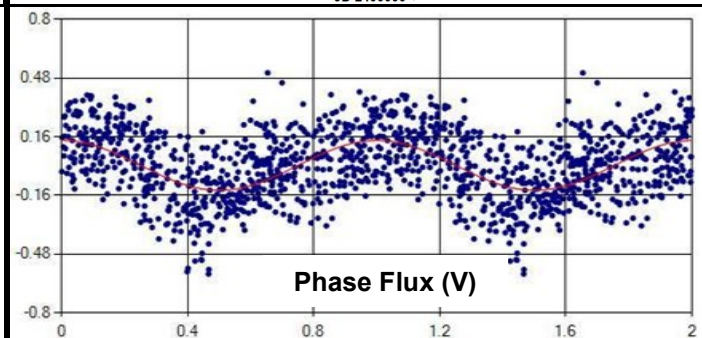
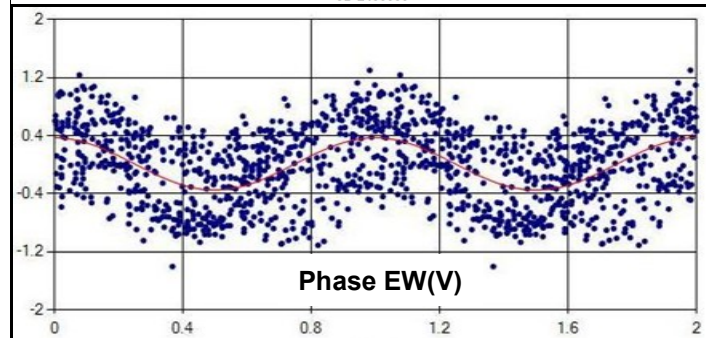
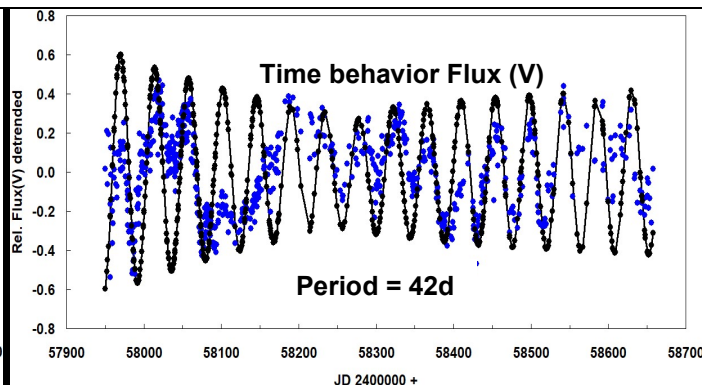
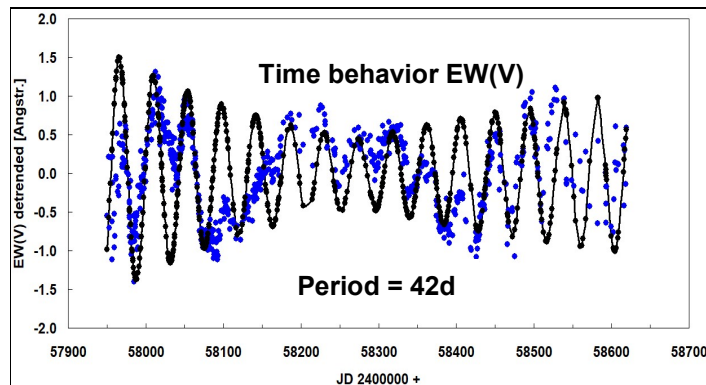
Monitoring of the H α Equivalent width since 1996 to now



Cyclic short-term variability of the H α Emission during total Eclipse



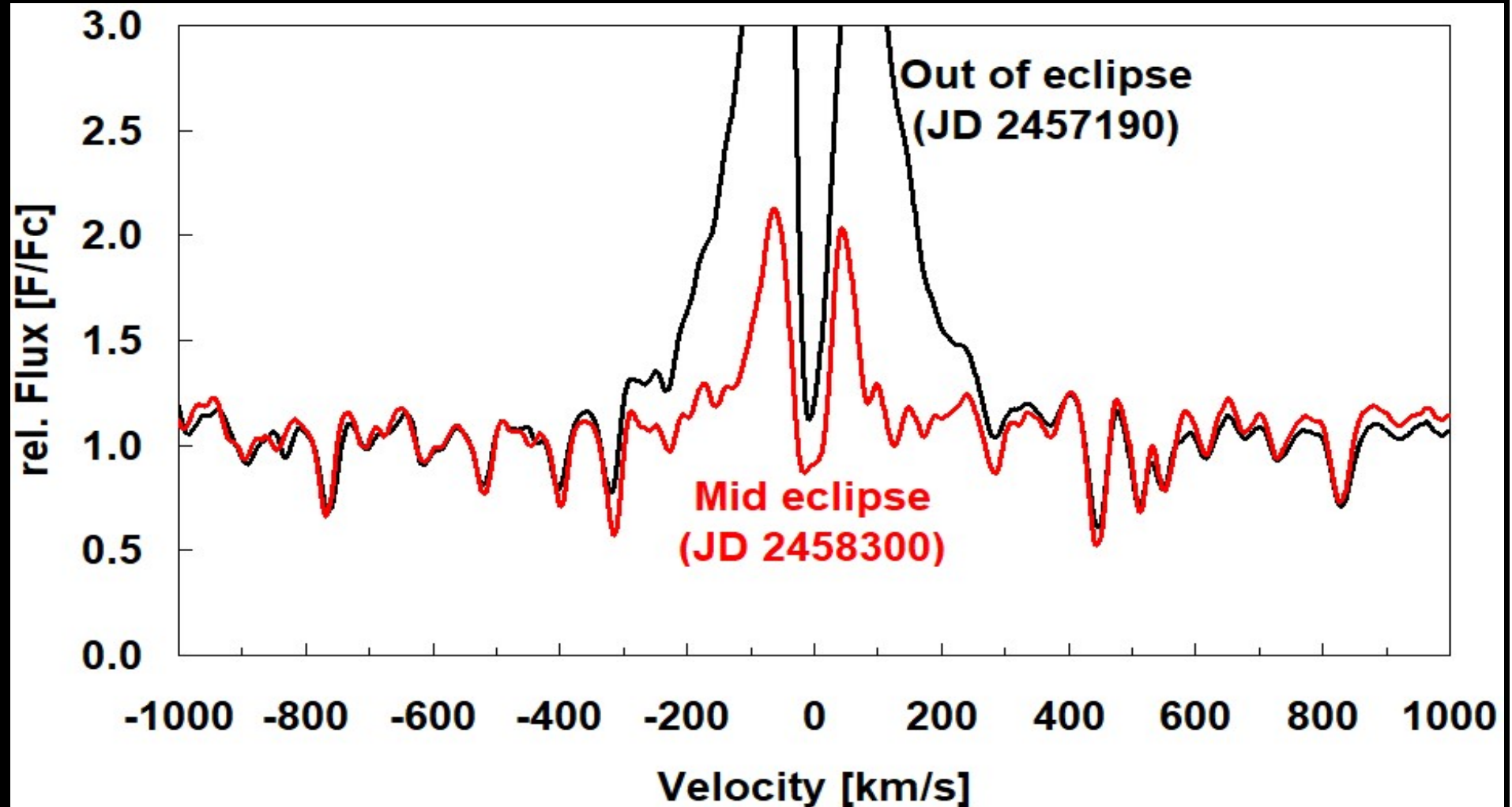




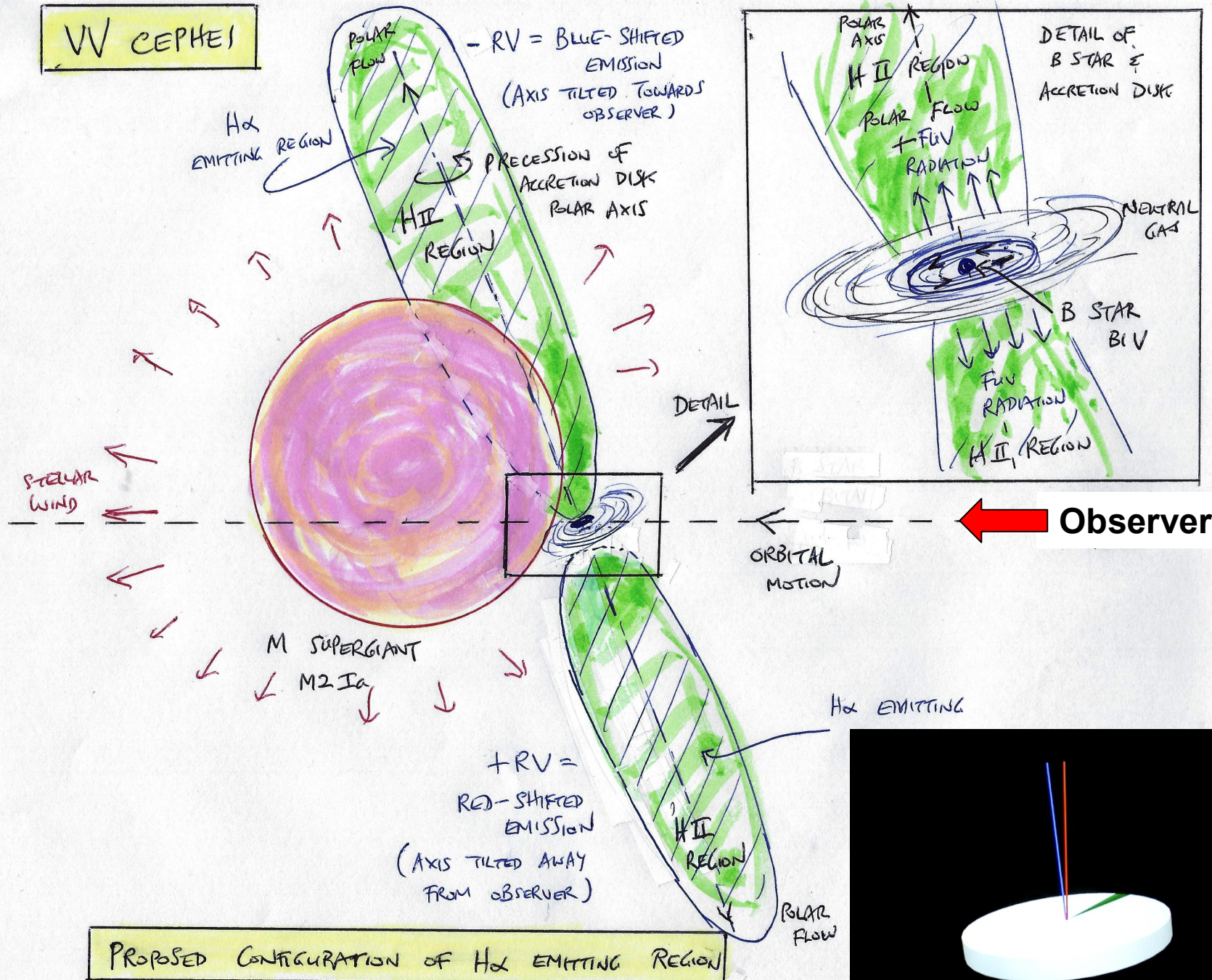
42 d Periodic
Variability

EW (left)
Flux (right)

Significantly narrower profile shape during total eclipse
implies a lower velocity source far from the accretion disk

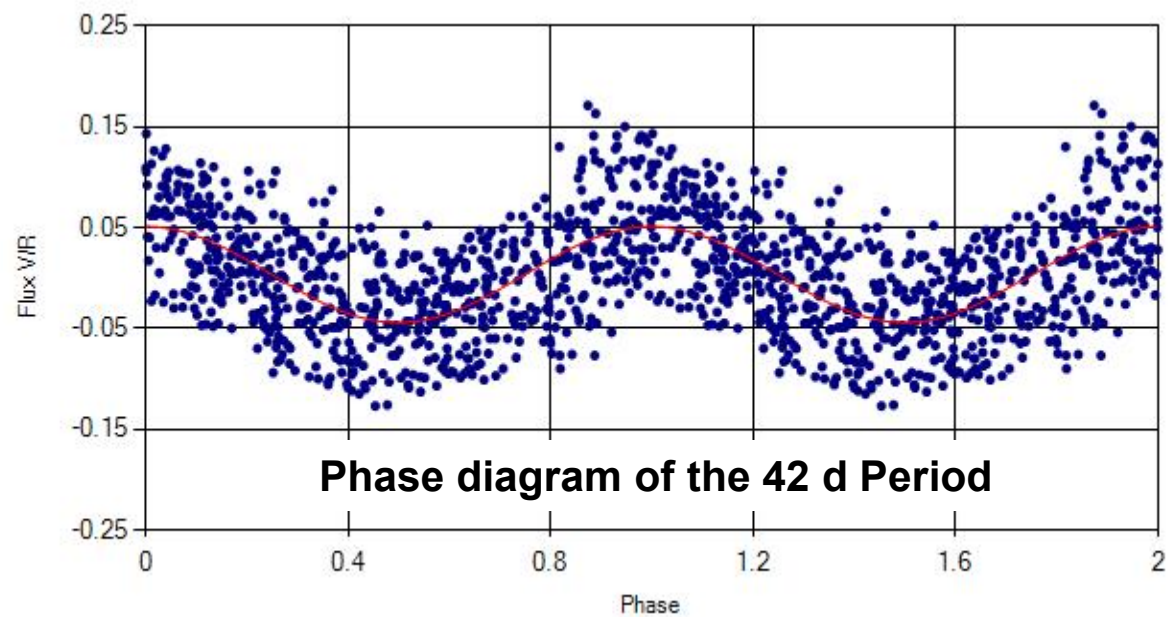
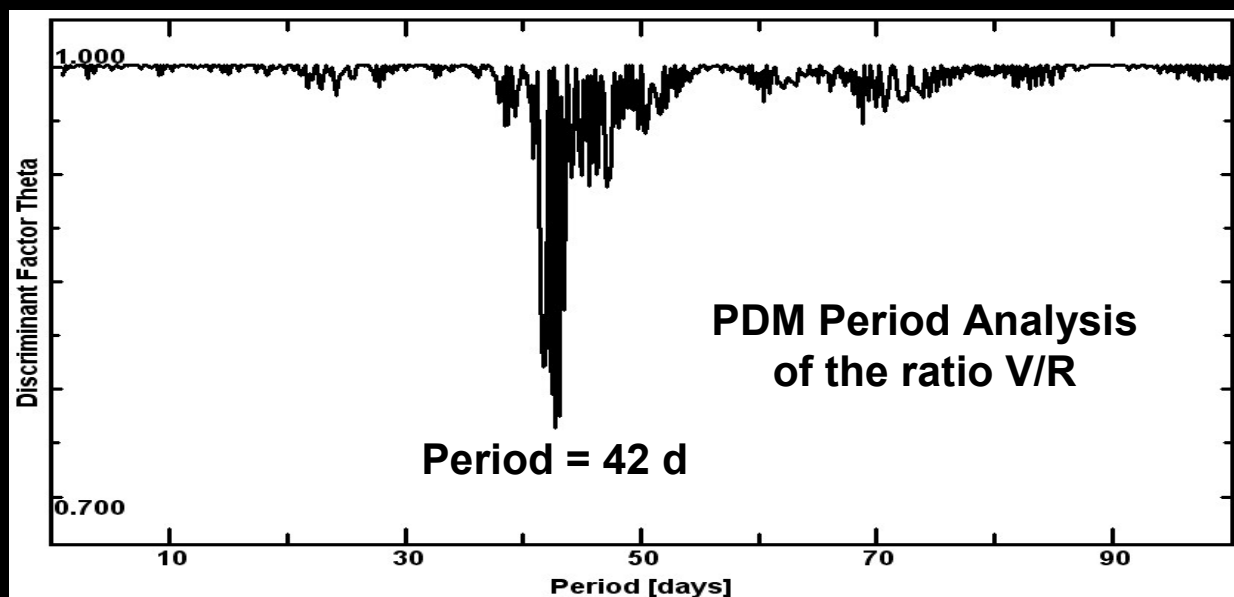


VV CEPHEI

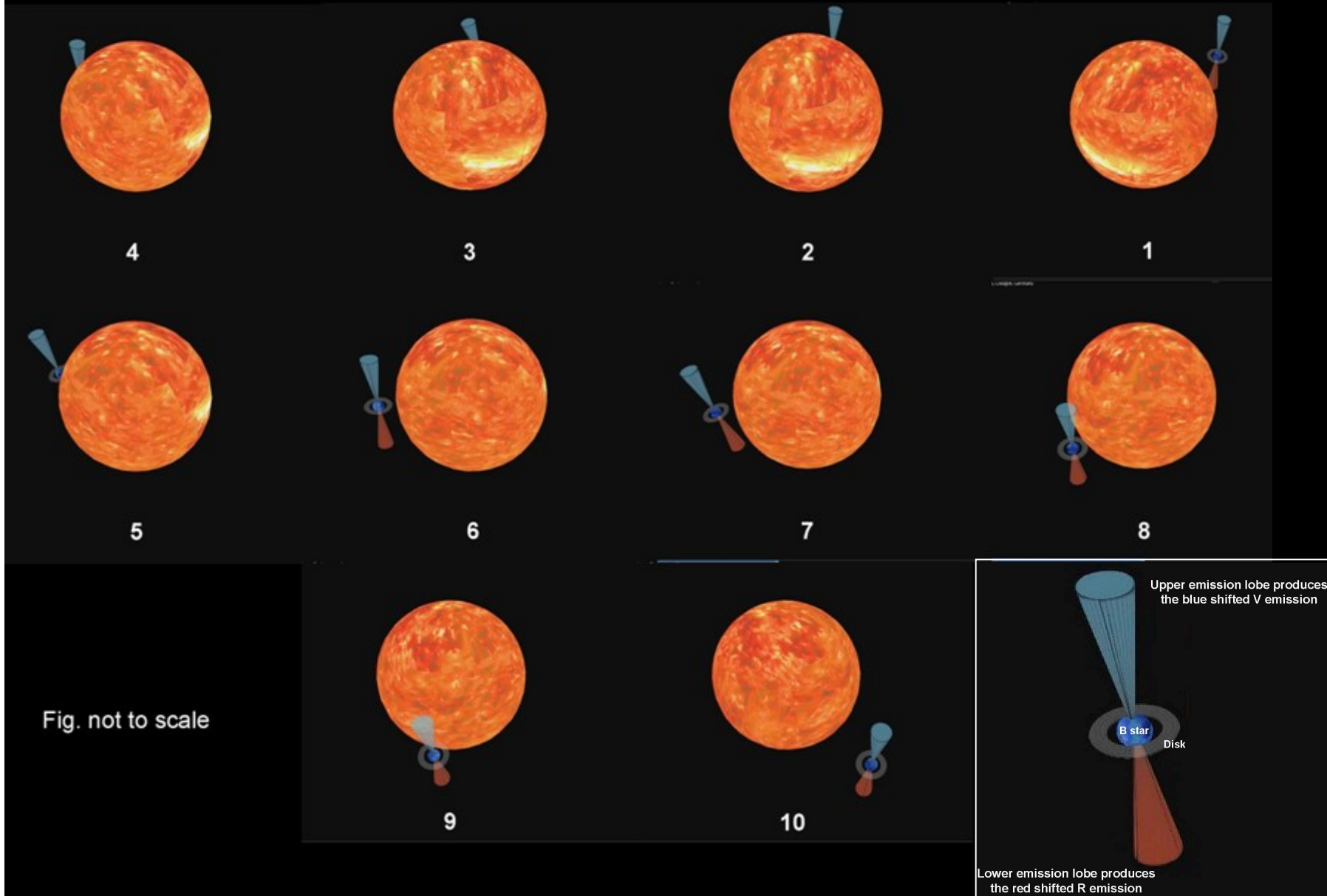


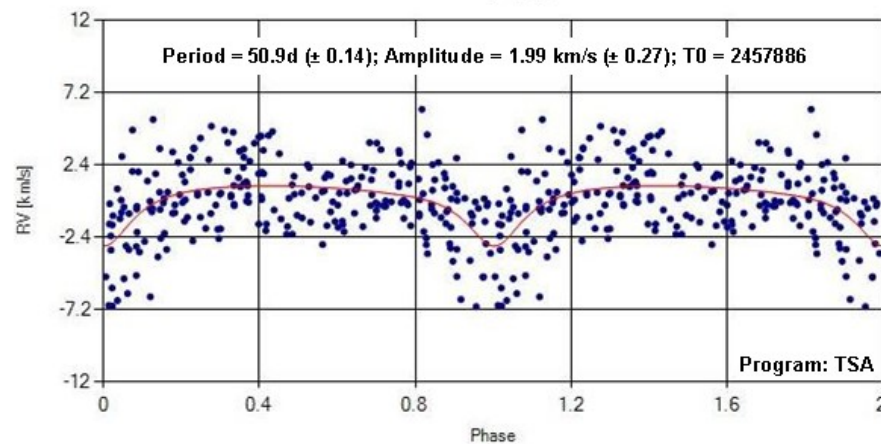
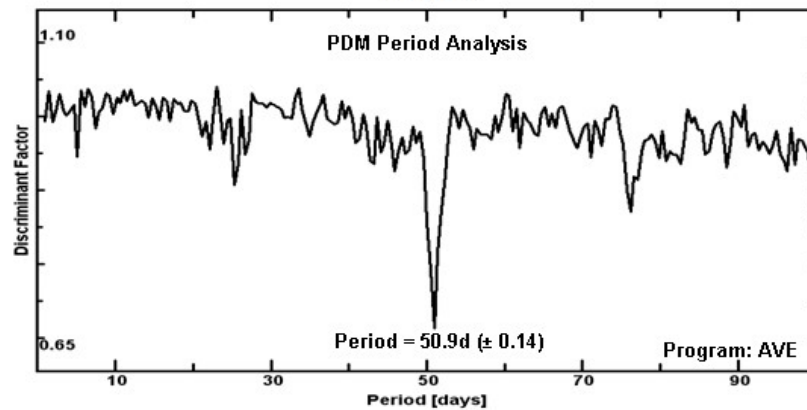
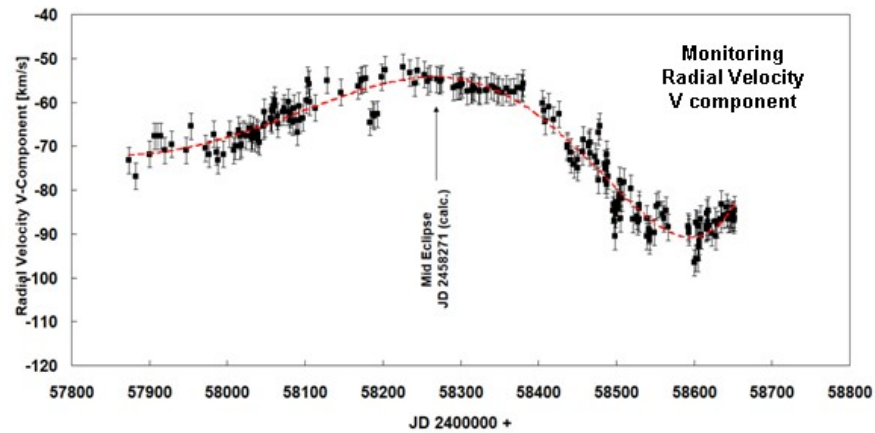
PROPOSED CONFIGURATION OF H α EMITTING REGION

Period Analysis V/R line flux



**Precession movement of the disk rotational axis on the orbit
and during the eclipse of the B star.
Upper and lower emission lobes follows this movement**





The Evidence
Radial velocity
Periodicity of the
V component



...ready for
observation?