



SFP Binary Star Program

CHARAS/SFP Wide Binary Group

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LESIA



Observatoire de la CÔTE d'AZUR

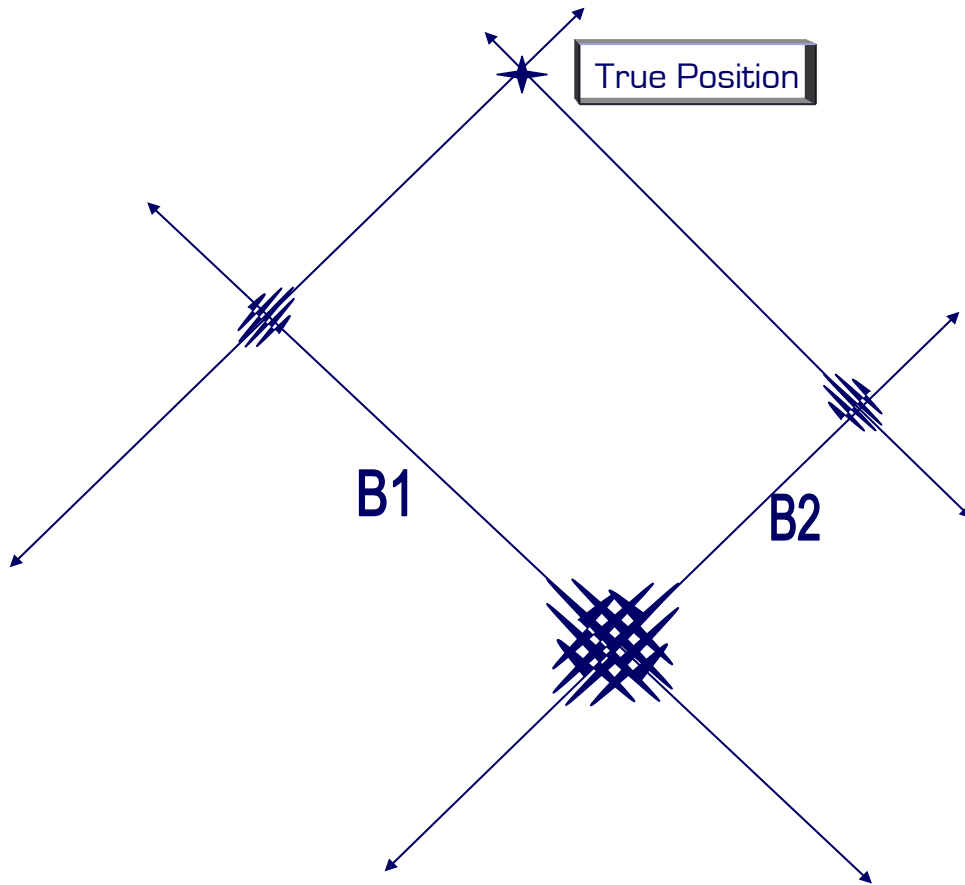


Organization

- SFP Lessons Learned
- Orbits
 - HR7272
 - HD16811
 - HD129132
 - HD157482
 - Chi Draconis
 - HD 184467
 - HD 198084
- Calibrated Visibilities
- Future Direction

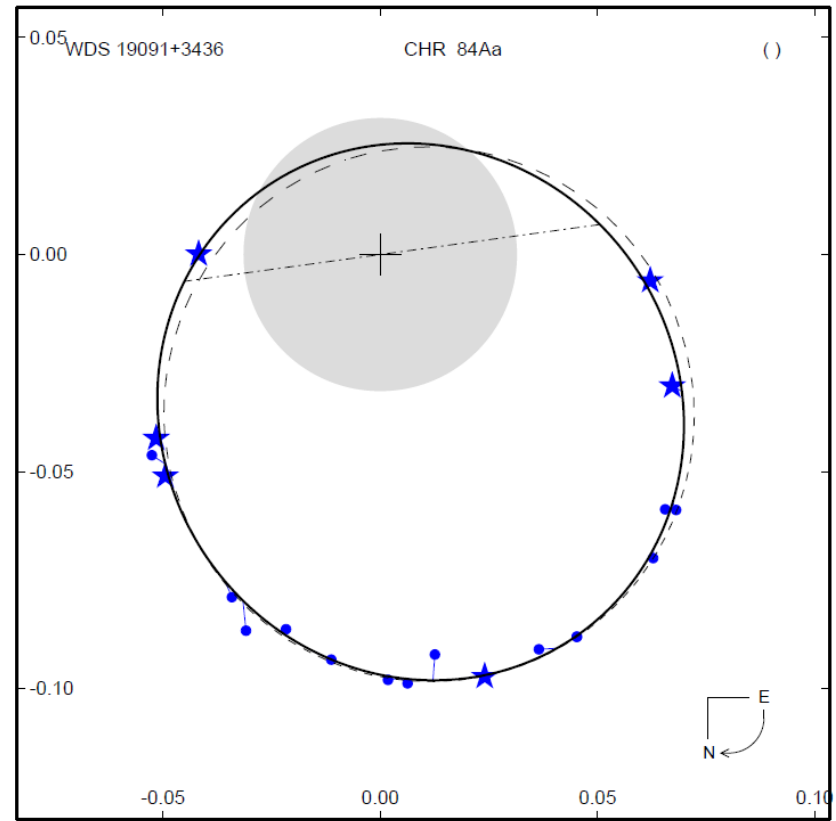


SFP Lessons Learned



Orbits

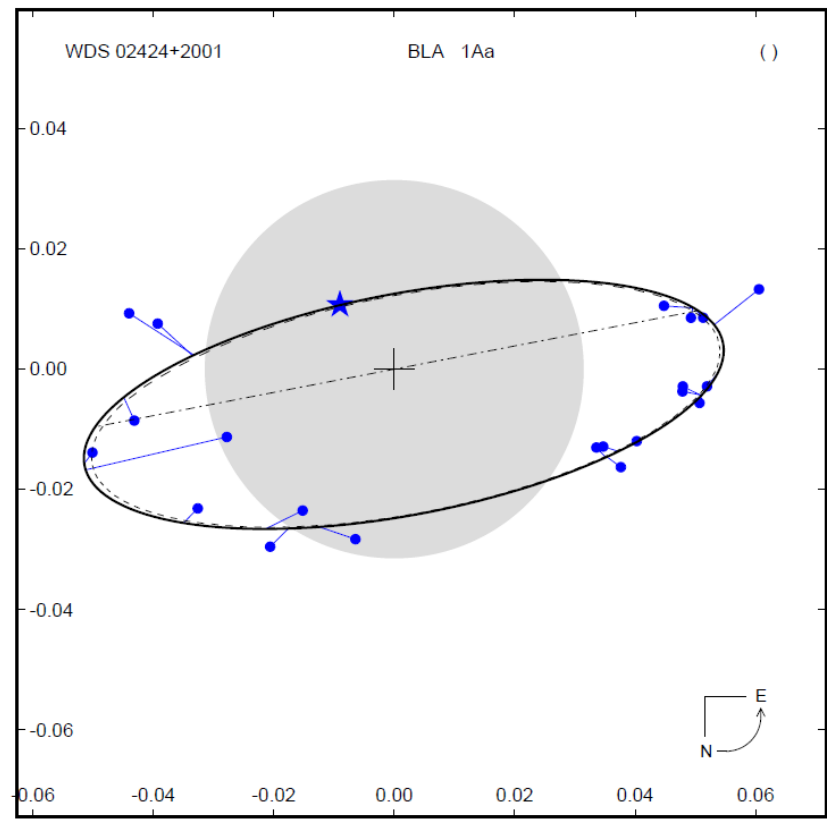
- HR 7272
 - G1V + G5V
 - Extrasolar planet host star
 - Period = 3.54 years
 - Dashed line, previous orbit (Hartkopf 2000)
 - Should be entering NW quadrant this fall
 - Simultaneous visual/spectroscopic solution via Tokovinin software





Orbits

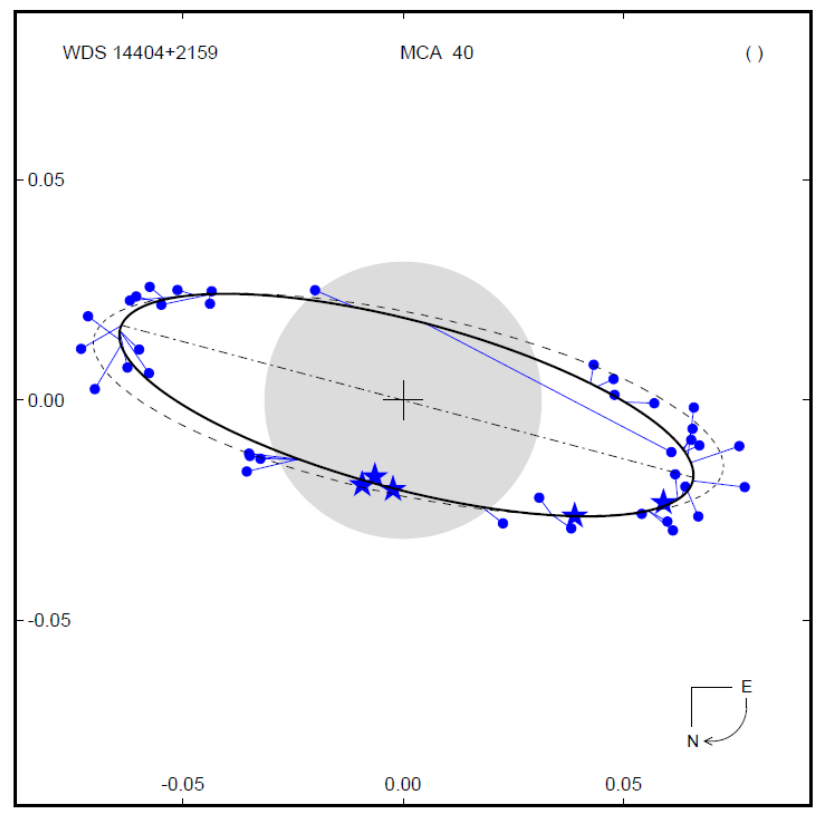
- HD 16811
 - Slow moving interferometric pair
 - Spectral type A0V
 - Disk represents a 4m mirror resolution limit for speckle interferometry
 - Period = 8.8 years
 - One observation per cycle necessary





Orbits

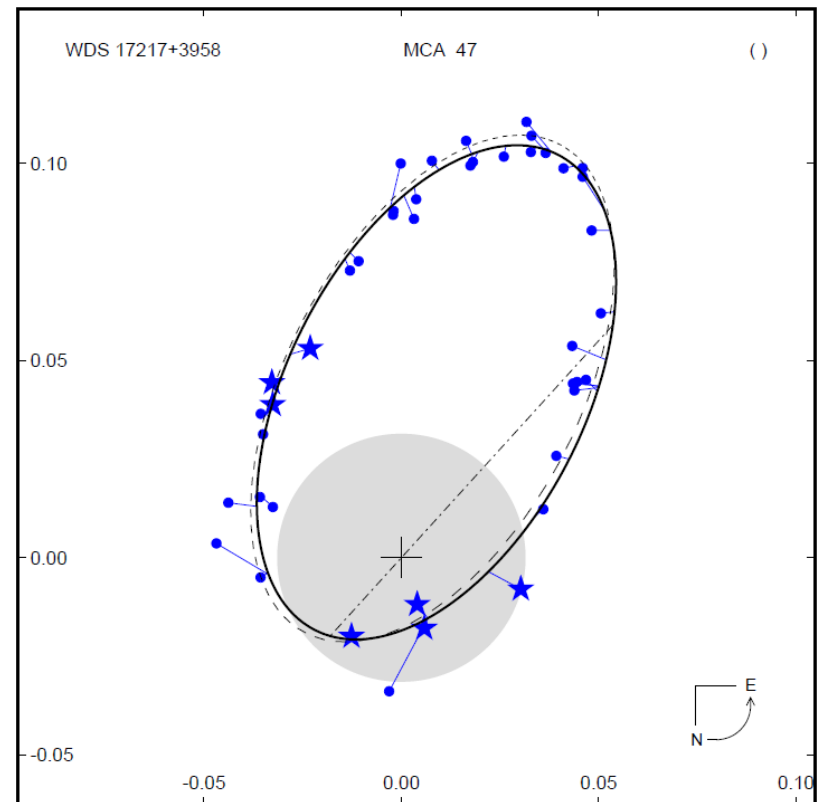
- HD 129132
 - Visual/Spectroscopic Triple
 - $a_{\text{inner}} = 7.05 \text{ mas}$
 - $a_{\text{outer}} = 67.3 \text{ mas}$
 - $P = 9.15 \text{ years}$
 - 2010: outside the 4m circle, in the large gap in the NW
 - Another prime target for continued observation





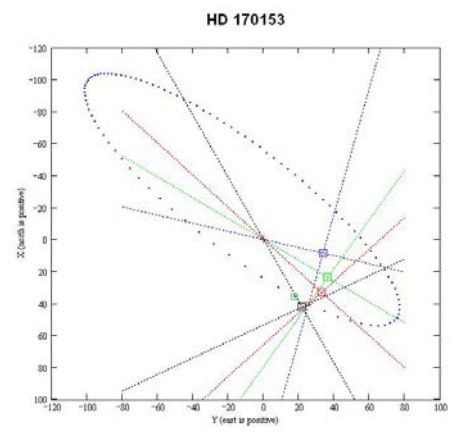
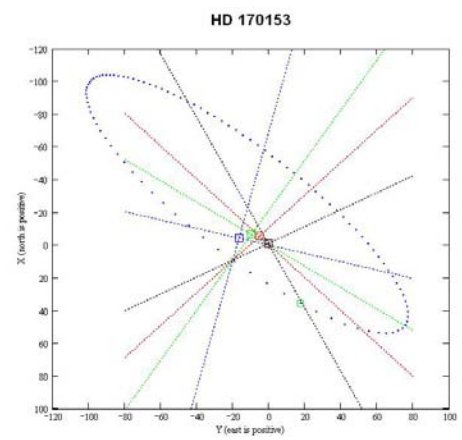
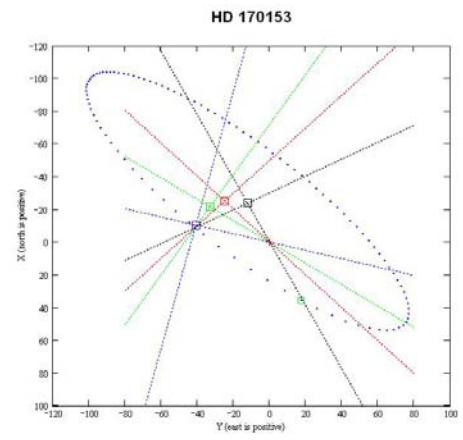
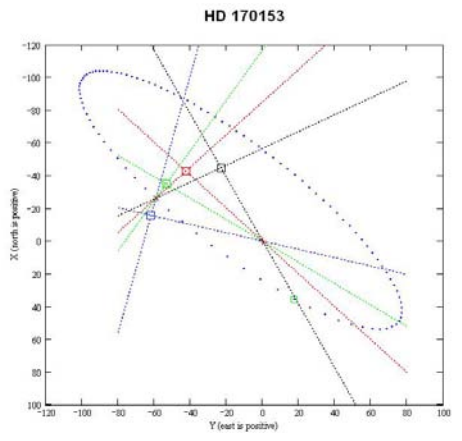
Orbits

- HD 157482
 - Another spectroscopic triple
 - $P = 5.52$ years (outer), 2.2 day (inner) Algol type
 - Observations in 2010 in the SE
 - 4 observations in 2008 in the north from May-August





χ Draconis



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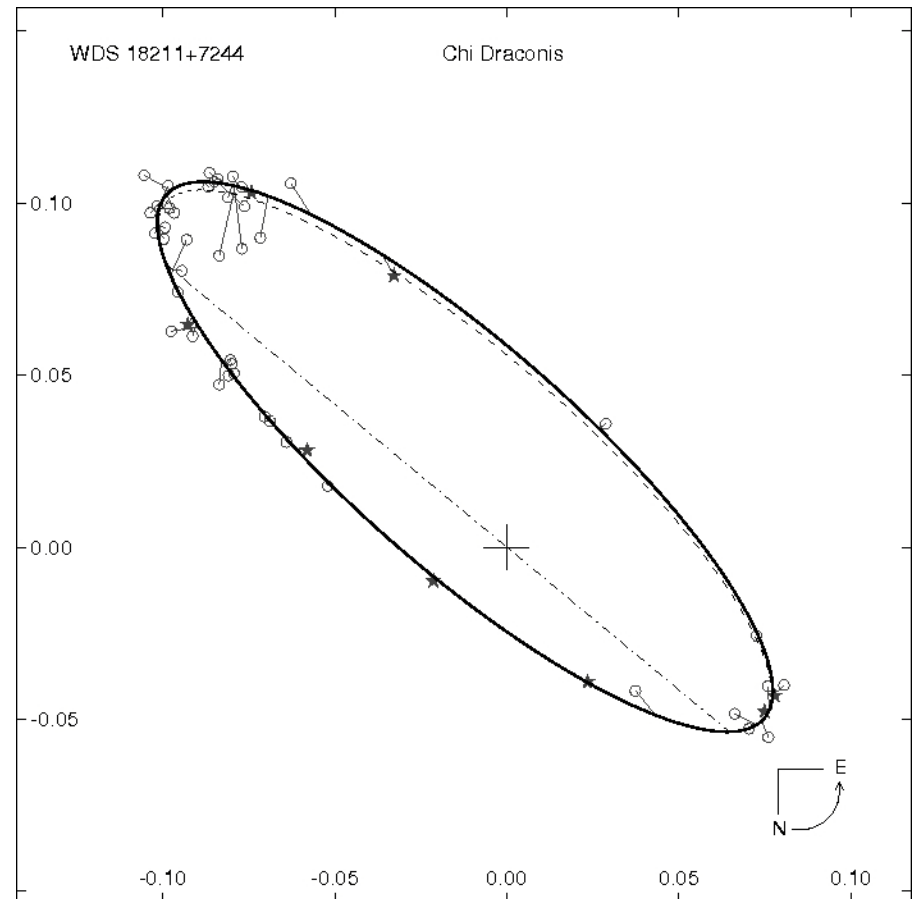


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χ Draconis

- χ Draconis
 - HD 170153
 - SB2 (F8IV-V + Late-G/Early-K dwarf)
 - Period = 281 days
 - During May 2009, the secondary traversed 130 degrees in 4 weeks
 - The 5 data points on the north side of the orbit all from May/June 2009





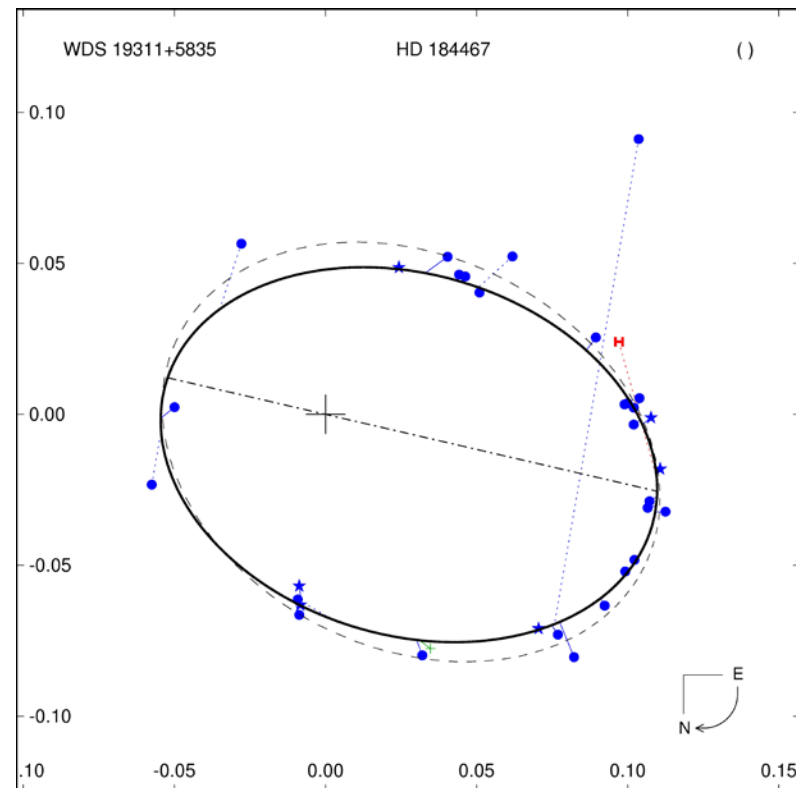
χ Draconis

Element	CHARA (2009)	Pourbaix(2000)
P (days)	280.53 ± 0.022	280.58 ± 0.062
To (BY)	1984.83239 ± 0.0026	1984.835 ± 0.00150
a (mas)	124.4 ± 1.1	123.0 ± 0.0012
e	0.428 ± 0.012	0.414 ± 0.008
i (°)	74.42 ± 0.58	74.8 ± 0.79
ω (°)	119.3 ± 1.1	299.9 ± 0.97
Ω (°)	230.30 ± 0.51	50.5 ± 0.60
π_{orbital} (mas)	123.4 ± 1.9	124.11 ± 0.48 (Hip)
M_p (M_{\odot})	0.96 ± 0.03	1.03 ± 0.050
M_s (M_{\odot})	0.75 ± 0.03	0.73 ± 0.024



HD 184467

- SB2 (K2V + K4V?)
 - IAU velocity standard star until 1983
 - Dashed line is the previous orbit of Pourbaix(2000)
 - $P = 494.2$ days
 - 5 points on the orbit from 2005-2008





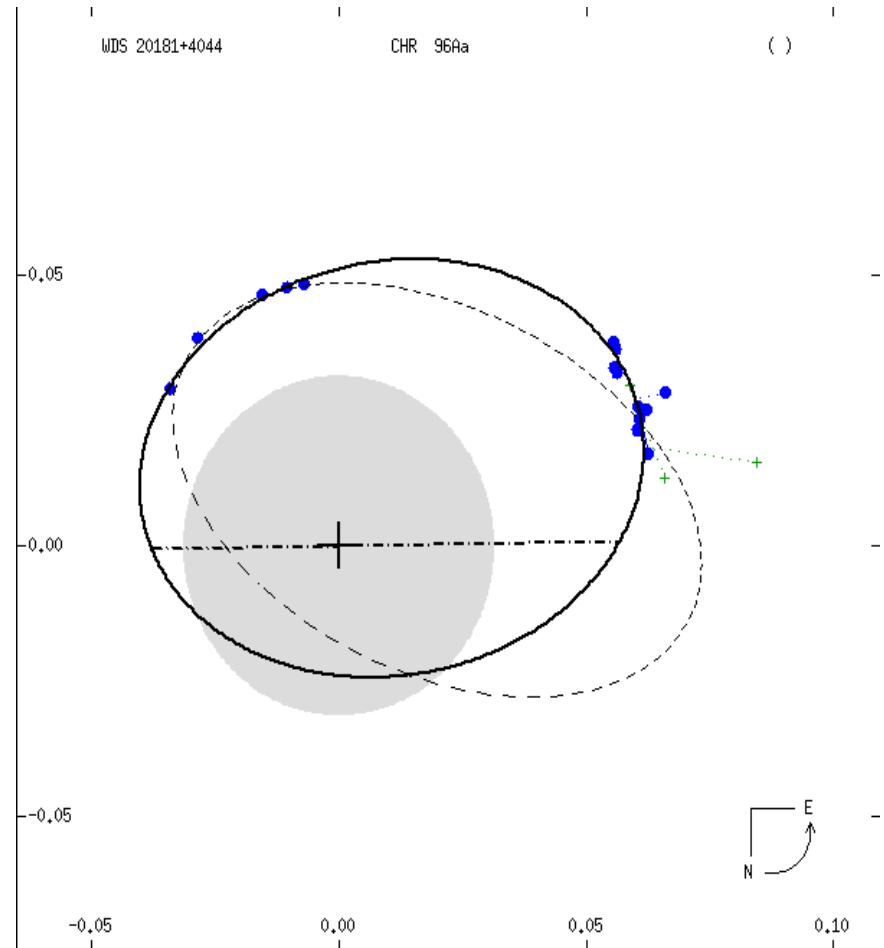
HD 184467

Element	Arenou (2000)	Pourbaix (2000)	CHARA (2009)
P (days)	494.75 ± 0.48	494.091 ± 0.26	494.16 ± 0.58
To (BY)	1992.0509 ± 0.00849	1985.2711 ± 0.00454	1986.6579 ± 0.02332
a (mas)	84.0 ± 3.0	86.0 ± 1.4	84.2 ± 0.84
e	0.340 ± 0.013	0.3600 ± 0.0078	0.371 ± 0.006
i (°)	144.6 ± 1.7	144 ± 2.4	144.0 ± 1.29
ω (°)	177.8 ± 2.1	356 ± 2.1	16.57 ± 4.1
Ω (°)	74.6 ± 6.8	243 ± 1.5	256.9 ± 2.66
π_{orbital} (mas)	59.84 ± 0.64 (HIP)		59.2 ± 2.04
M_p (M_{\odot})	0.83 ± 0.09	0.80 ± 0.15	0.82 ± 0.09
M_s (M_{\odot})	0.79 ± 0.09	0.80 ± 0.14	0.77 ± 0.09



CHARA 96 (HD 193322)

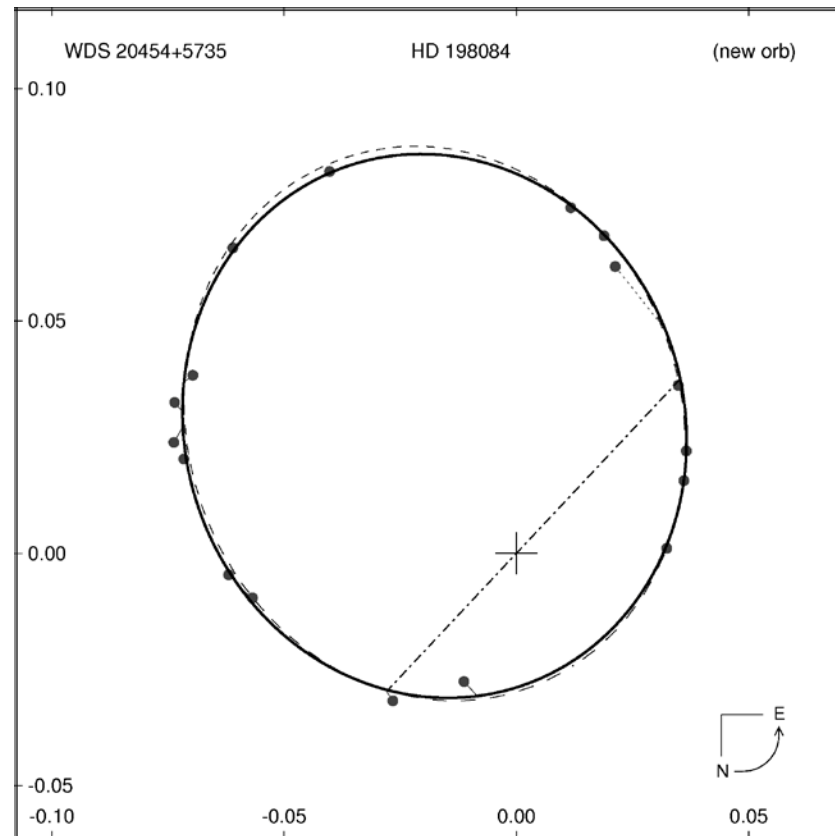
- Spectroscopic Triple (O stars)
- Outer astrometric orbit
- Approximately 30 year outer orbit
- Continued coverage in 2010 as the orbit progresses.





HD 198084

- HD 198084
 - Completely new visual orbit for this system
 - Period = 523.42 days
 - All data for this orbit from CHARA SFP Program
 - Pair of nearly equal F8IV-V stars





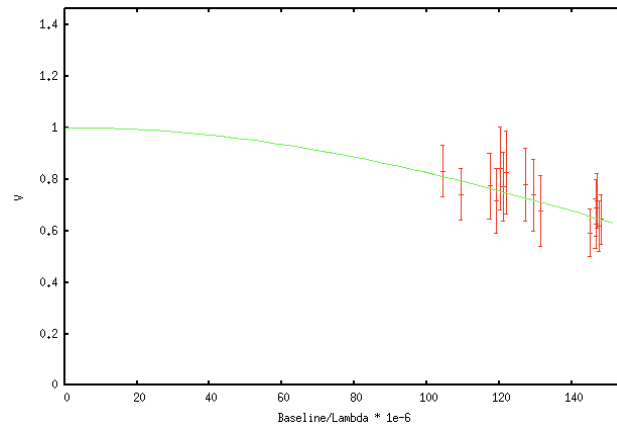
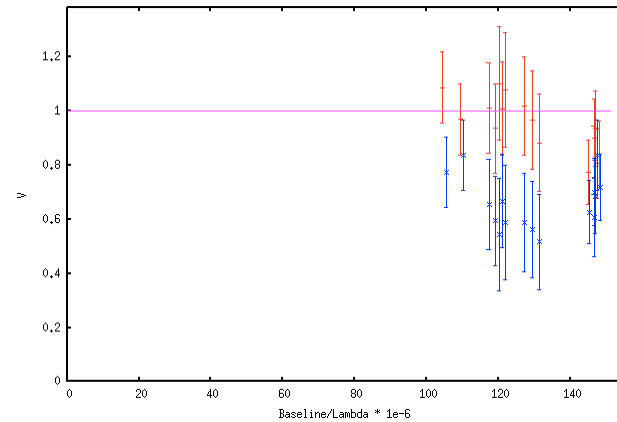
HD 198084

Element	Visual only (2009)	Vis-Spec (2010)
P (days)	522.596 ± 0.591	523.4192 ± 0.1010
To (BY)	1996.354 ± 0.01167	1996.335 ± 0.0017
a (mas)	65.6 ± 2.1	65.0 ± 1.0
e	0.556 ± 0.005	0.551 ± 0.004
i (°)	27.4 ± 1.7	24.53 ± 3.13
ω (°)	257.4 ± 3.4	68.86 ± 0.76
Ω (°)	136.8 ± 3.6	325.21 ± 1.05
π_{orbital} (mas)	36.64 ± 0.48 (HIP)	39.8 ± 4.8
M_p (M_{\odot})		1.071 ± 0.037
M_s (M_{\odot})		1.047 ± 0.037



HD 198084 – Calibrated Visibilities

- Linear diameters of 0.820 and 0.500 +/- 0.021 (mas)
- $R_p = 2.373 \pm 0.292 R_\odot$
- $R_s = 1.447 \pm 0.187 R_\odot$
- Problems with this approach





Future Direction

- Where to go from here
 - SFP-1 paper submitted to AJ, second referee report back, small changes and acceptance
 - More observations of SFP systems in 2010
 - Further refine the SFP method
 - Continue calibrated SFP experiments
 - Extend observations to CLIMB

