

Standing on the Shoulders of Cool Dwarfs: Directly Measured Diameters of Low-Mass Main-Sequence Stars

2005 Michelson Fellows Symposium – Oct 20-21 – California Institute of Technology, Pasadena, CA



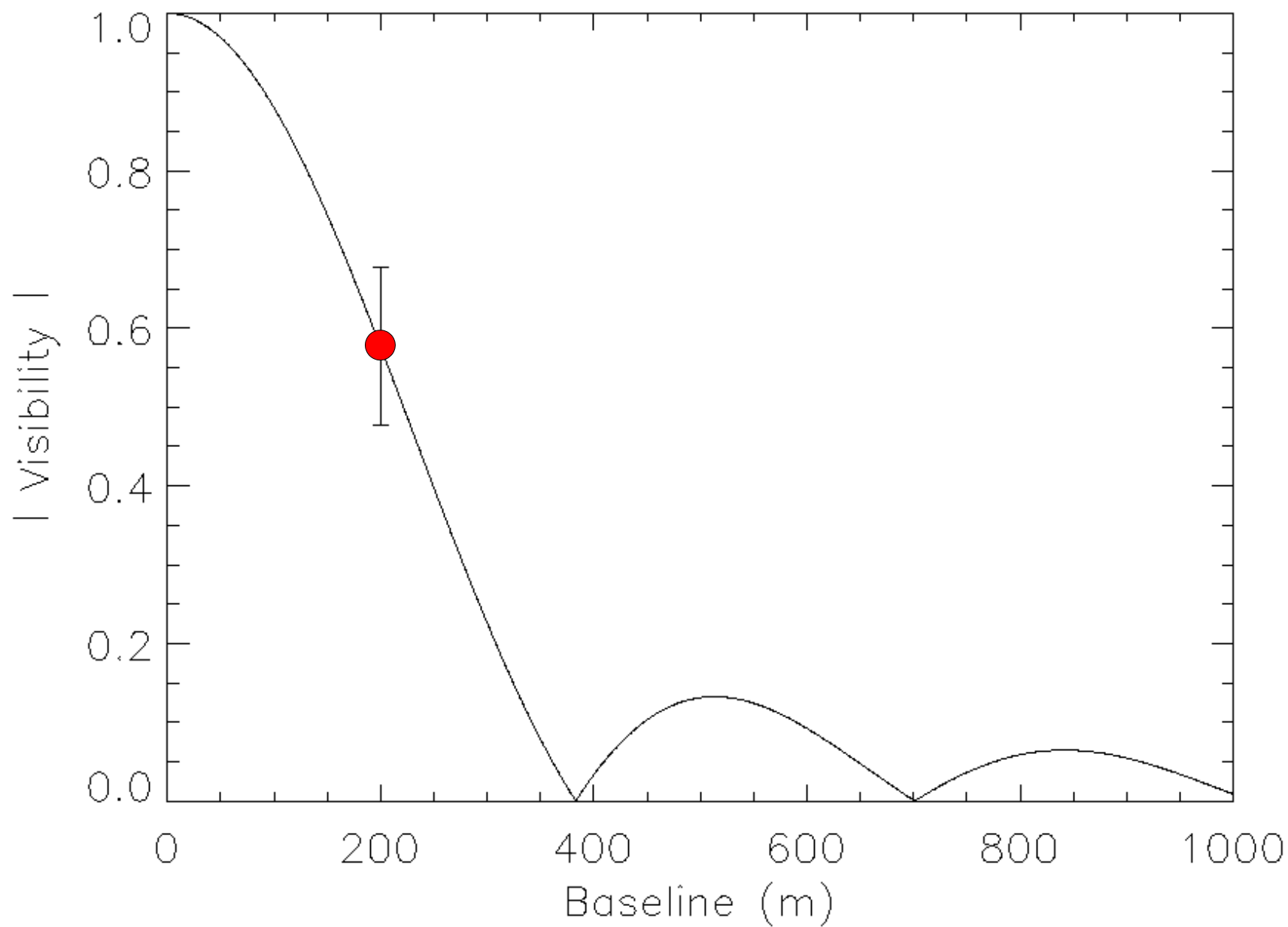
CHARA (MtW): **Dave Berger**, Theo ten Brummelaar, Judit Sturmann, Laszlo Sturmann, Nils Turner, Chad Ogden

CHARA (GSU): Doug Gies, Hal McAlister, Todd Henry

NOAO: Steve Ridgway, Jason Aufdenberg

LEISA (Paris): Antoine Merand

Diameter of GJ _____



In our Galaxy, M dwarfs are



Selection Effect: small, **cool**, & low luminosity

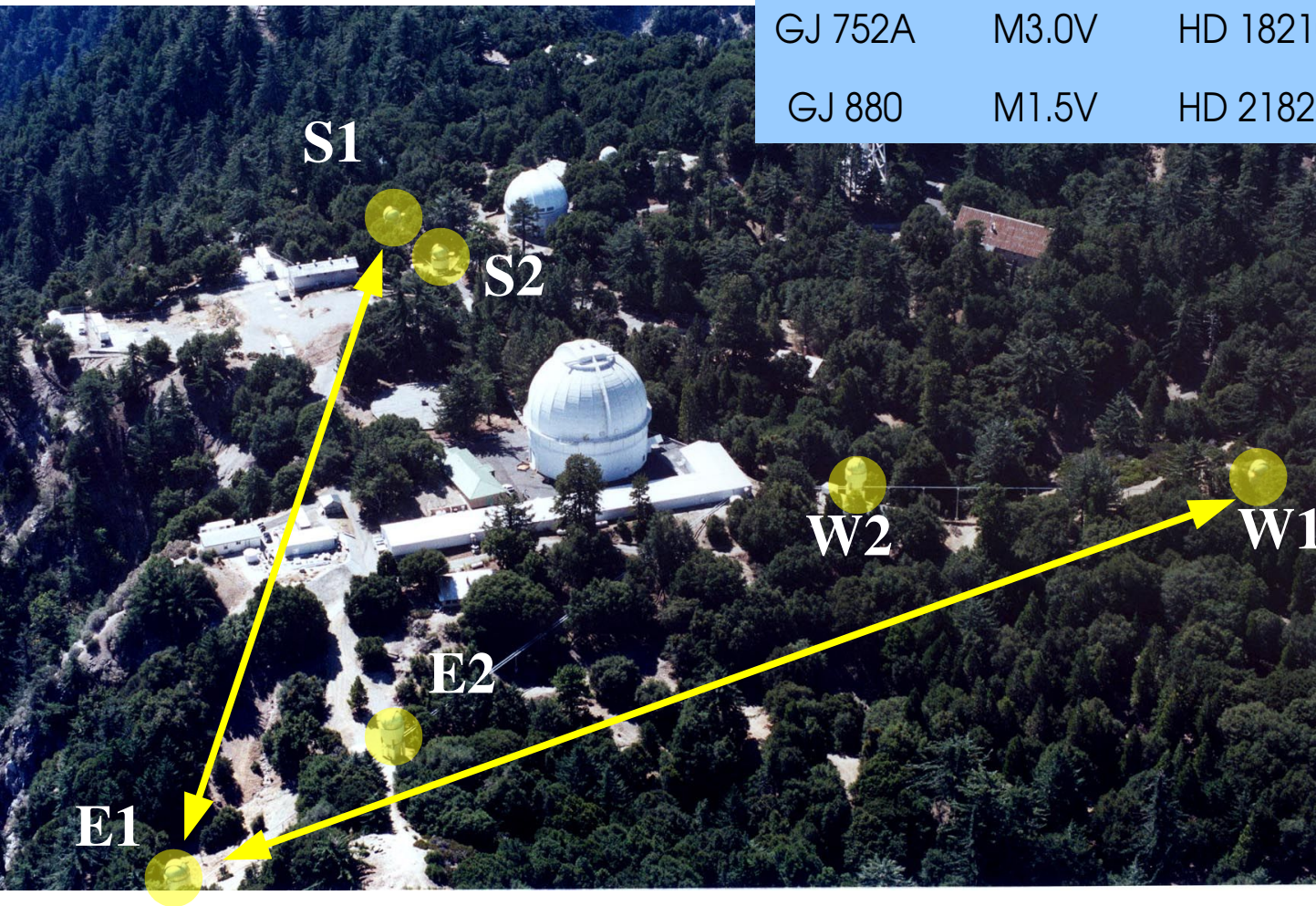
21 M dwarfs with directly measured diameters

14 : photometry & spectroscopy of EBs

7 : LBI of individual stars

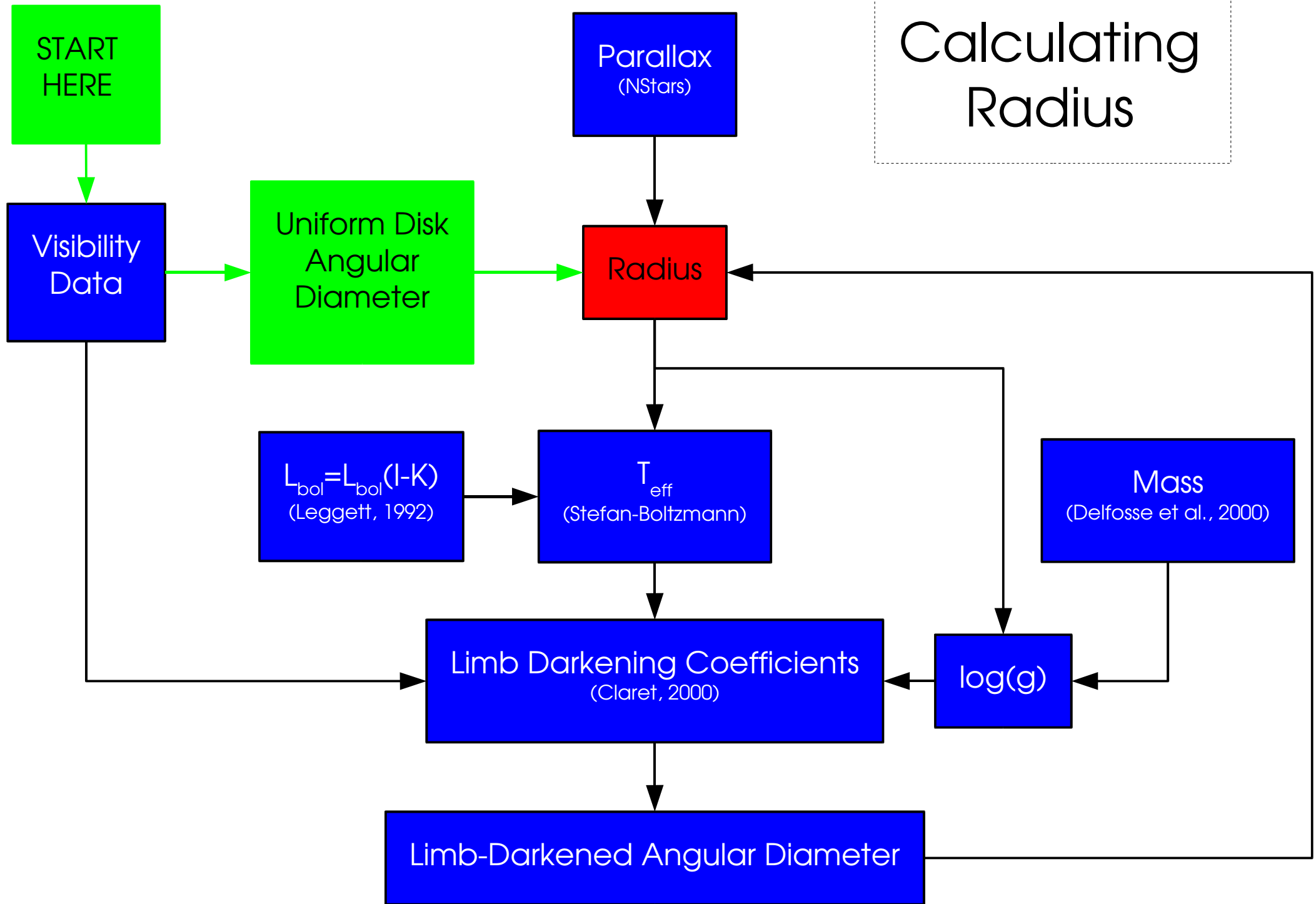
Observations of 6 M-dwarfs with the CHARA Array

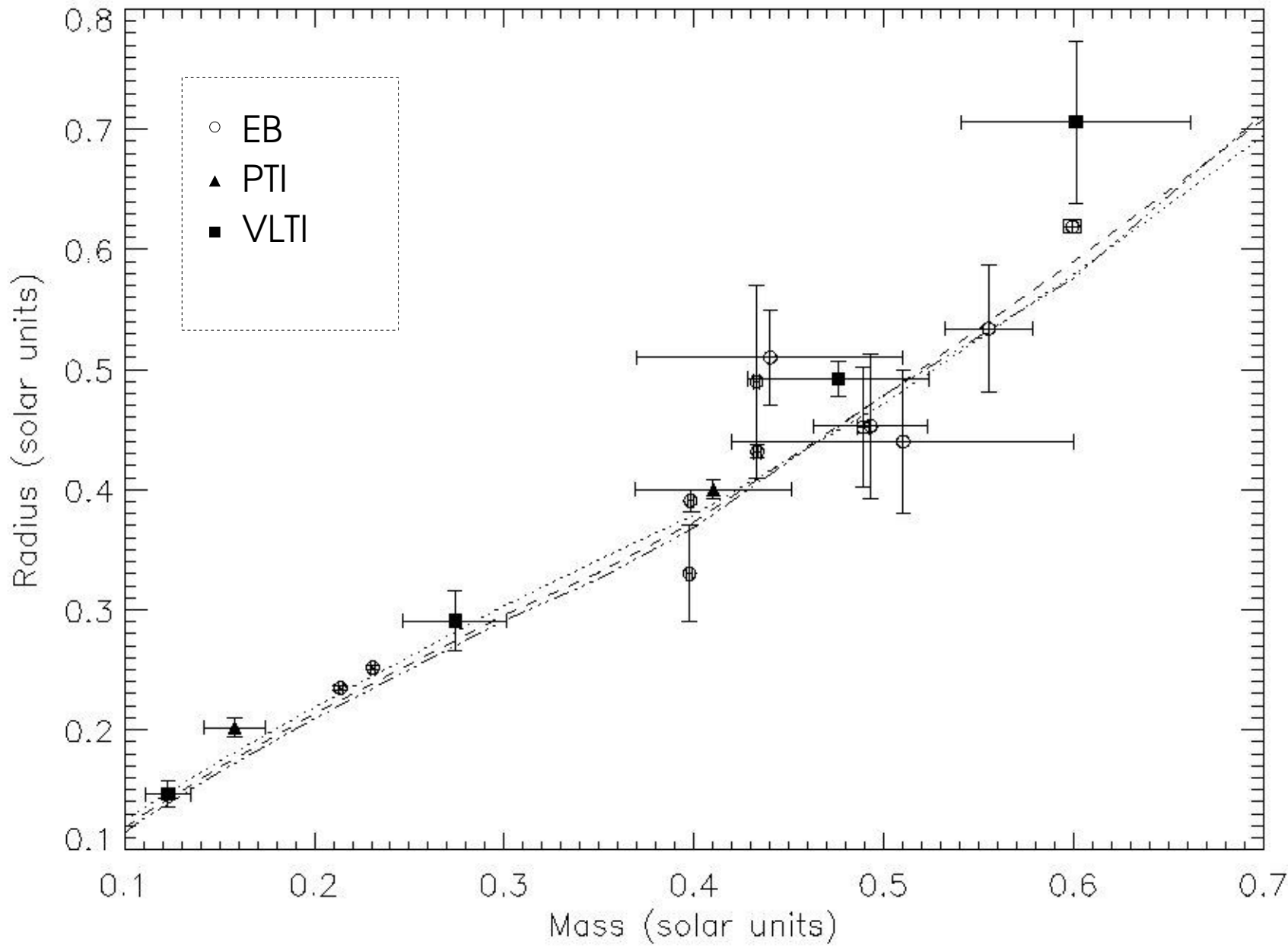
| <u>Object</u> | <u>Sp Type</u> | <u>Calibrator</u> | <u>Baseline</u> | <u>Instrument</u> |
|---------------|----------------|-------------------|-----------------|-------------------|
| GJ 15A | M1.5V | HD 2952 | W1/E1 (314 m) | FLUOR |
| GJ 514 | M1.0V | HD 119550 | S1/E1 (331 m) | Classic |
| GJ 526 | M1.5V | HD 119550 | S1/E1 (331 m) | Classic |
| GJ 687 | M3.0V | HD 151541 | S1/E1 (331 m) | Classic |
| GJ 752A | M3.0V | HD 182101 | S1/E1 (331 m) | Classic |
| GJ 880 | M1.5V | HD 218261 | S1/E1 (331 m) | Classic |



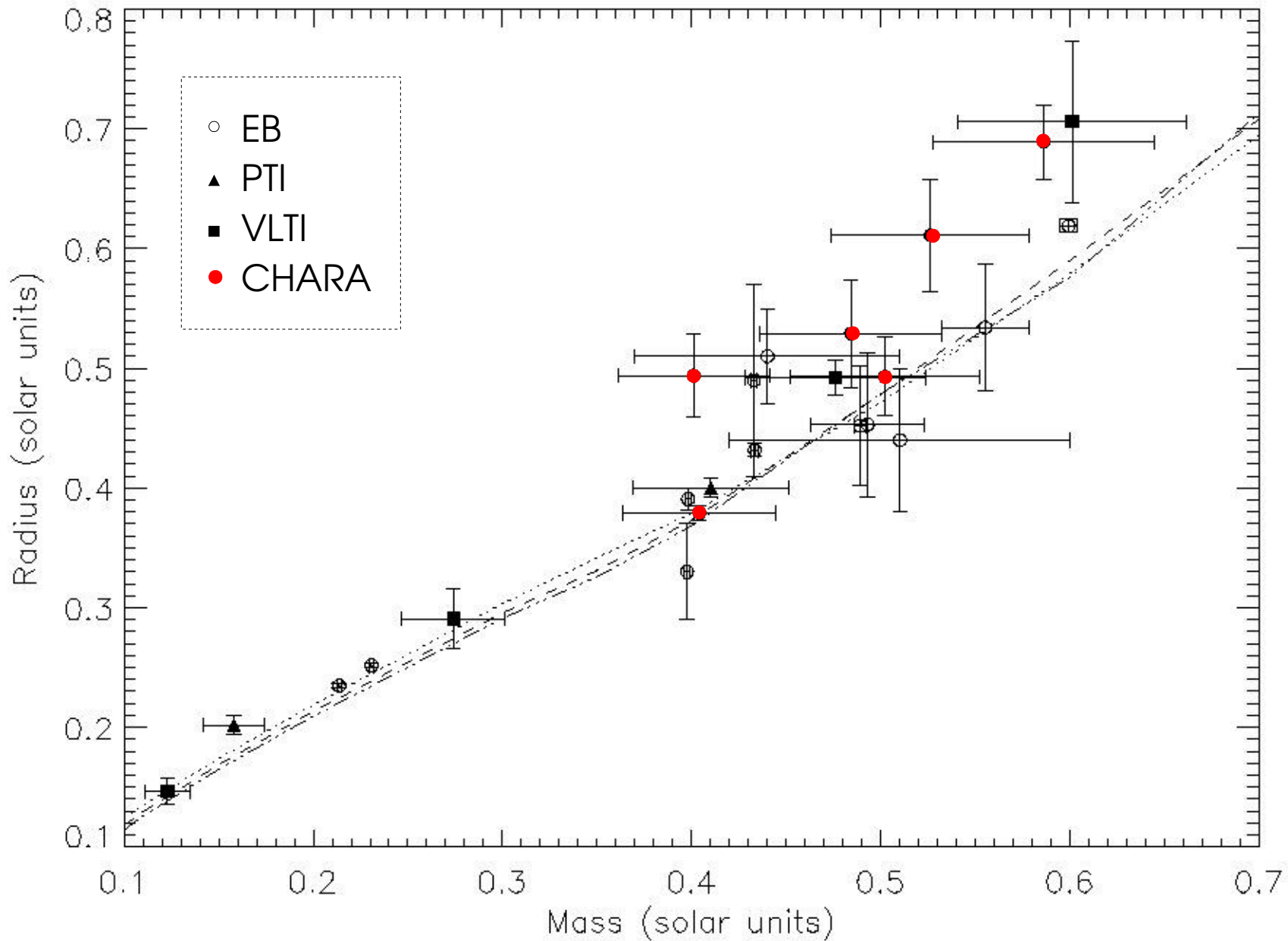
all observations @ K' (2.1 microns)

Calculating Radius



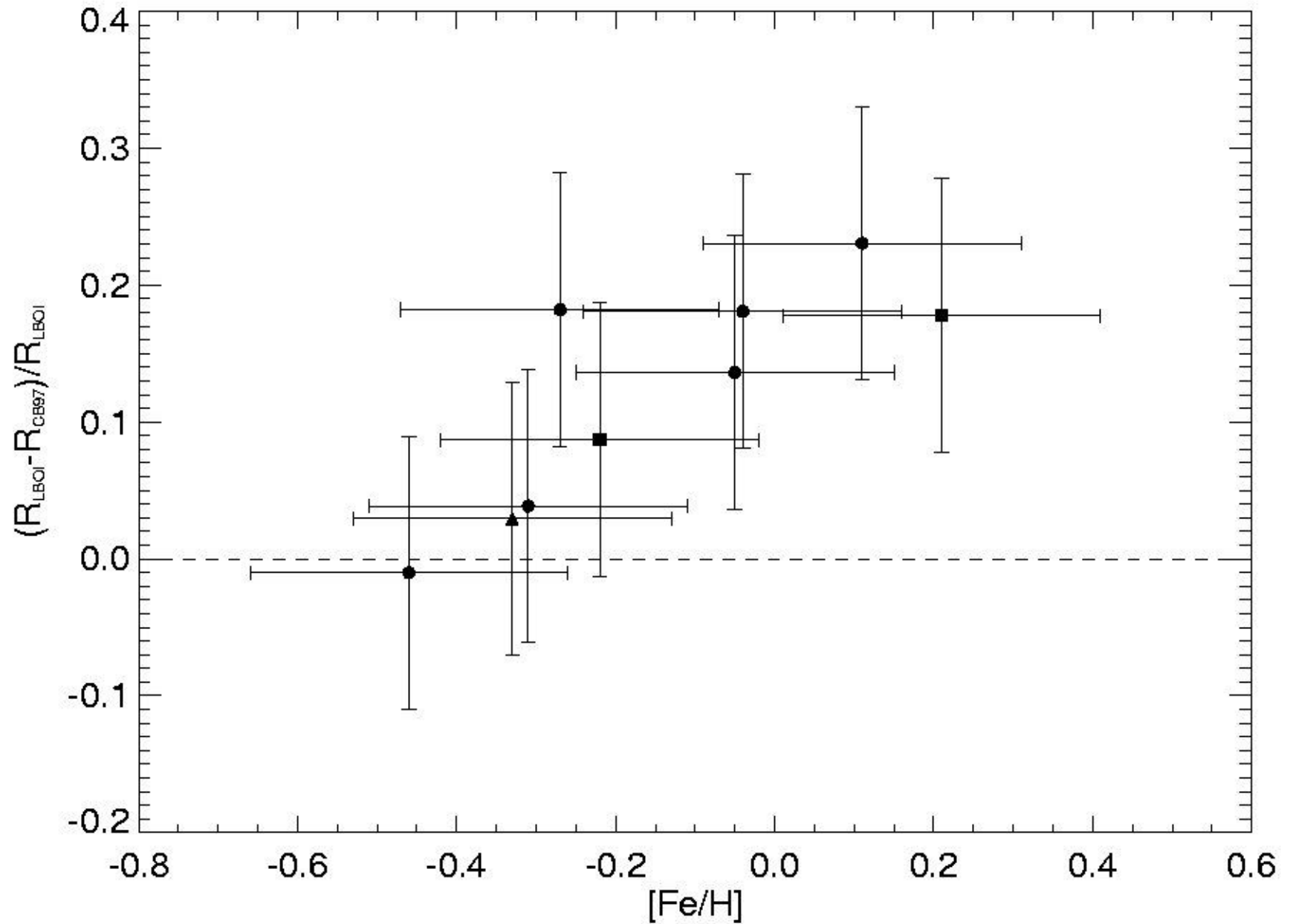


* lines represent models from Chabrier & Baraffe for different metallicities (.... for (Fe/H)=0.0, ---- for (Fe/H)=-0.5, -... for (Fe/H)=-1.0)



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The Observation/Model Disparity – A Metallicity Trend?



Coming Attractions...



- Increased resolution and spatial frequency:
 - ✓ H band (1.6 microns) ---> 0.3 mas
 - ✓ R/I band ---> 0.15 mas
- Increased sensitivity:
 - ✓ upgrading acquisition and tip/tilt
 - ✓ fringe tracking in J/H/K
 - ✓ dispersion compensation
- More targets, more targets, more targets