

Observing DL Vir (HD 120901) with the VLT

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Scientific motivation

- **object** DL Vir, a system with a cool primary (K0III) and a hot binary as companion (A1). Parsons et al. (Astronomical Journal 127, 2004) have studied it with photometric measurements and spectra, and suspect that it is a triple system.
- **the reason** obtain interferometric measurements to calculate the separation, flux ratio and position angle.
- **and the BIG reason** Armstrong et al. (Astronomical Journal 131,2006) have been able to determine the inclination of the orbit of a binary measuring many points in its visual orbit with NPOI. Combining this data with the radial velocities they have determined the masses of the stars.

Model parameters

Model estimations for HD 120901

K	H	V	a1+a2 (mas)	b1+b2 (mas)	period (years)	flux ratio
4.963	5.098	6.98	0.02	0.0002	6.25	0.8

GO ABORT HELP

User-Provided Model... Query CDS by Name... Proceed to Observational Setup

Enter Source Info:

Source name: HD_120901

RA 2000: 13:52:38.8080

DEC 2000: -18:42:32.441

Relevant object photometry for instrument AMBER:

Mag. K: 4.9629998207092

Mag. H (for Finito): 4.9000000953674

Mag. V (for Adaptive Optics): 6.9800000190735

Choose a Parametric Model for the Source

Number of Functions: 2 Choices

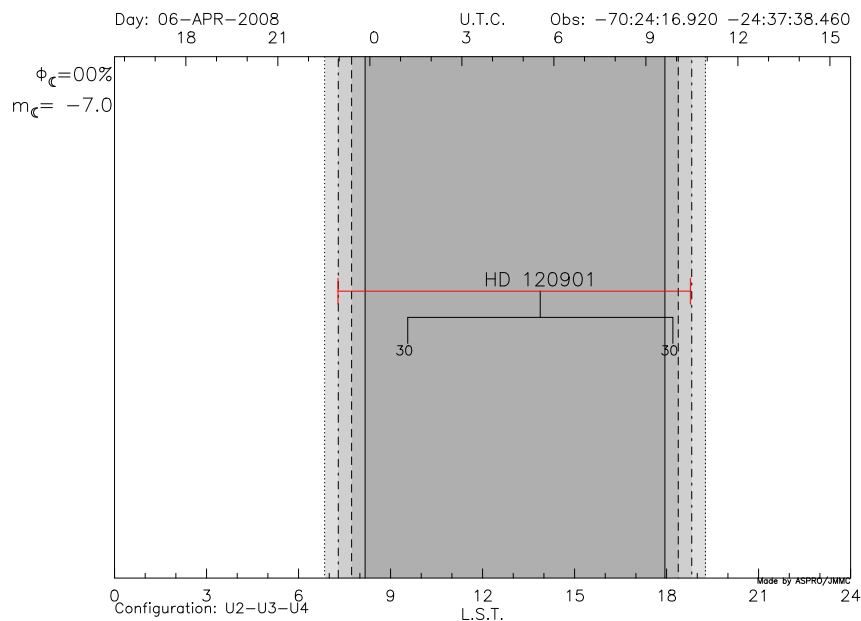
Function 1: POINT Choices

Parameters: 0 0 0.44999998807907 0 0 0

Function 2: BINARY Choices

Parameters: 0 0.01999999952965 0.55000001192093 1 1.9999999494758E-04 45

Observing proposal



- Instrument: AMBER
- Low resolution, 25 ms
- Visitors mode, H, J, K
- Baseline
 - U2-U3-U4 (H.A. -4 to 0)
 - U1-U2-U3 (H.A. 0 to 4)
- Date
 - 06/04/2008
 - 06/04/2009

Calibrator: HD 120452_M04

Angular distance to the science object 0.9 deg

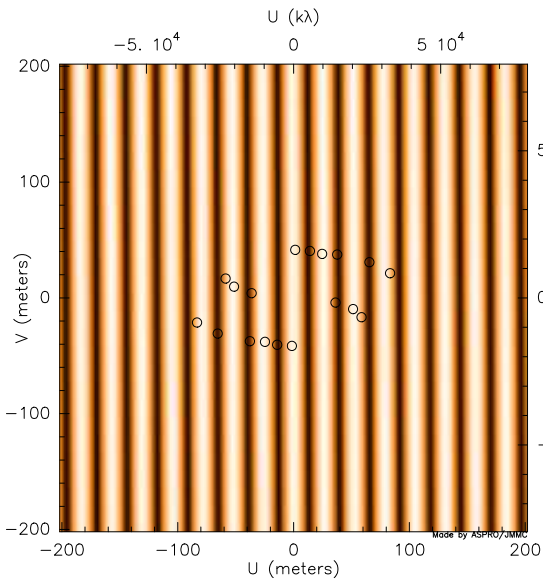
Spectral type K0III

No shadowing, delay lines available

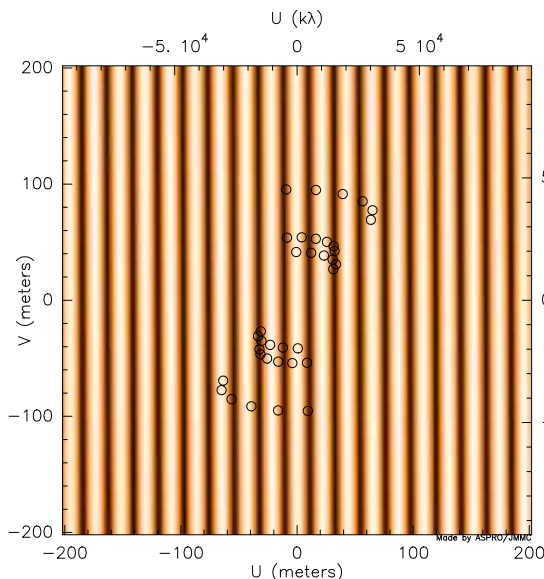
UV coverage

U2-U3-U4

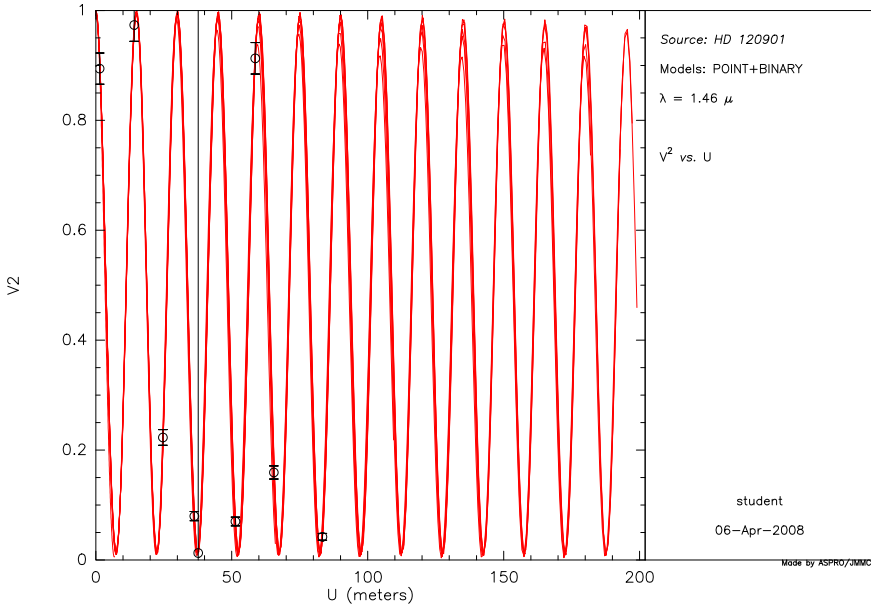
U1-U2-U3



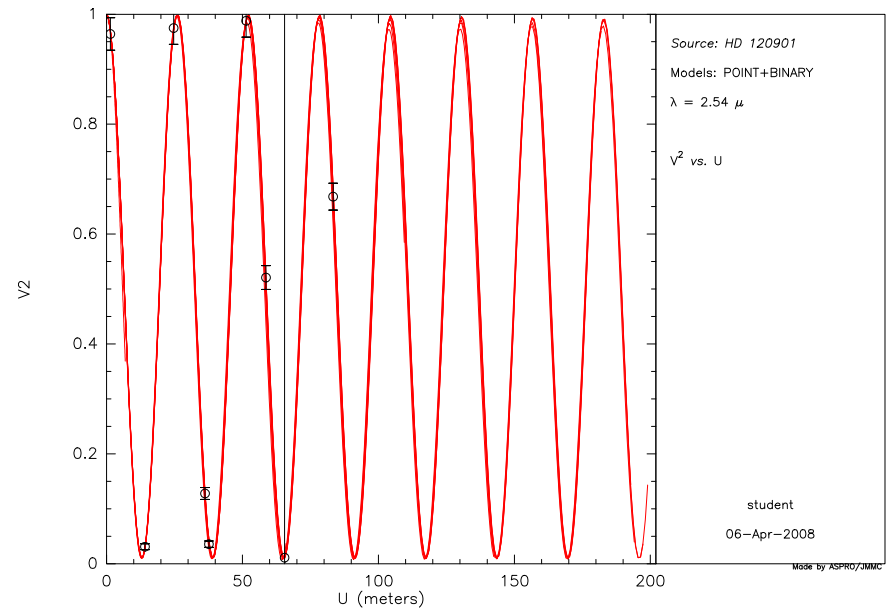
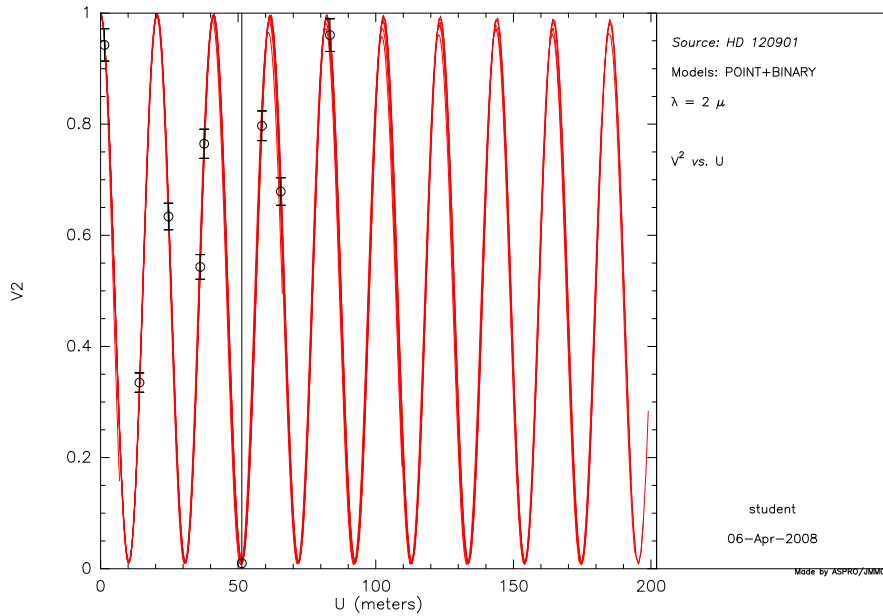
Wavelength 2.540 μ
Declination -18.8°
Models: POINT+BINARY
Source: HD 120901
Config: UT/AMBER/Low/25ms

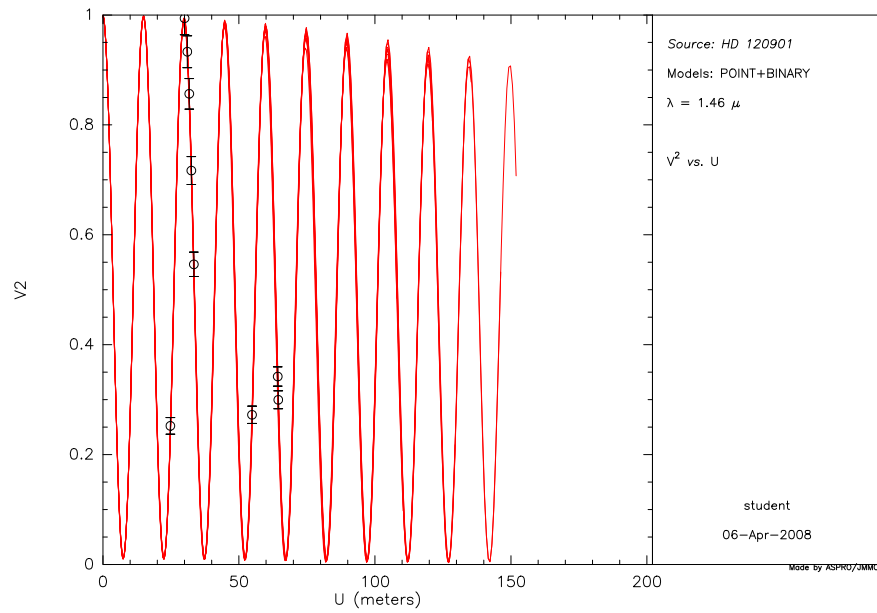


Wavelength 2.108 μ
Declination -18.8°
Models: POINT+BINARY
Source: HD 120901
Config: UT/AMBER/Low/25ms

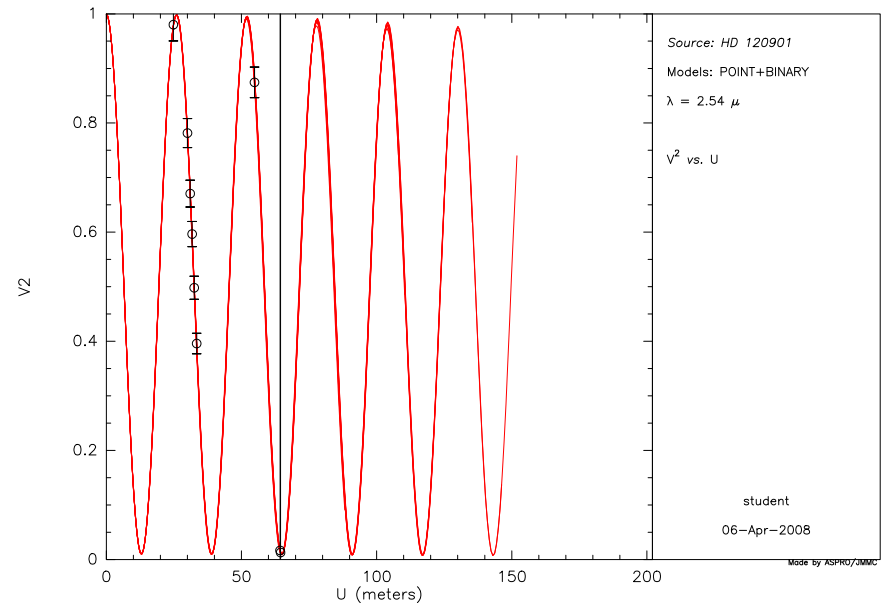
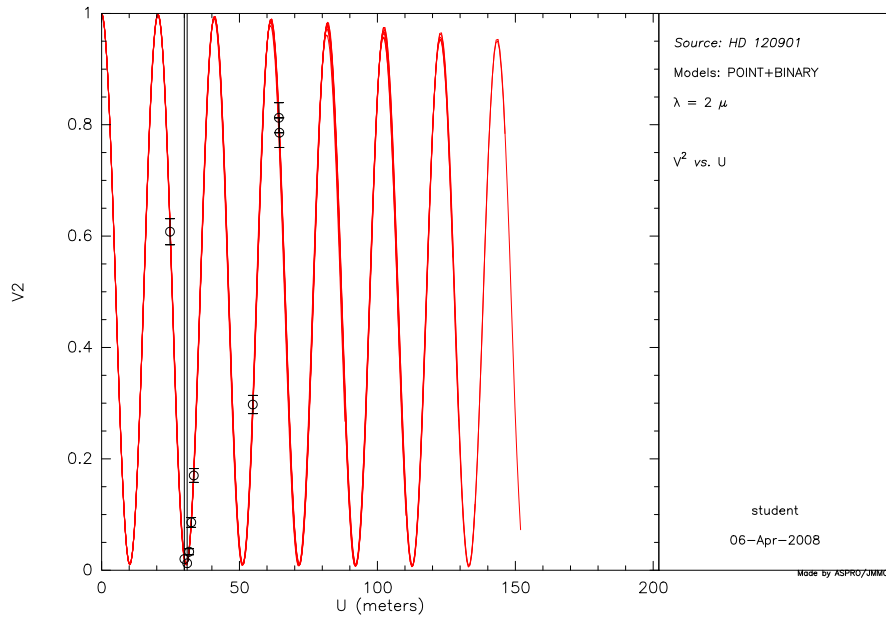


Modeled visibility: U2-U3-U4





Modeled visibility: U1-U2-U3



Measurements and outcome

- From the interferometric measurements we obtain the flux ratio, the separation and the position angle
- We take measurements two different nights to have an estimate of the visual orbit
- But....probably 2 points are not enough to fit a model to obtain the inclination $\sin (i)$
- In case the visual orbit could be constraint to calculate $\sin (i)$, combining that data with the spectroscopic radial velocities and using Kepler's third law:

$$(M_1+M_2) 2\pi G \sin^3 (i) = P(v_{r1} + v_{r2})^3$$



it would be possible to calculate the mass of each star.