

Visual Orbits of Spectroscopic Binaries

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Observatoire







Y² models - Demarque et al. (2004)

Torres et al. (2010)



Science Background

• Interferometry

Measure fringe visibility variations Resolve visual orbit (VB)

 \rightarrow Inclination (*i*), angular size (α)

Spectroscopy

Measure radial velocities Fit spectroscopic orbit (SB2) $\rightarrow M_1 \sin^3 i, M_2 \sin^3 i, a \sin i$

Combined

 \rightarrow Masses (M_1, M_2), distance (d) Compare to stellar evolution models





Binary Sample

- 10 double-lined binaries
- Spectral types: 1 B star, 4 A stars, 5 F stars K = 3.2 - 6.1 ΔK ≈ 0.1 - 1.6 mag
- Orbits:
 - P = 7.6 50.4 days $a \approx 1.6 - 7.5 \text{ mas}$ e = 0.2 - 0.6



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Observations

- Spectroscopy APO 3.5m ARCES + CTIO 1.5m CHIRON echelle spectrographs
- Interferometry CHARA - CLIMB usually S1-W1-E1







Radial Velocities

















The CHARA/NPOI Science Meeting 2019





Some preliminary orbits...













Summary

- Combine spectroscopy & interferometry to measure the orbits of longer period binary systems.
- Determine fundamental stellar parameters to compare to stellar evolution models.
- SO FAR orbits for 6/10 systems... finish observations next semester!





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