

VV Cep Observing Campaign Details

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ABSTRACT

VV Cephei (HIP 108317, HD 208816 RA/Dec 329.16309937 +63.62556040 21 56 39.14 +63 37 32.02 [SIMBAD, 2016]), is an eclipsing binary system similar to ϵ Aurigae, exhibiting a high mass loss rate [Stencel et al., 1993]. It exhibits rather similar light-curve with characteristics that are worthy of careful study over a 3-4 year period commencing now as it starts approaching its closest approach.

VV Cephei is believed to be a B[e]/shell star, with a spectral classification of

M2epIa-Iab+B8:eV [Shenavrin et al., 2011] [AAVSO, 2016] and a primary eclipse period of 7.430 [AAVSO, 2016] days (20.3436 standard based on 365.25 years). The system has a parallax of 1.33 mas (1.5kpc distant [van Leeuwen, 2007]) placing it within the Cepheus OB2 association. Its mass is not precisely stated, values ranging from 2 (?) to 20 M_{\odot} . The mass loss rate is not precisely stated [Josselin et al., 2003, fig.4] offers a ball-park estimate of $10^{-9.5} M_{\odot} \text{Yr}^{-1}$. Its orbit has semi-major axis of 16.2 ± 3.7 arcsec (12.7AU) with an eccentricity of 0.346 and an inclination of 84 degrees. It has a radial velocity (R_v) parameters [Hopkins et al., 2015]:

$$k1 = 19.43 \pm 0.33 \text{ [km sec}^{-1}\text{]}$$

$$k2 = 18.14 \pm 0.68 \text{ [km sec}^{-1}\text{]}.$$

Wavelength dependent short-term light-curve variations ranging from 58 days in UV to 118.5 days in longer wavelengths has been reported ([Bauer & Bennett, 2000 via Wikipedia]). This is not uncommon in large, cool stars with complex physics in their photospheres and shells. This opens up a fertile area for higher cadence work for small telescope scientists given the wider spectral range of data from spectrographs common to this community.

This is a bright star [Ducati, 2002],
U 7.03, B 6.65, V 4.90, R 3.19, I 1.85, J 1.03, H 0.17, K -0.11

(Note ascending brightness well into IR suggests a cool star/envelope possibly somewhat due to being embedded in a shell).

Its velocity w.r.t. LSR frame is -18.7 [km sec⁻¹] [0.9] [Wilson, 1953]

For what it is worth, SIMBAD includes 410 references between 1850 and 2016 and 197 references between 1985 and 2016.

Other Identifiers:

HR 8383, HD 208816, HIP 108317
R.A. (2000) : 21h 56m 39.1s
DEC. (2000) : +63d 37m 32.01s
Distance : 4900 light years
Diameter (solar dimeters) : 1000 -1800
Epoch: JD 2,435,931.4 Period : 7430.5 days/(20.34 years)
Ingress/Egress : based on 1998 eclipse 84 /99 days
Totality : 467 days (from 1998 eclipse)373 days (Pollmann)
Duration : 650 days (from 1998 data), 673 days (Pollmann)

Ernst Pollmann offers these dates/times for expected events:

Next eclipse timing:

T1	04 August	2017	JD 2,457,970
T2	27 October	2017	JD 2,458,054
T0- Mid	01 June	2018	JD 2,458,288
T3	06 February	2019	JD 2,458,521
T4	16 May	2019	JD 2,458,620

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PIs:

Ernst Pollmann, Leverkusen, Germany, ernestospec@hotmail.de
Philip D. Bennett, Halifax, Canada, pbennett@ap.smu.ca