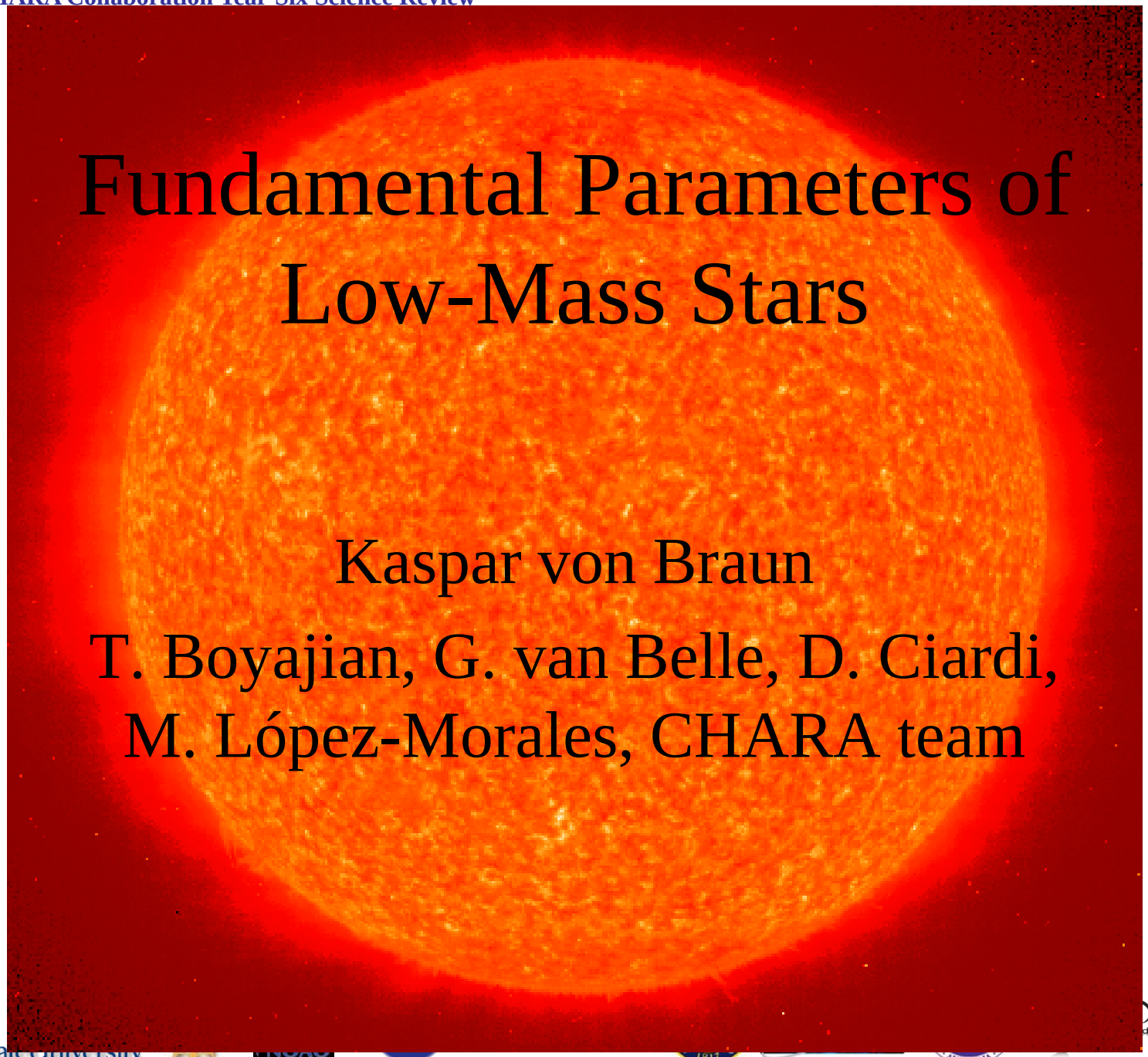
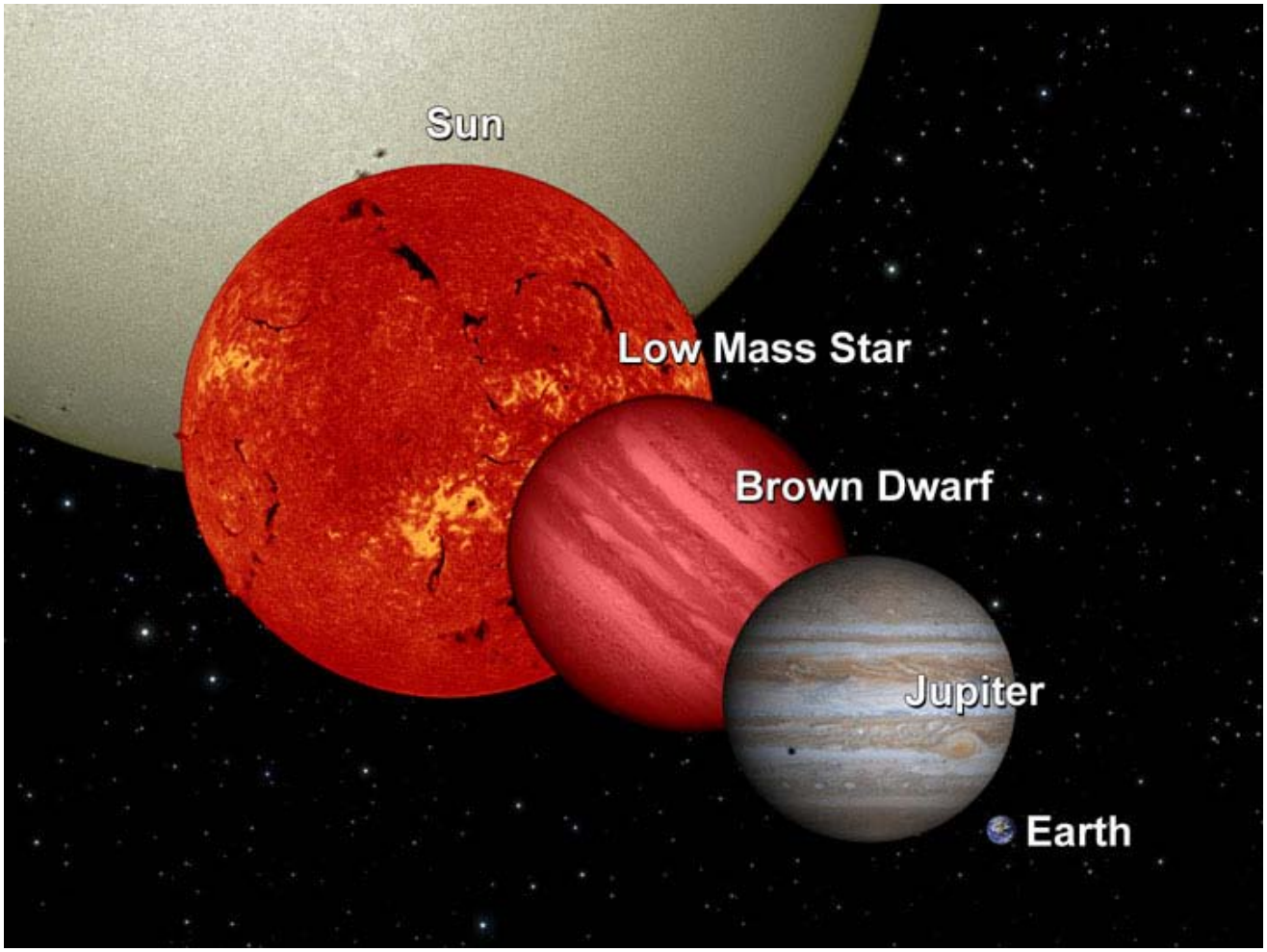


Fundamental Parameters of Low-Mass Stars

Kaspar von Braun

T. Boyajian, G. van Belle, D. Ciardi, M. López-Morales, CHARA team

Low-Mass Stars



NASA

Low-Mass Stars

Defined here:

- K0V and later (limited by brightness – ~6.5 pc)
- M: 0.15 – 0.9 M_{sun}
- R: 0.2 – 0.9 R_{sun}

- Observed with CLASSIC.
- long baselines (R_{est} ~ 0.5–1.5 mas).

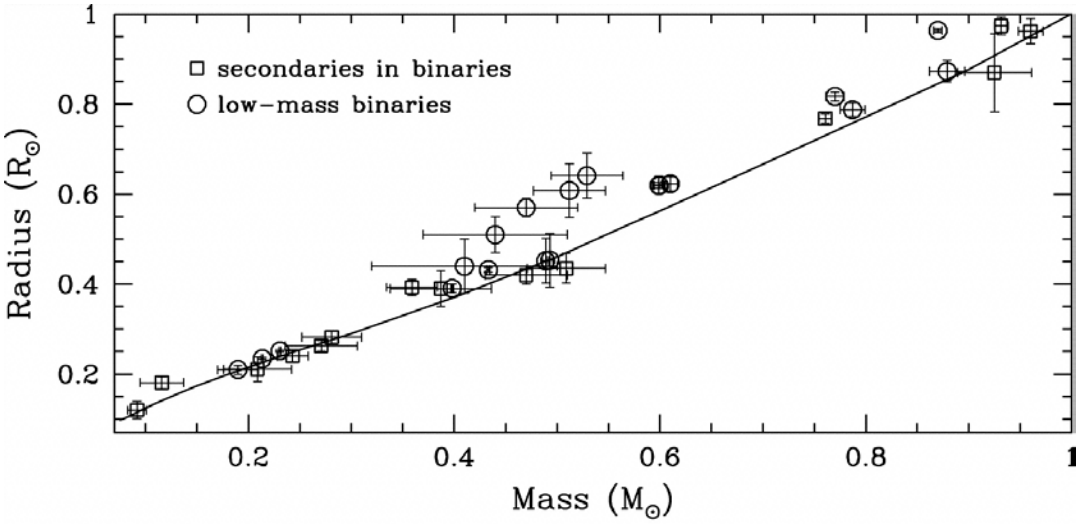
Low-Mass Stars – why?

- LOTS of them (important!)
- Radii/HZs of transiting low-mass exoplanets
- Difficult: small (= faint), active/noisy
- Poorly behaved

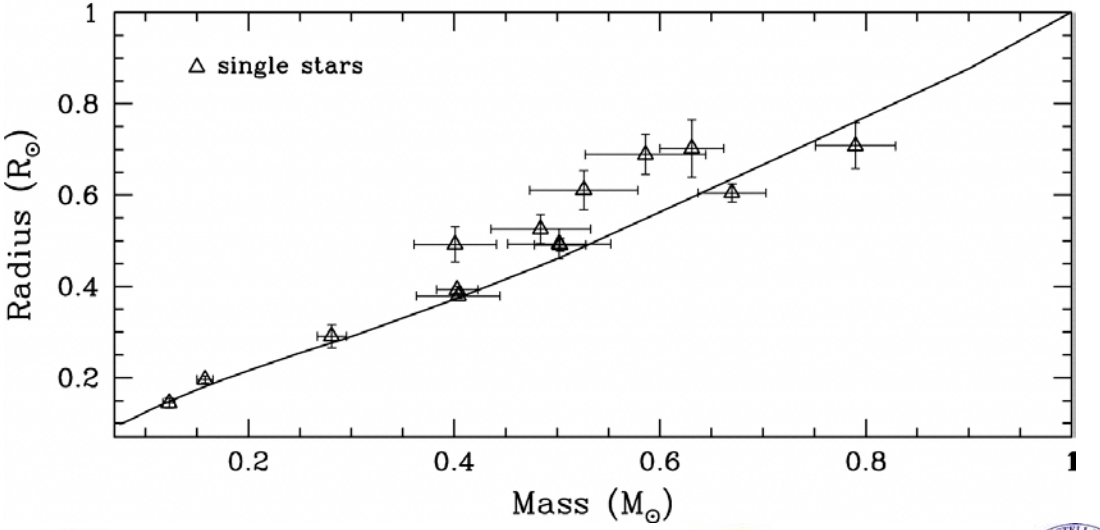
Low-Mass Stars – why?

- LOTS of them (important!)
- Radii/HZs of transiting low-mass exoplanets
- Difficult: small (= faint), active/noisy
- Poorly behaved (don't follow orders)

Low-Mass Stars – why?

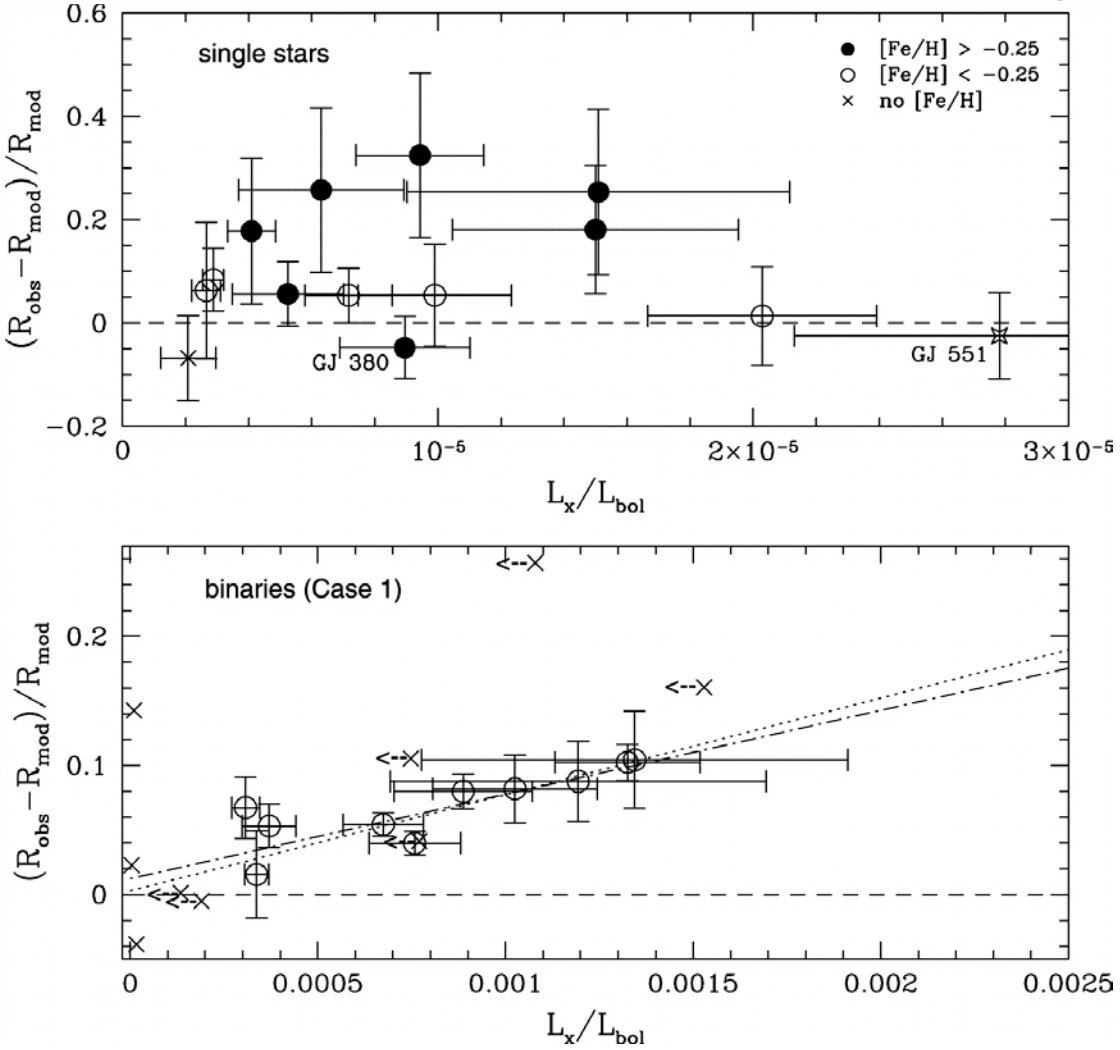


Models:
Baraffe et al. (1998)



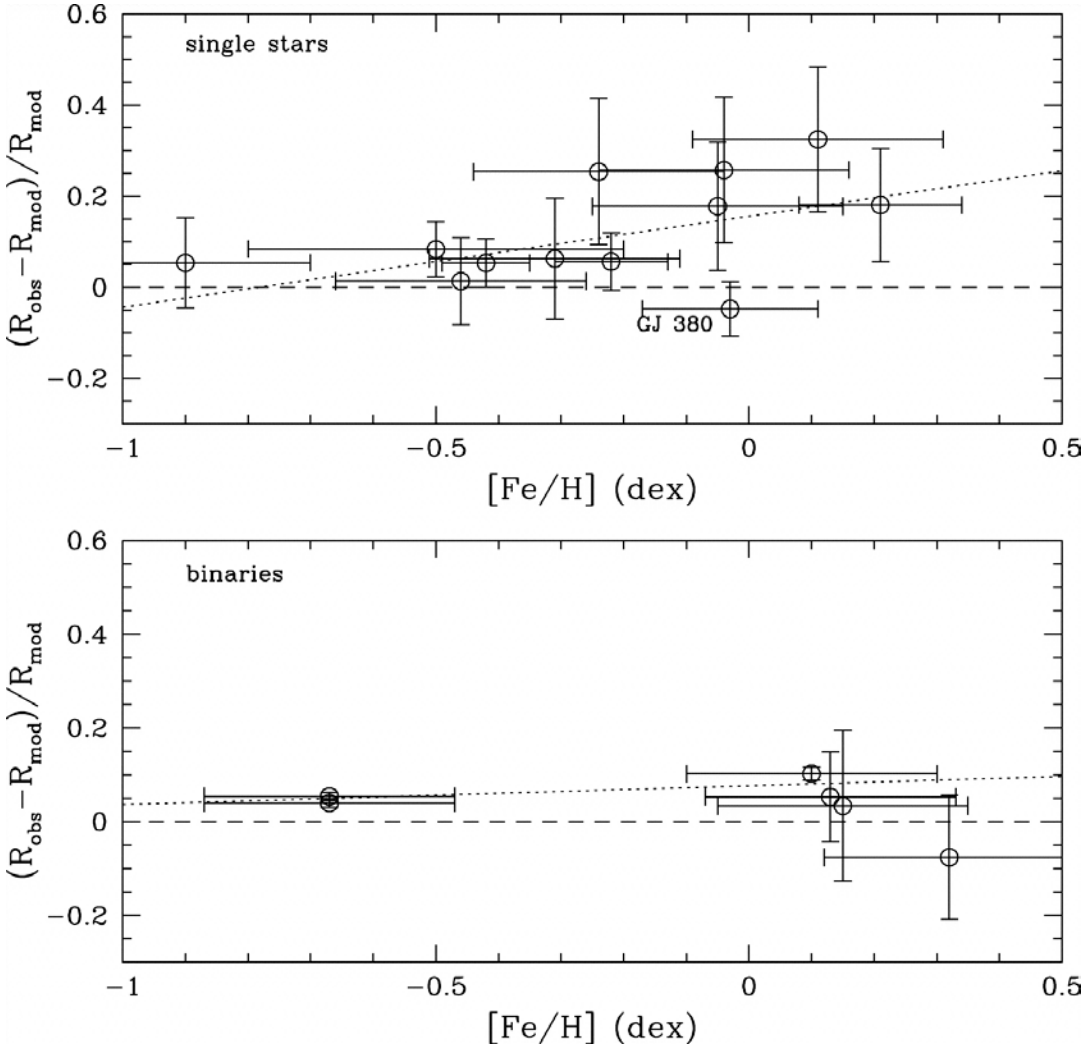
López-Morales (2007)

Low-Mass Stars – why?



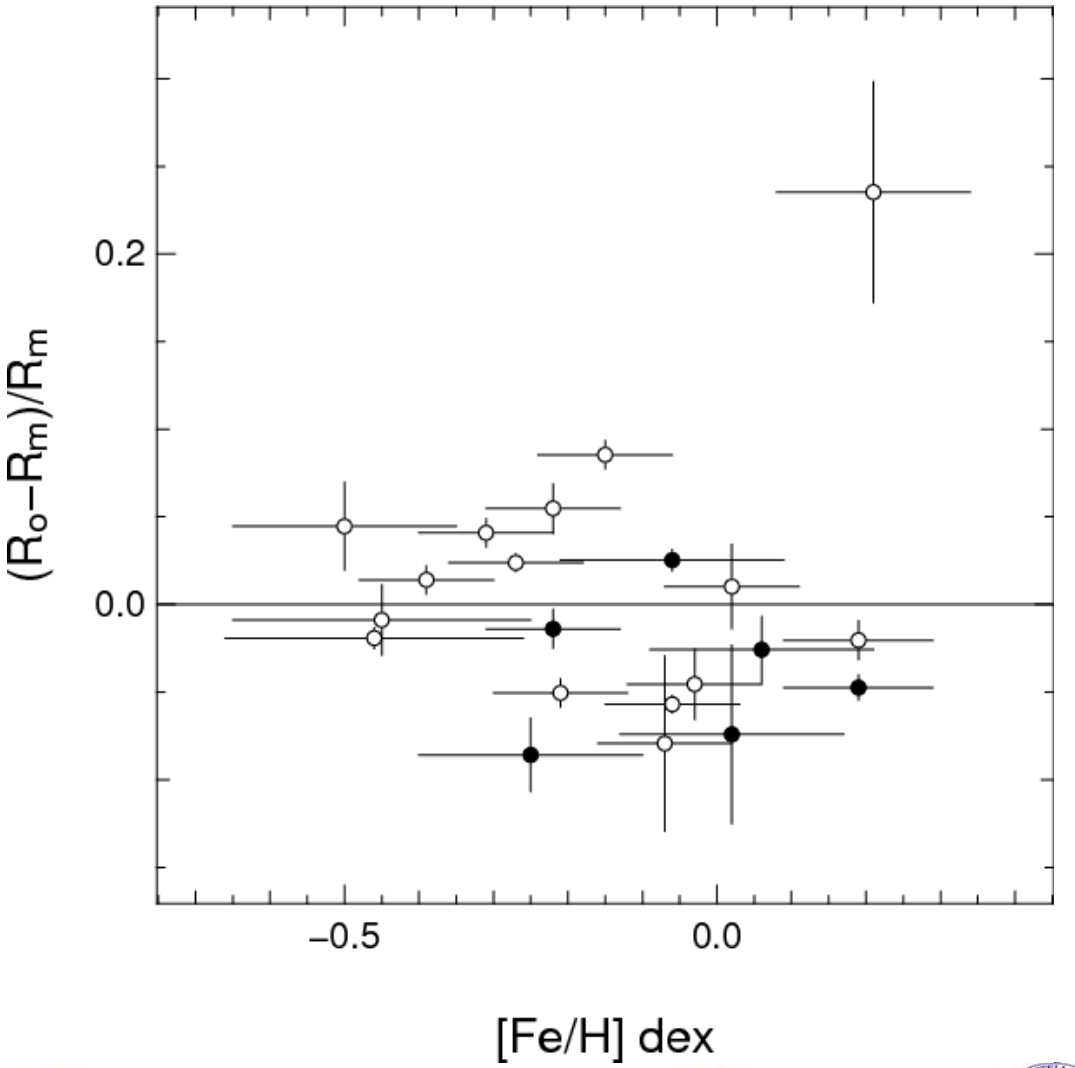
López-Morales (2007)

Low-Mass Stars – why?



López-Morales (2007)

Low-Mass Stars – why?



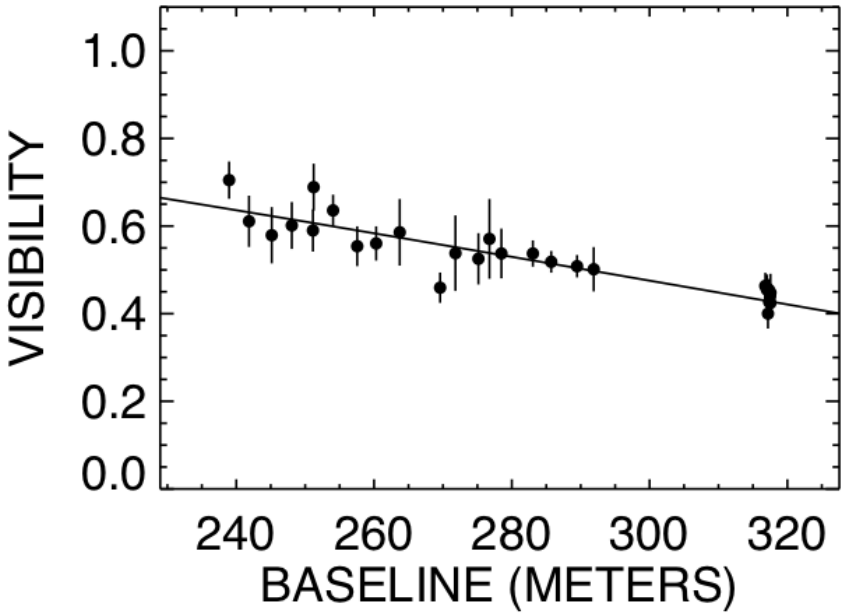
Demory et al. (2009)

Low-Mass Stars – how?

Target Selection:

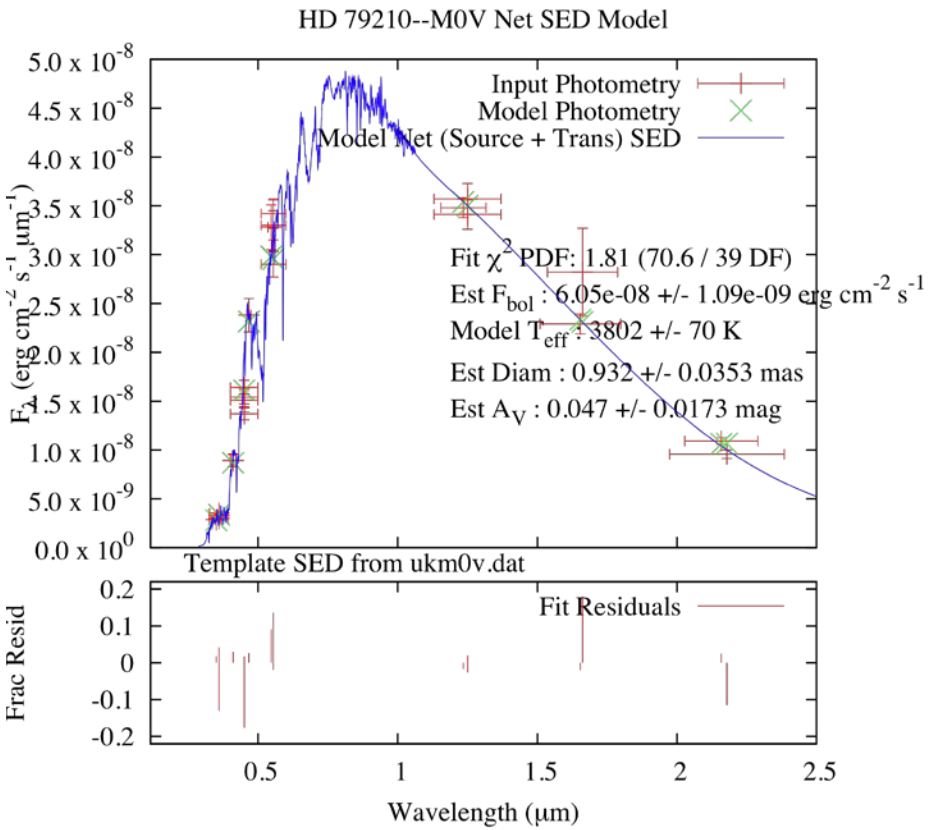
- Observability
- Range in metallicities
- Targets on either side of 0.35 solar masses

Low-Mass Stars – how?



$R = f(\lambda, \pi)$

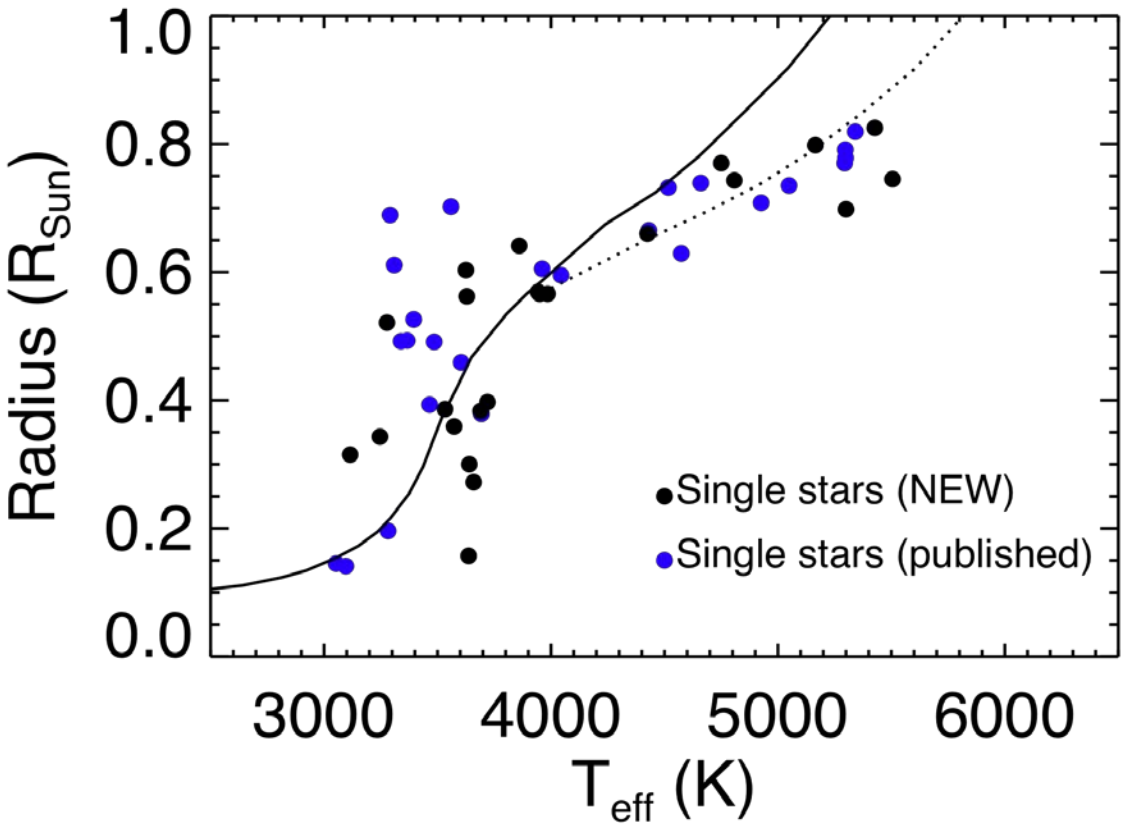
$\delta R/R \sim 3\%$



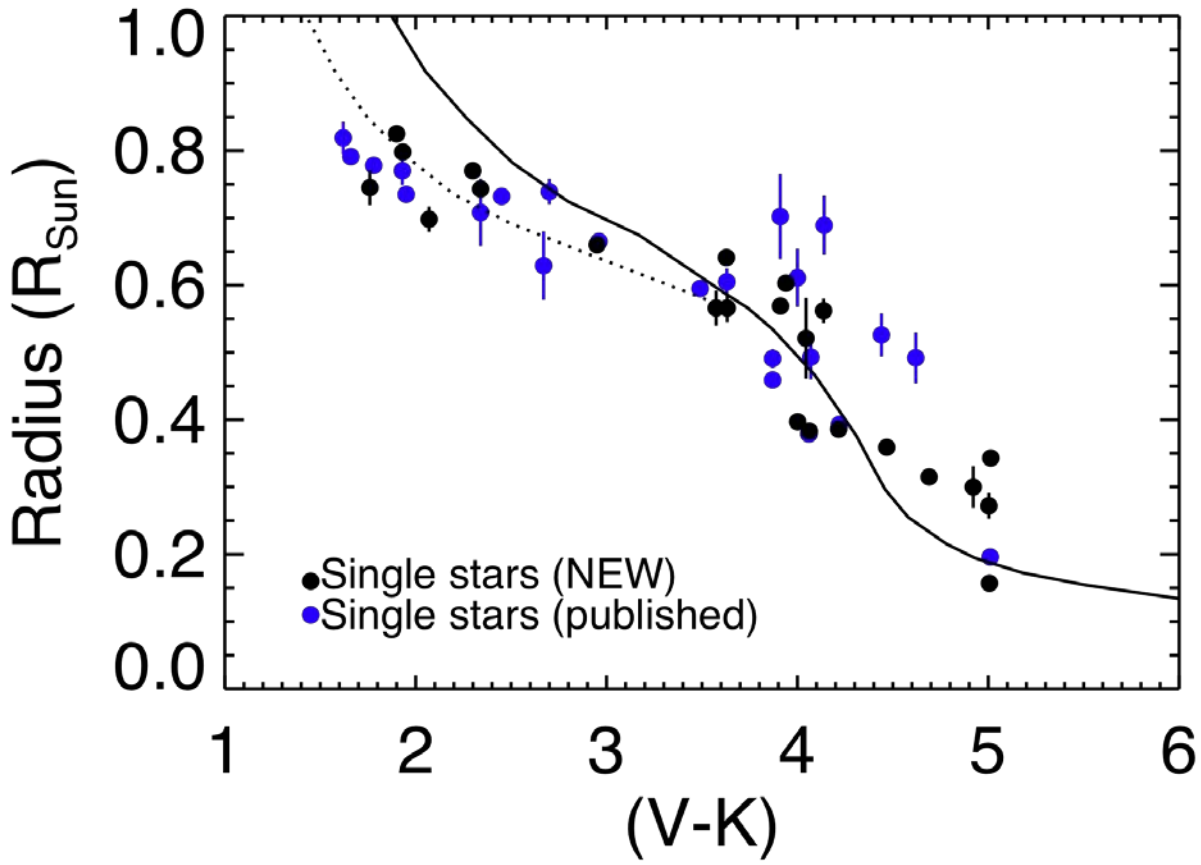
$T_{eff} = f(\lambda, F_{bol})$

$\delta T_{eff}/T_{eff} \sim 1—2\%$

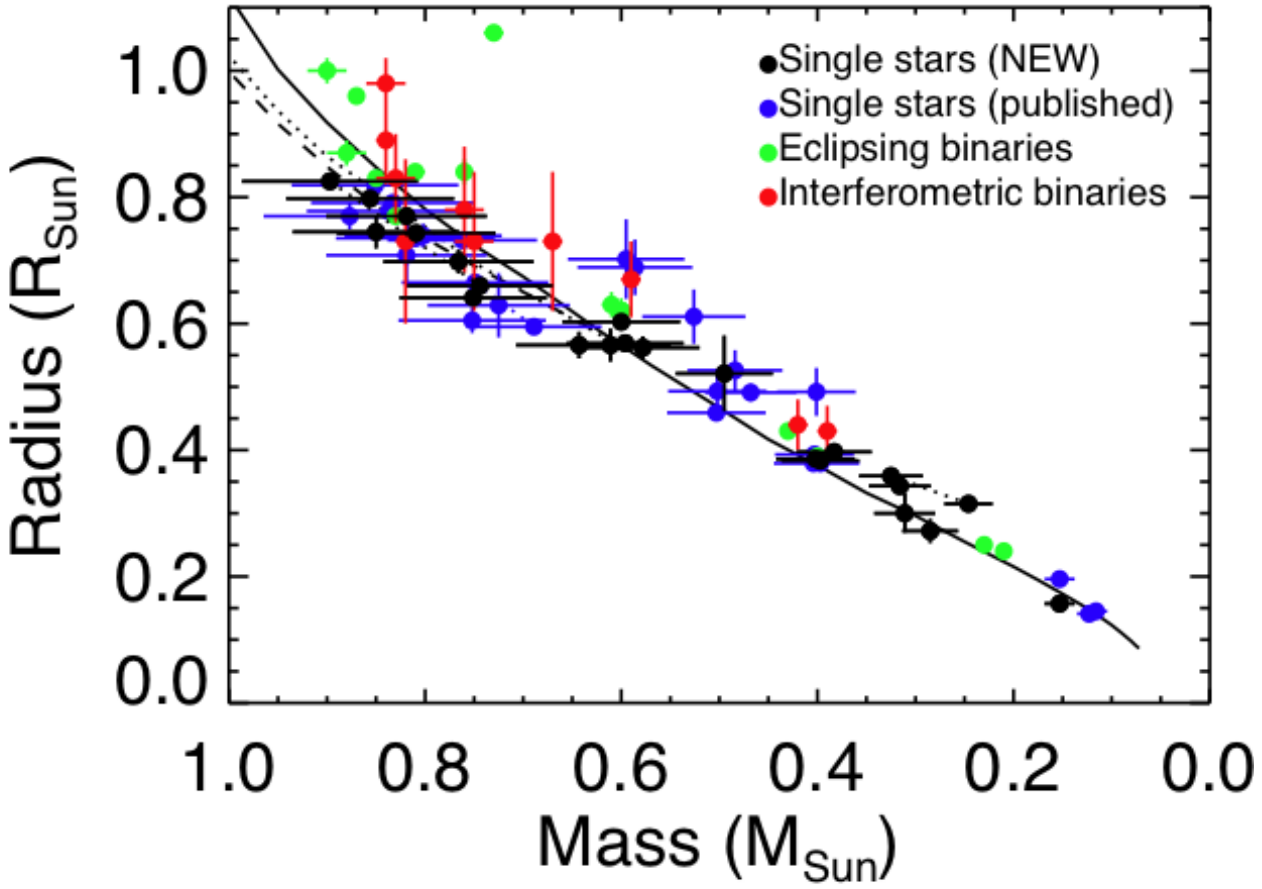
Preliminary Results



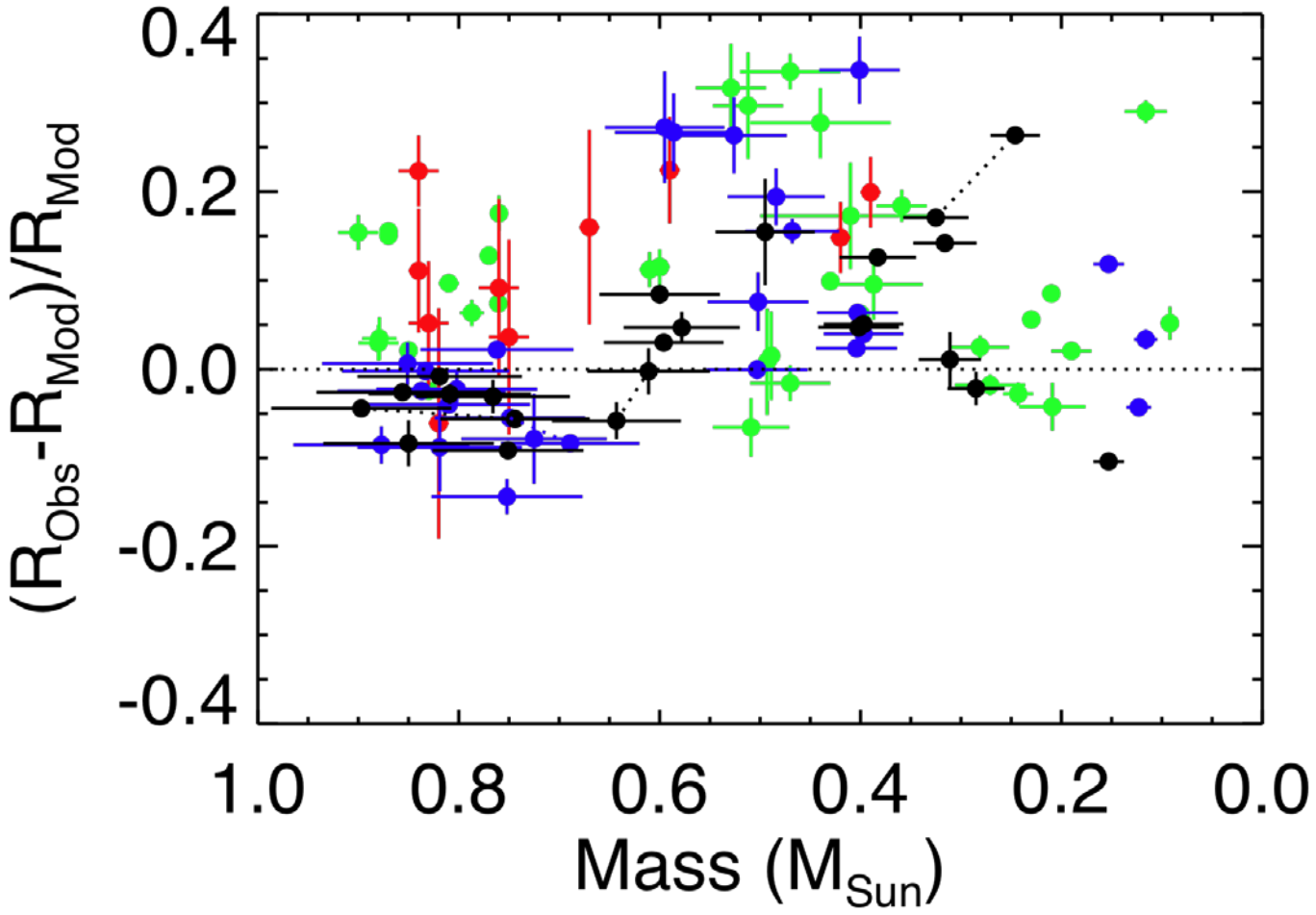
Preliminary Results



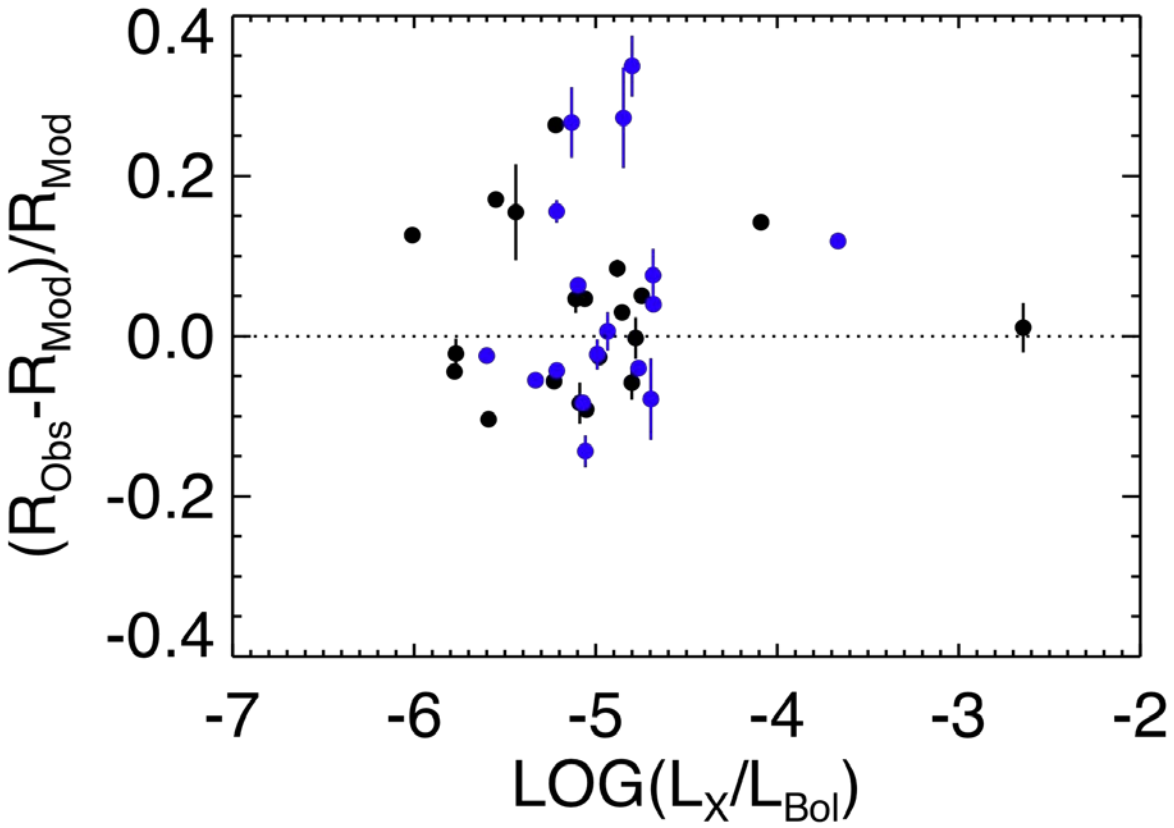
Preliminary Results



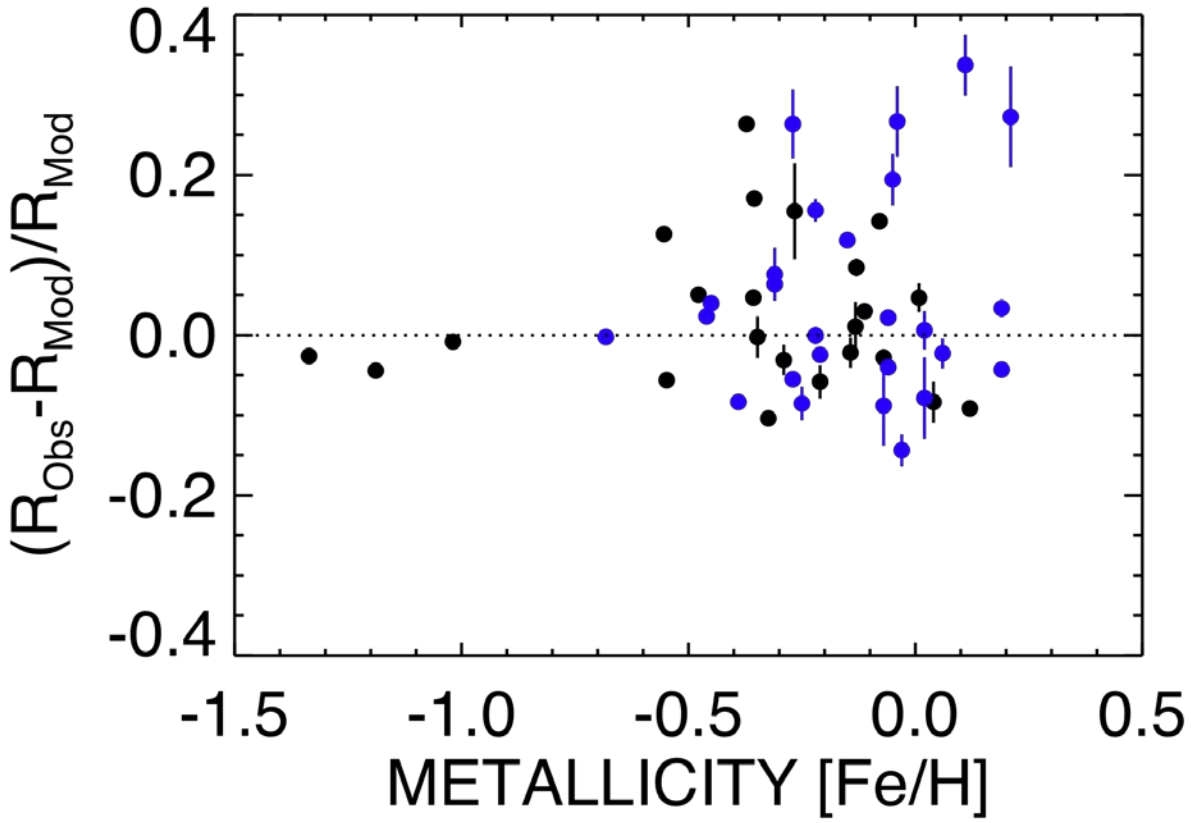
Preliminary Results



Preliminary Results



Preliminary Results



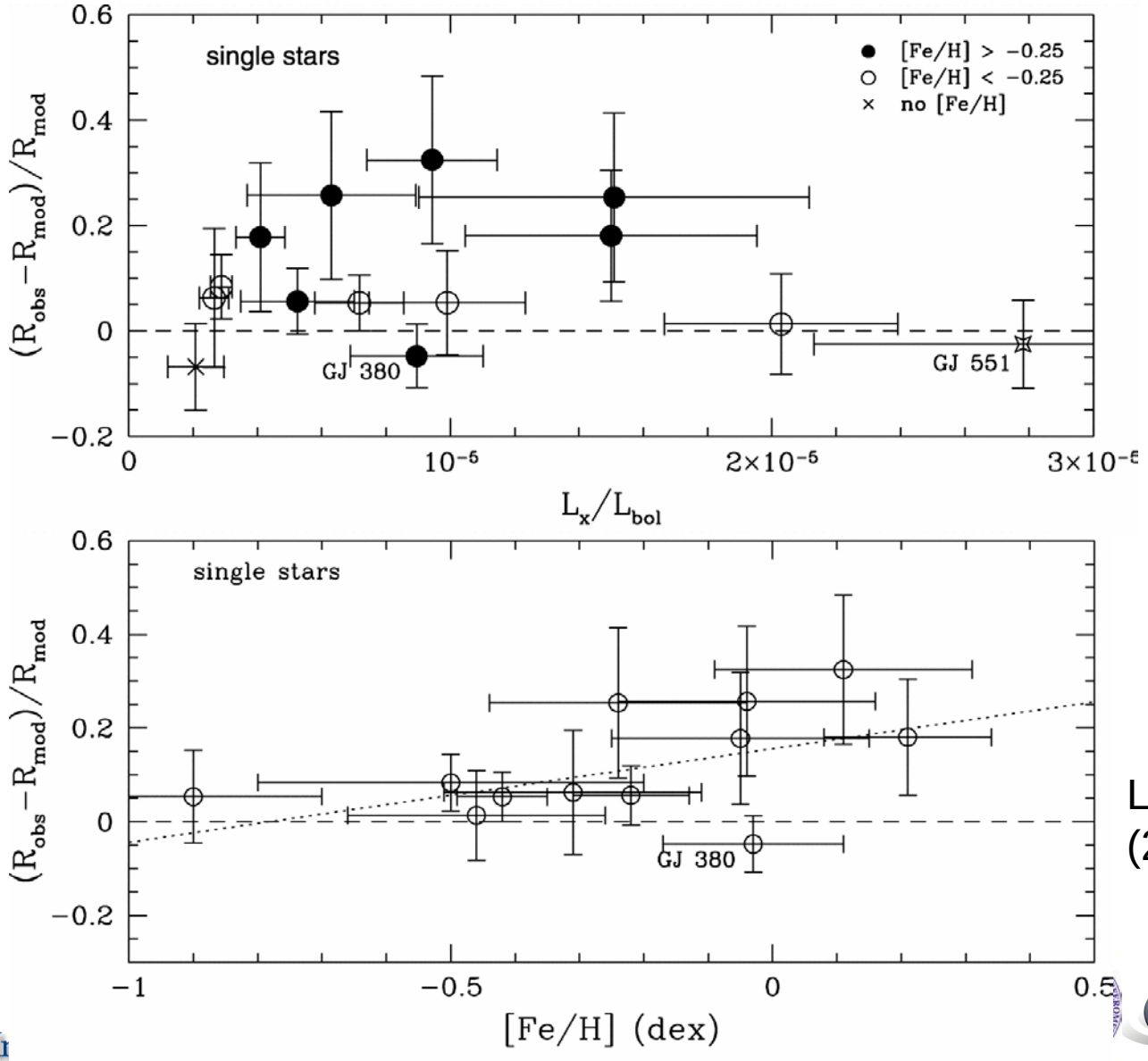
Summary

- ~20 KM dwarfs observed (last 3 seasons).
- Precisions: ~3% in radii, 2% in T_{eff}
- Range in metallicities (-1.4 < [Fe/H] < 0.2)
- Range in masses (0.15 – 0.9 M_{sun})

Preliminary interpretation:

- Our data generally support the discrepancy between data and theory.
- Metallicity/radius trend perhaps weaker than originally thought.

Low-Mass Stars – why?



López-Morales (2007)