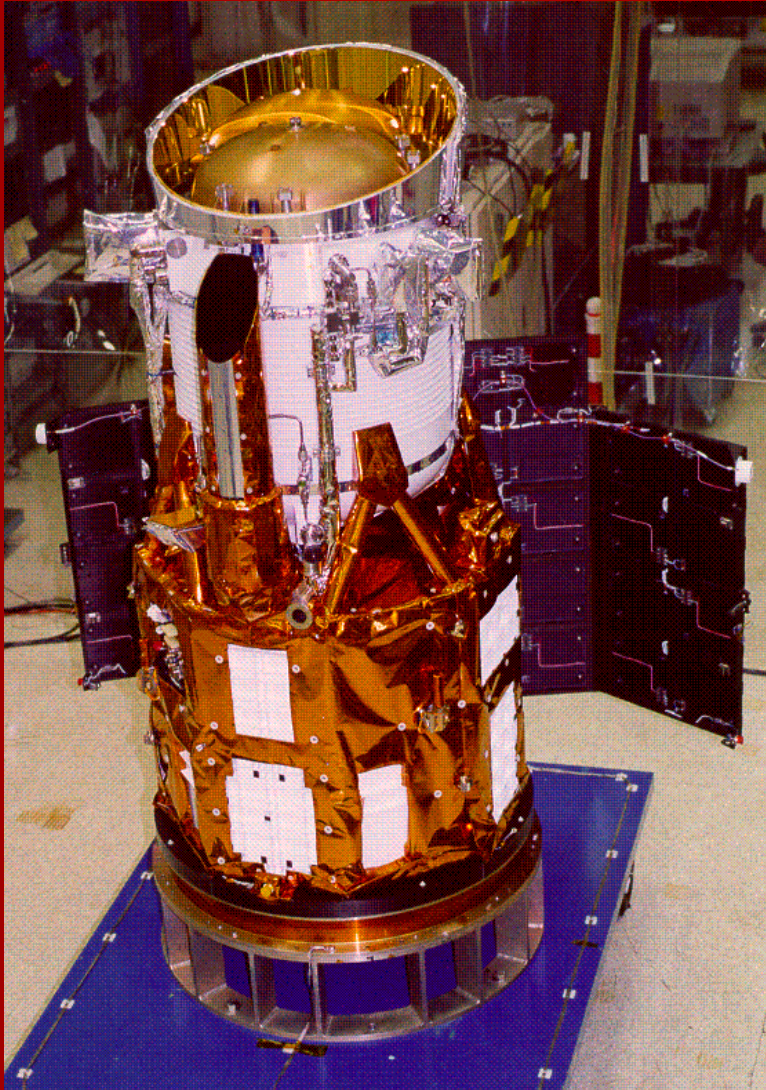


WIRE SATELLITE PHOTOMETRY OF ECLIPSING BINARY STARS

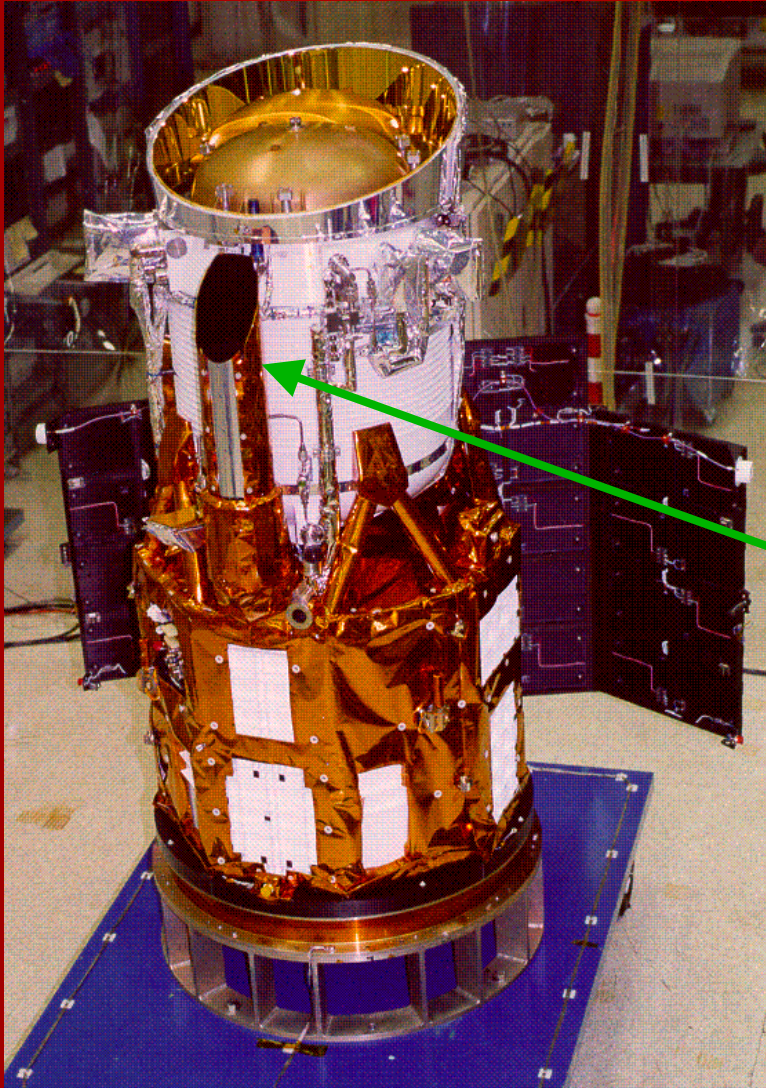


The WIRE satellite



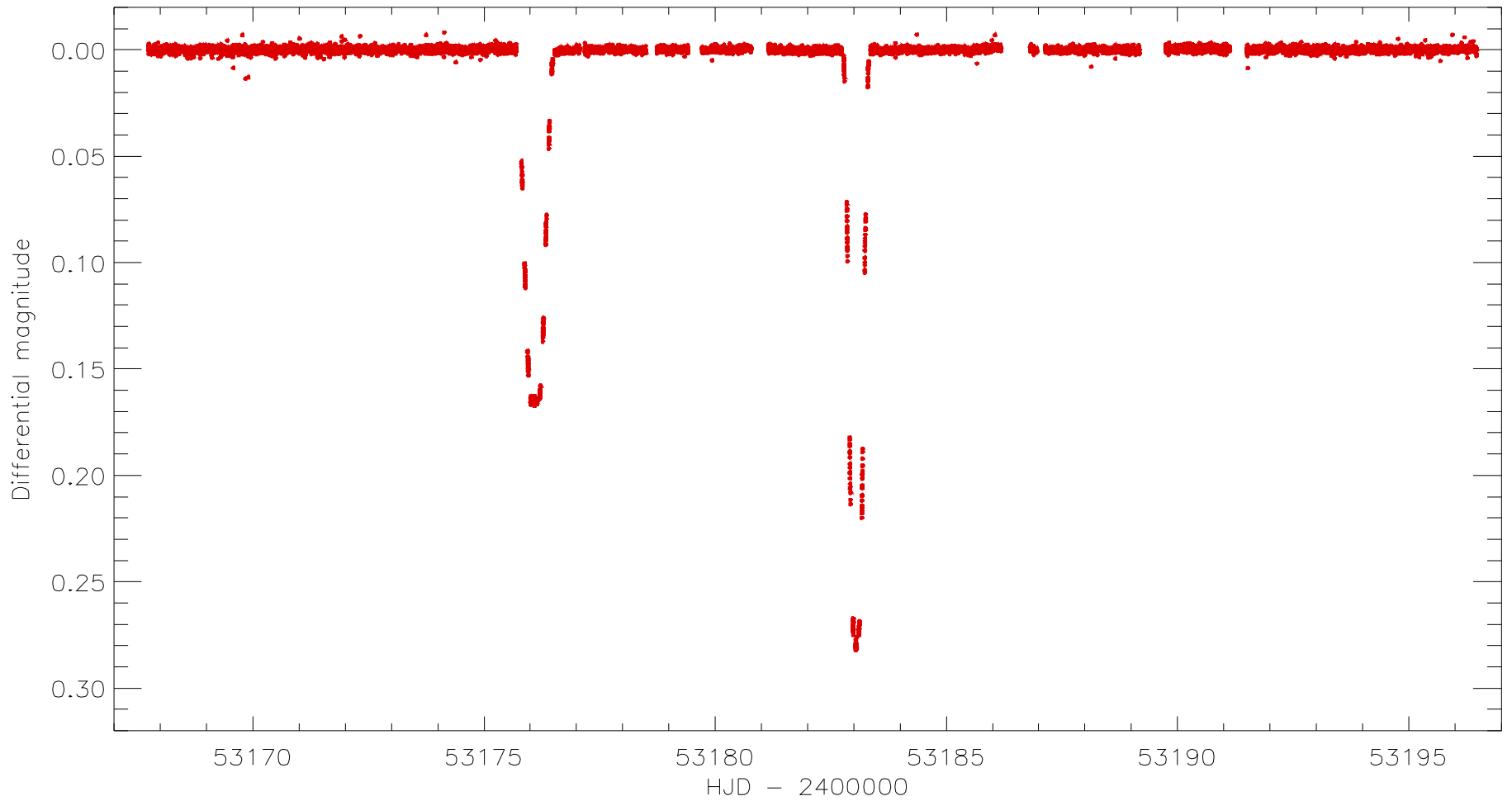
- Launched in 1999 for an IR galaxy survey
 - electronics problem caused loss of coolant

The WIRE satellite



- Launched in 1999 for an IR galaxy survey
 - electronics problem caused loss of coolant
- Star tracker used since 1999 as a high-speed photometer
 - aperture: 5 cm
 - cadence: 2 Hz
 - 5 targets at once

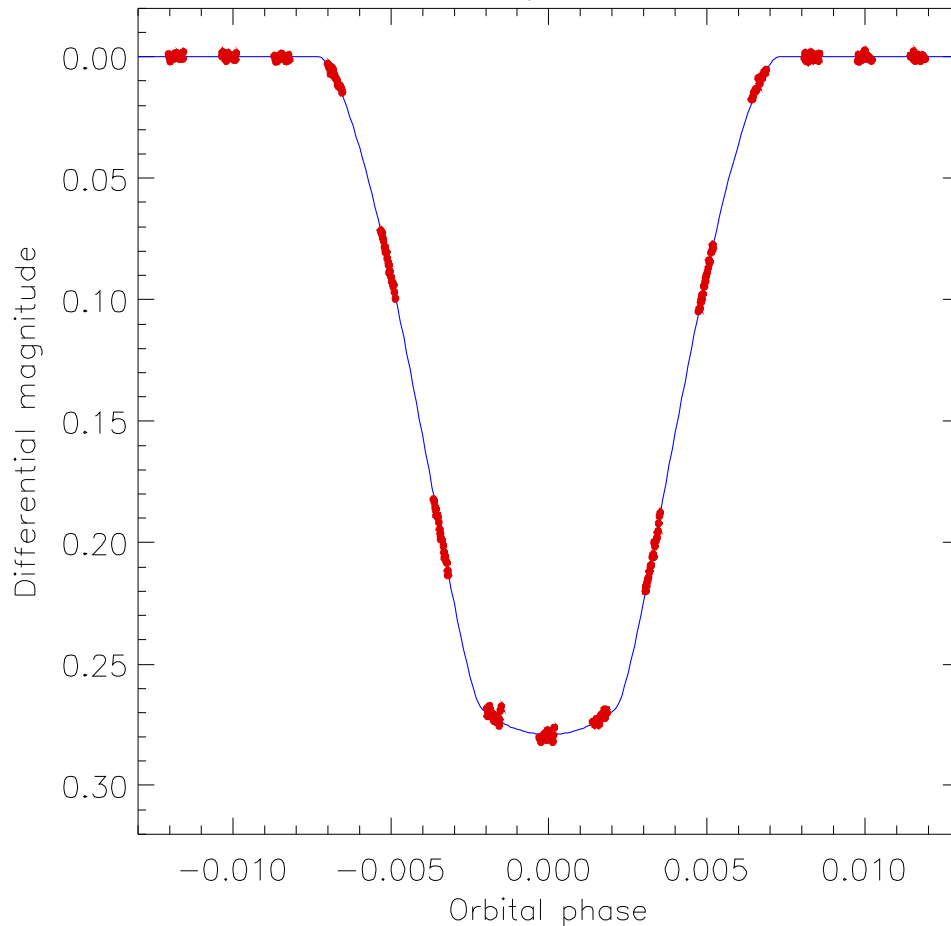
Eclipsing binaries with WIRE: ψ Centauri



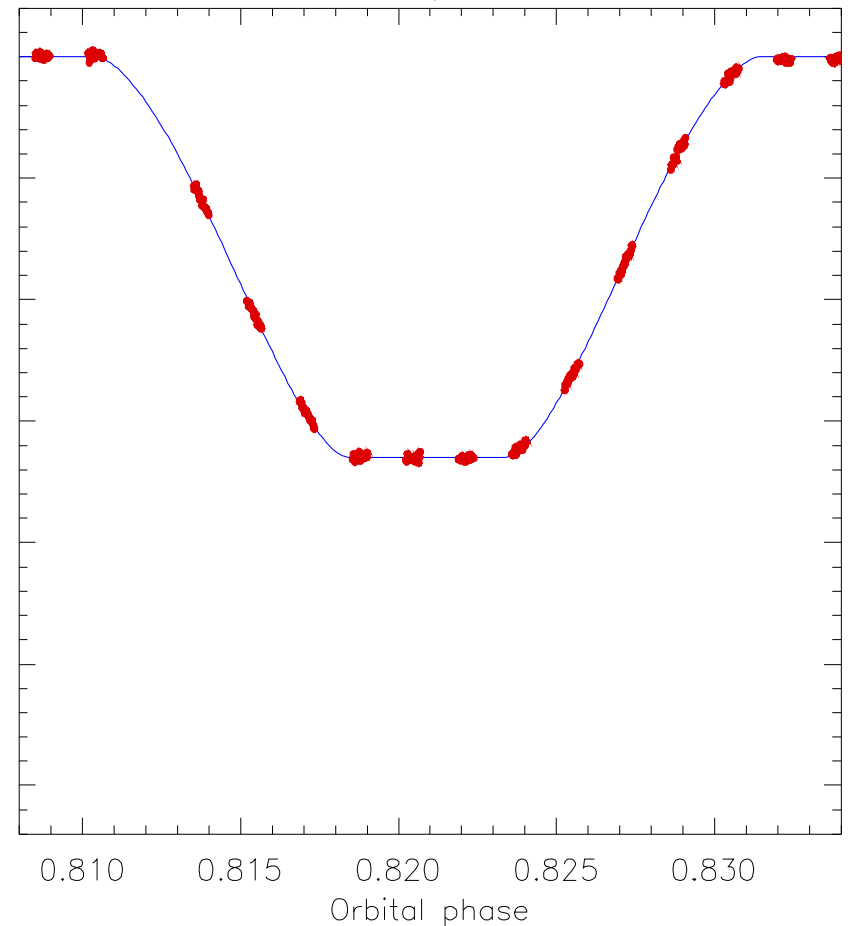
- $V = 4.0$ spectral type = B9 V + A2 V
- Previously known to be a spectroscopic binary
- WIRE light curve: 41 000 points with 2 mmag scatter

Eclipsing binaries with WIRE: ψ Centauri

Primary eclipse

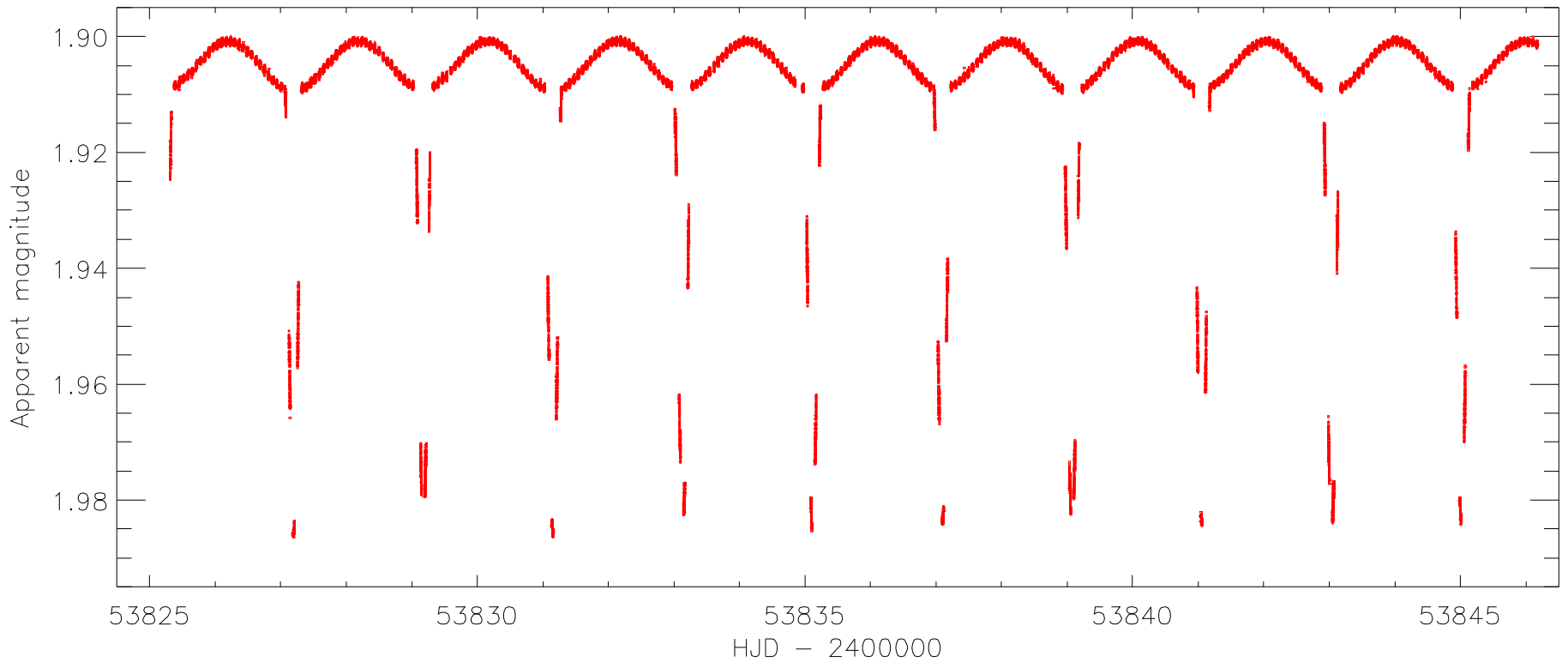


Secondary eclipse



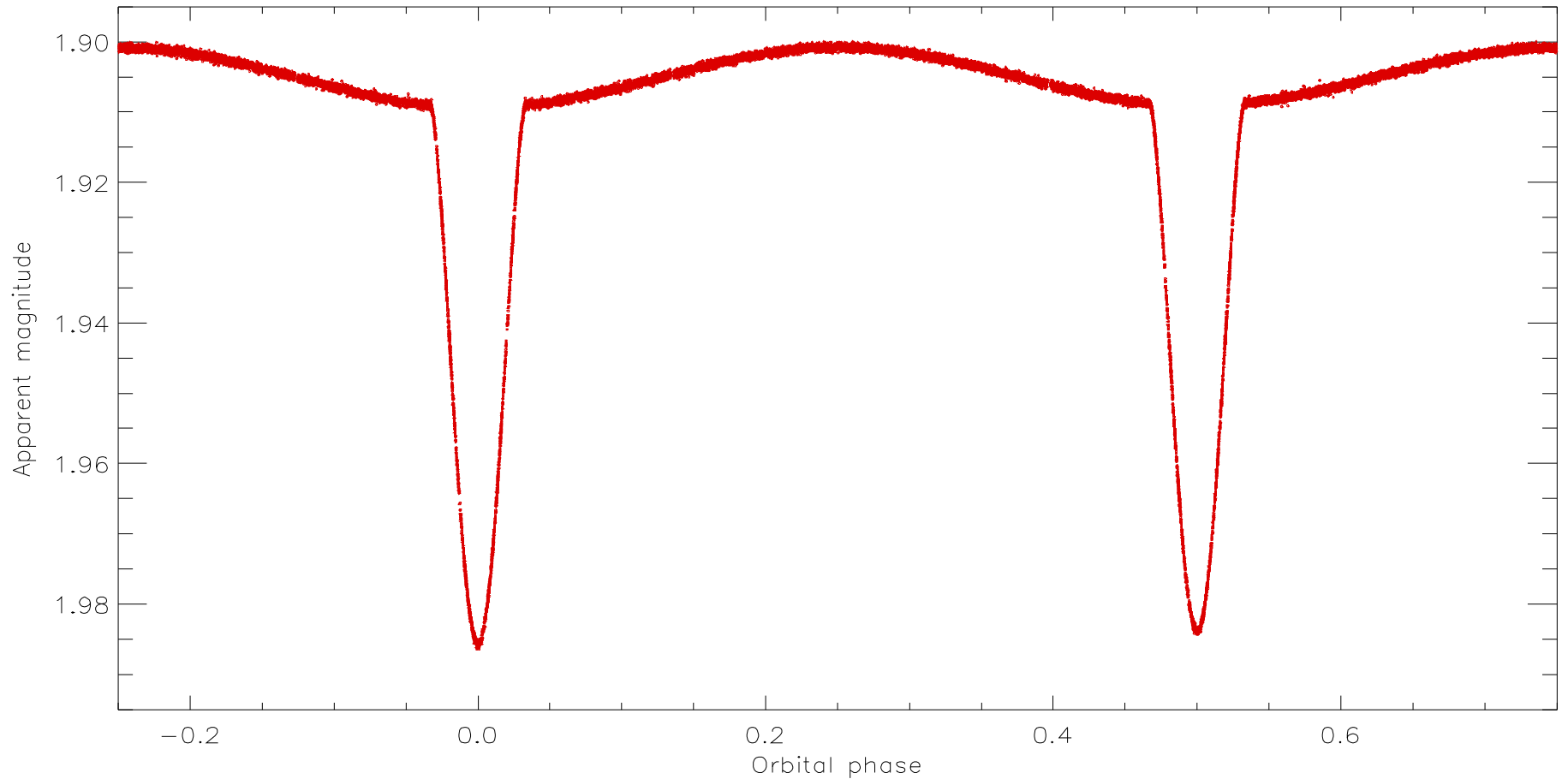
- Orbital period = 38.8 days
 - Light curve fitted with JKTEBOP: fractional radii to 0.1%
 - See Bruntt et al., 2006, A&A, 456, 651
- Total eclipses

Eclipsing binaries with WIRE: β Aurigae



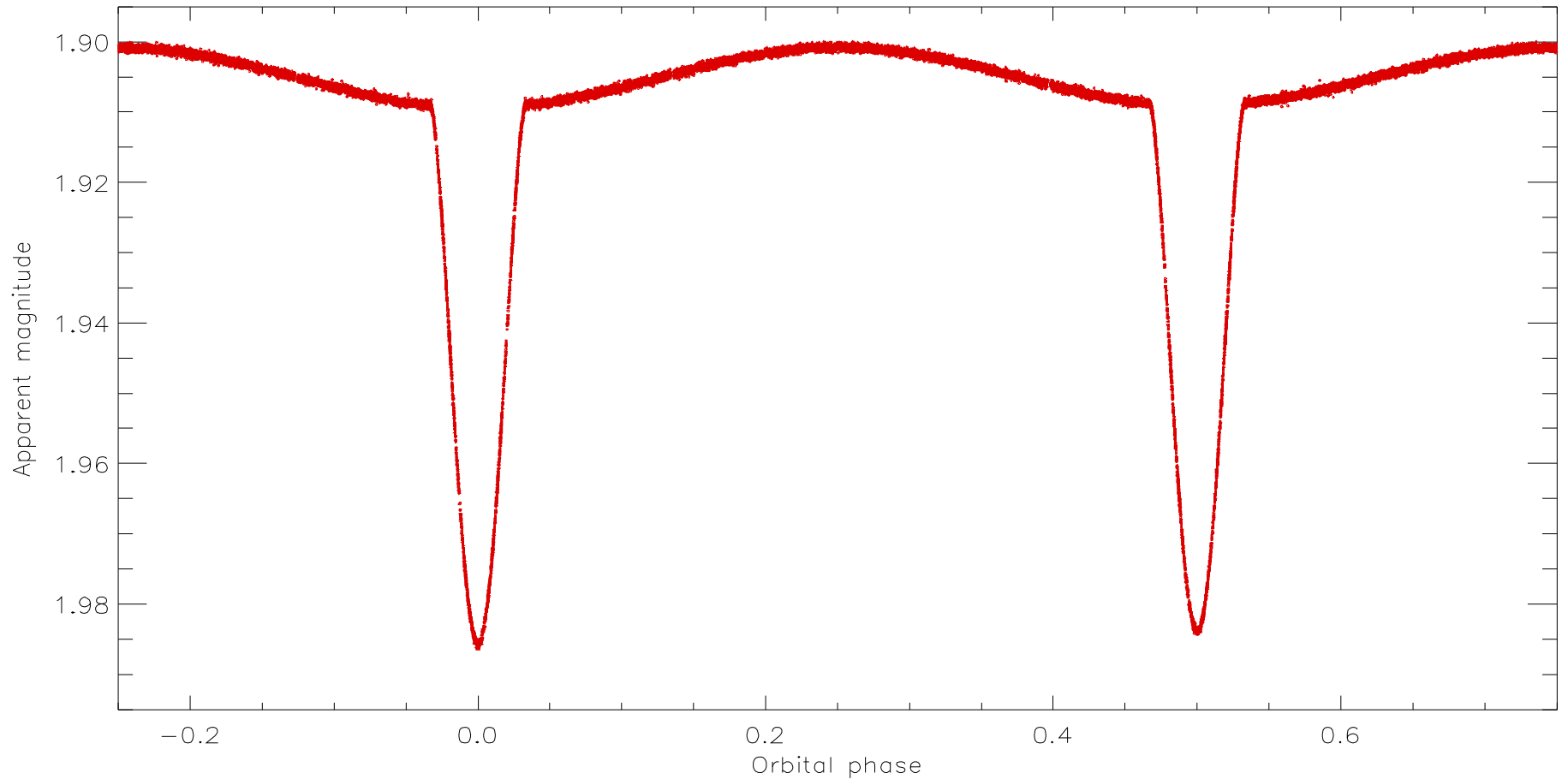
- $V = 1.9$ Orbital period = 3.960 days
- Spectral type = A1m + A1m
- Eclipses discovered in 1911
- WIRE light curve: 30 000 points with 0.3 mmag scatter

Eclipsing binaries with WIRE: β Aurigae



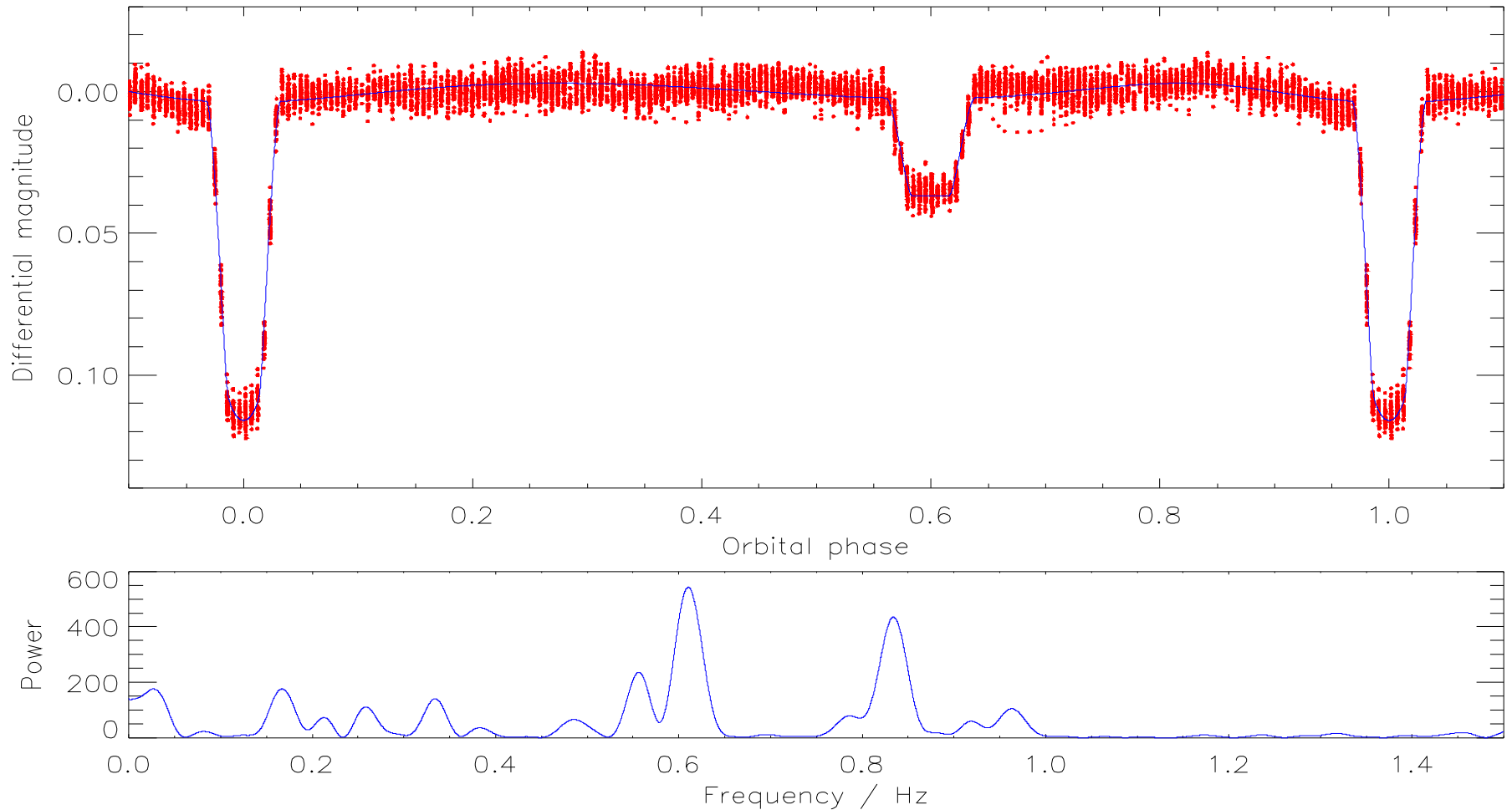
- JKTEBOP fit (nonlinear LD): (r_1+r_2) to 0.1%
 r_1 and r_2 to 5 %
- Add in spectroscopic light ratio: r_1 and r_2 to 0.5%

Eclipsing binaries with WIRE: β Aurigae



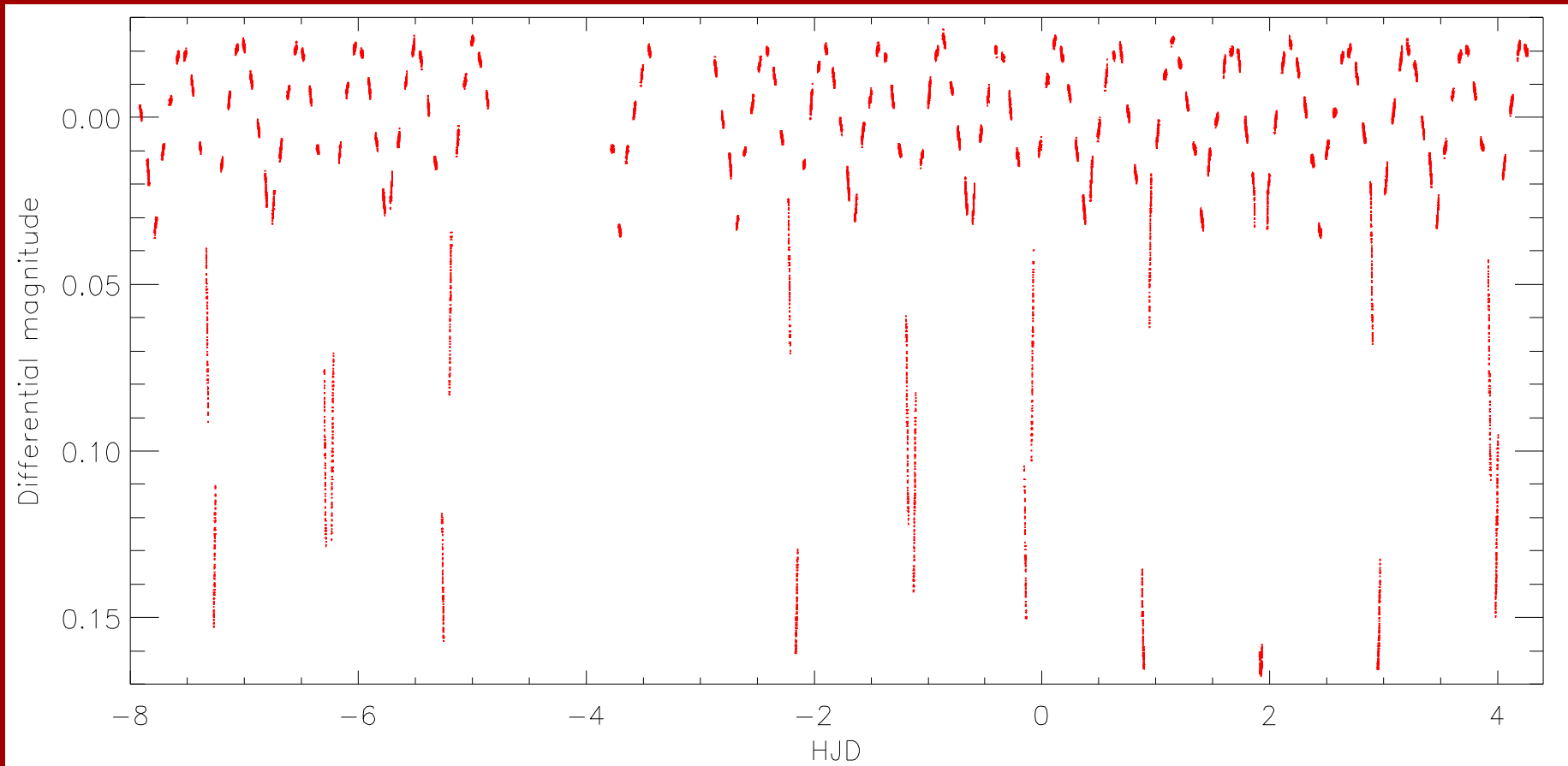
- $M_1 = 2.376 \pm 0.027 M$ $R_1 = 2.762 \pm 0.017 R$
- $M_2 = 2.291 \pm 0.027 M$ $R_2 = 2.568 \pm 0.017 R$
- Southworth et al., 2007, A&A, in press (astro-ph/0703634)

Eclipsing binaries with WIRE: AR Cas



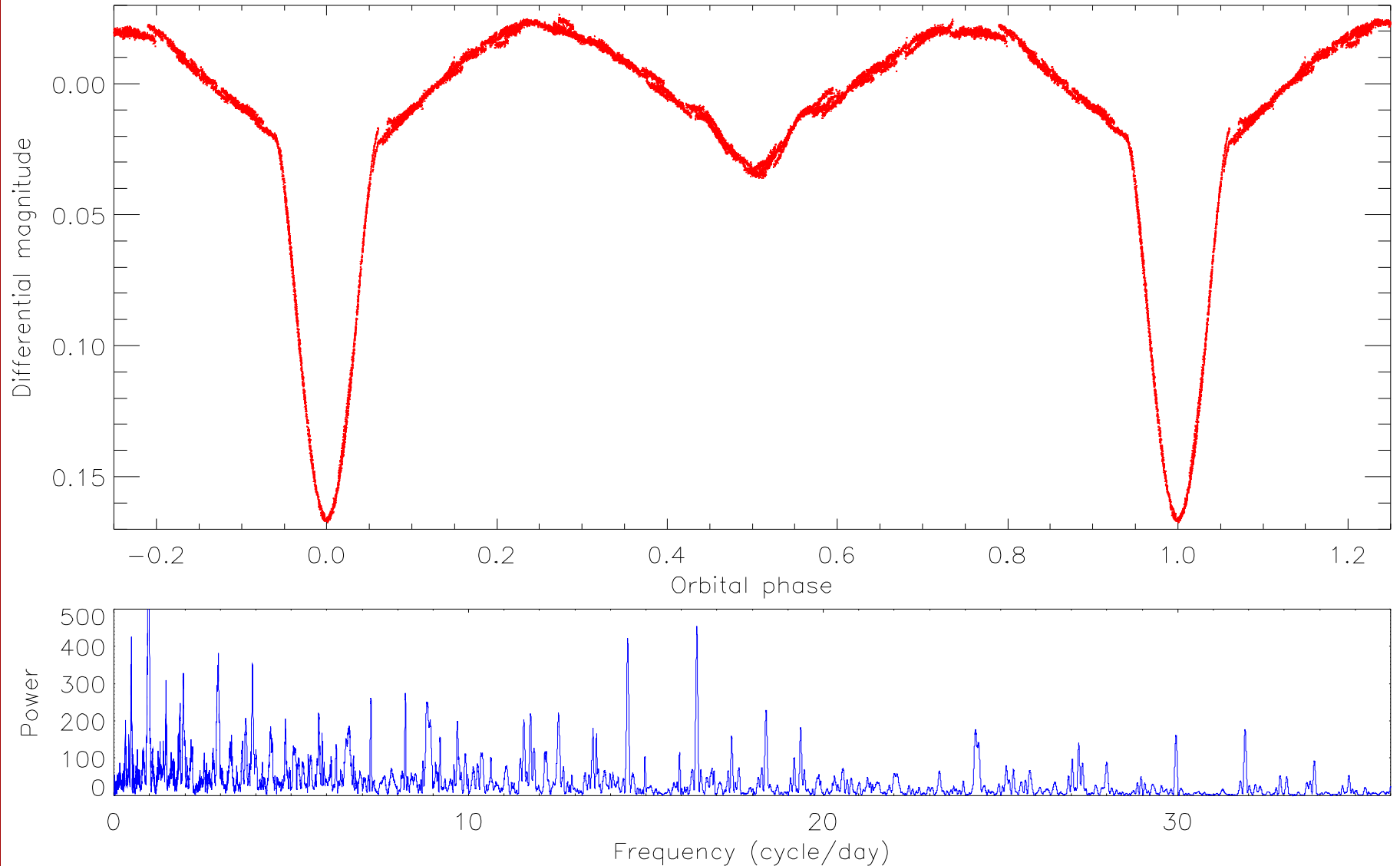
- Period = 6.07 days B4 V + A6 V V = 4.9
- Light curve contains 2 mmag variation at primary star rotation period and several pulsation frequencies

Eclipsing binaries with WIRE: δ Cap



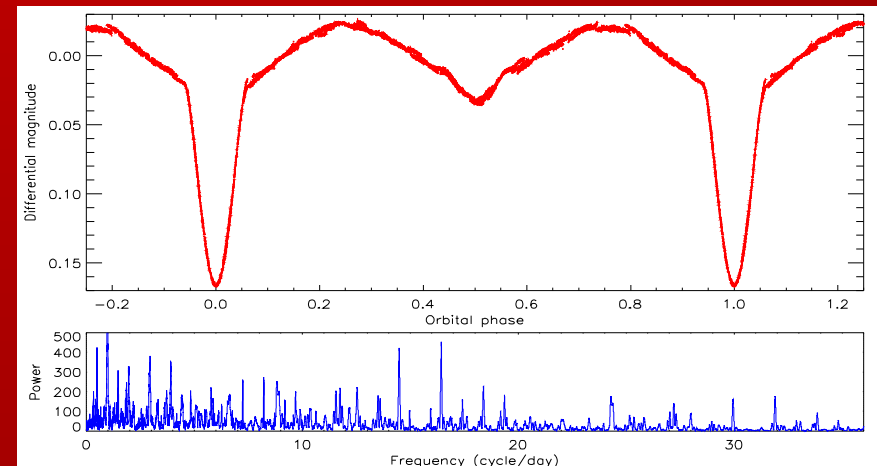
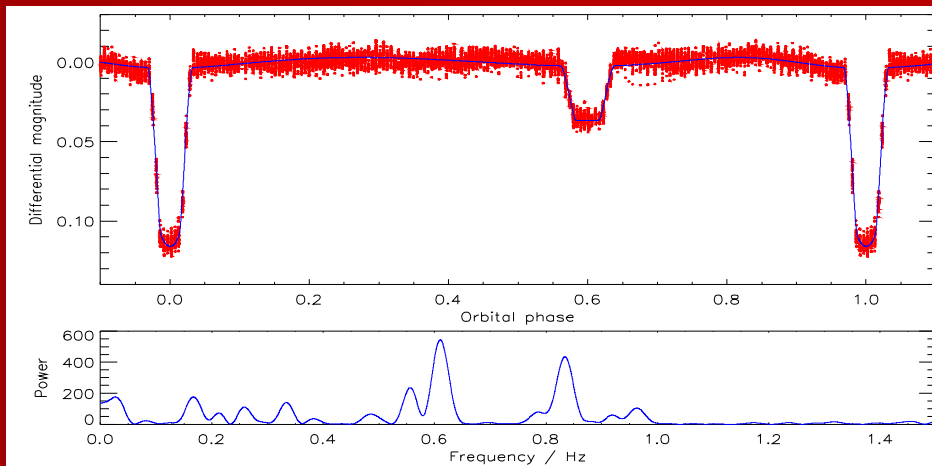
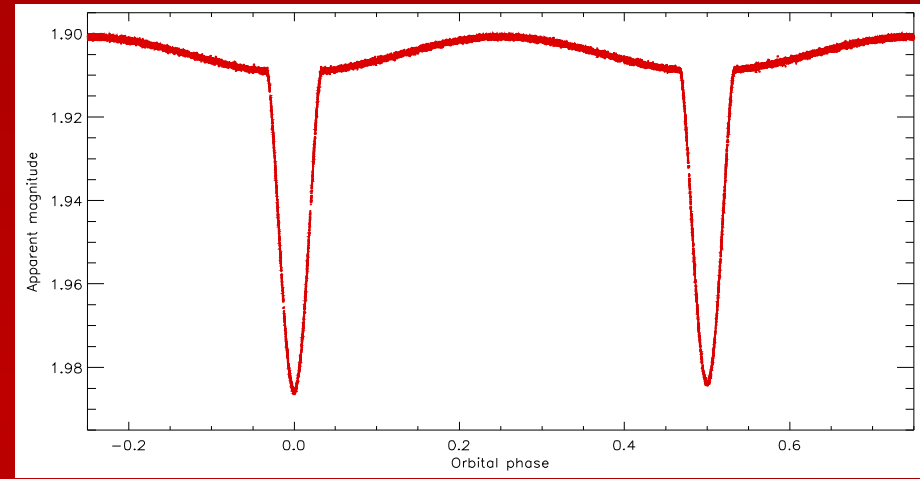
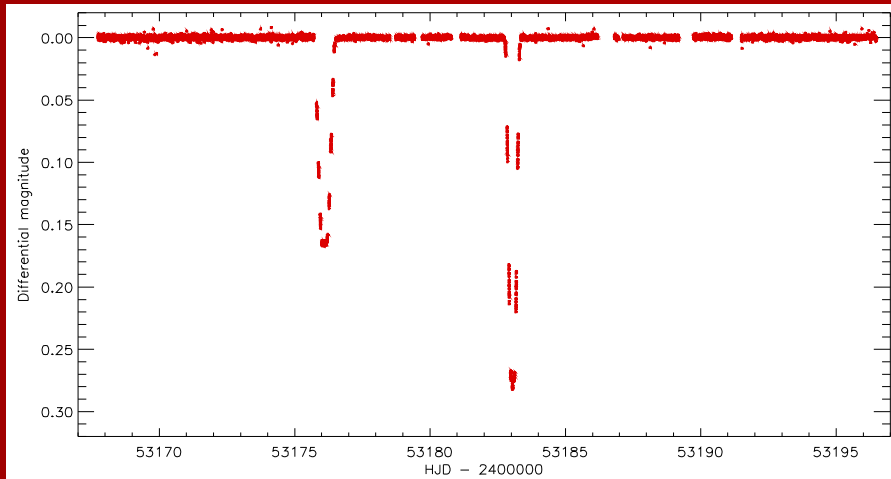
- $V = 2.9$ Orbital period = 1.02 days
- Spectral type = Am + F
- X-ray source: coronal activity?

Eclipsing binaries with WIRE: δ Cap



- Primary component is variable, perhaps a δ Scuti star

WIRE satellite photometry of eclipsing binary stars



John Southworth

Hans Bruntt

Derek L Buzasi

- 
- John Southworth
 - University of Warwick
 - j.k.taylor@warwick.ac.uk
 - <http://www.astro.keele.ac.uk/~jkt>