

CAN STELLAR ABUNDANCES HELP EXPLAIN THE ARCHITECTURE OF PLANETARY SYSTEMS DISCOVERED BY *TESS*?

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WHY ABUNDANCES?

- **Stellar abundances play an integral role** in determining certain aspects of the chemical, geological and physical constraints of exoplanets and their planetary systems
- The geological structure of terrestrial exoplanets can be determined by using the stellar hosts' **Mg/Si & Fe/Si ratios** along with an exoplanets' mass and radii
- This in turn can inform us about the migration history and potential habitability of newly found terrestrial worlds

OUR PROCESS

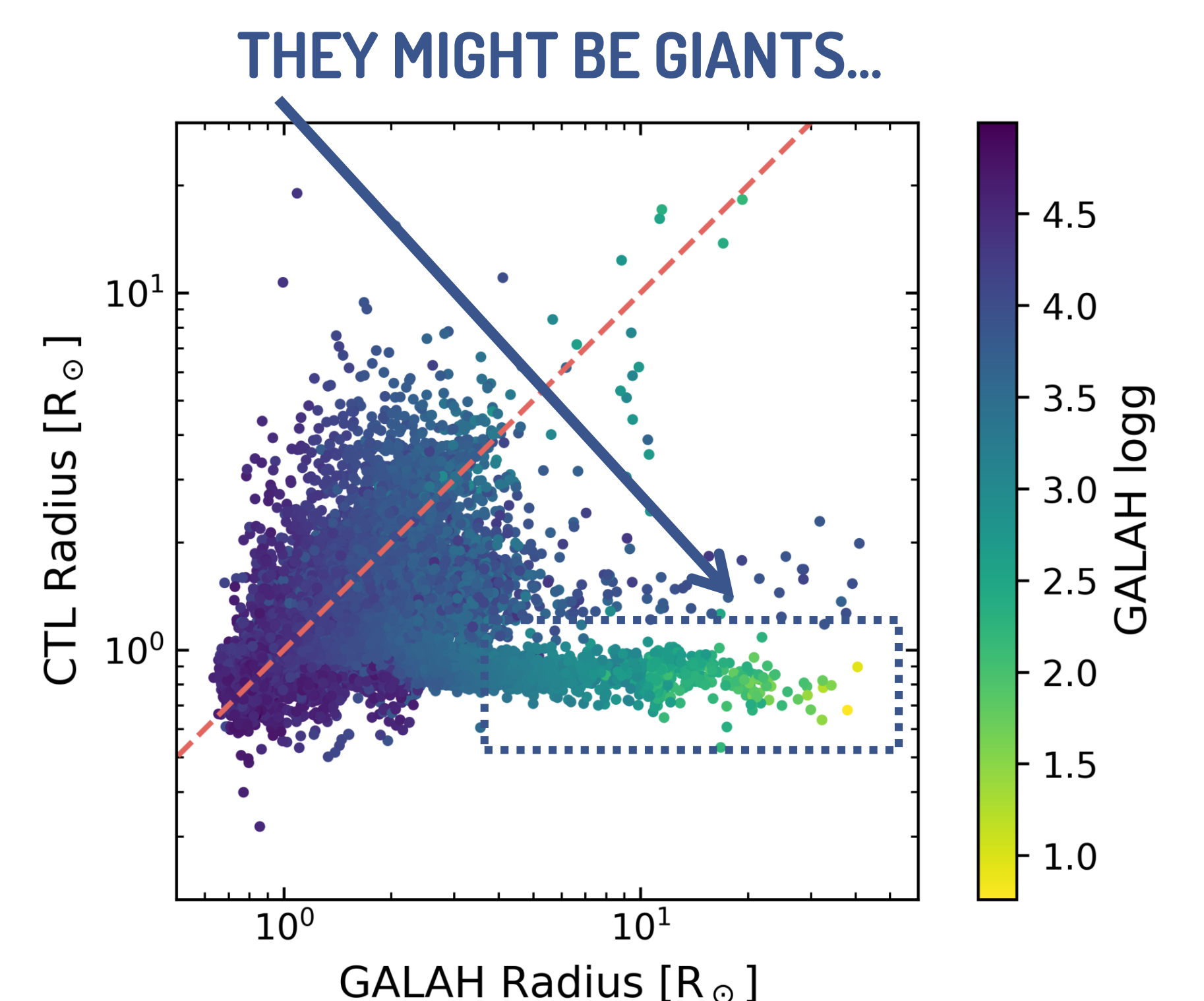
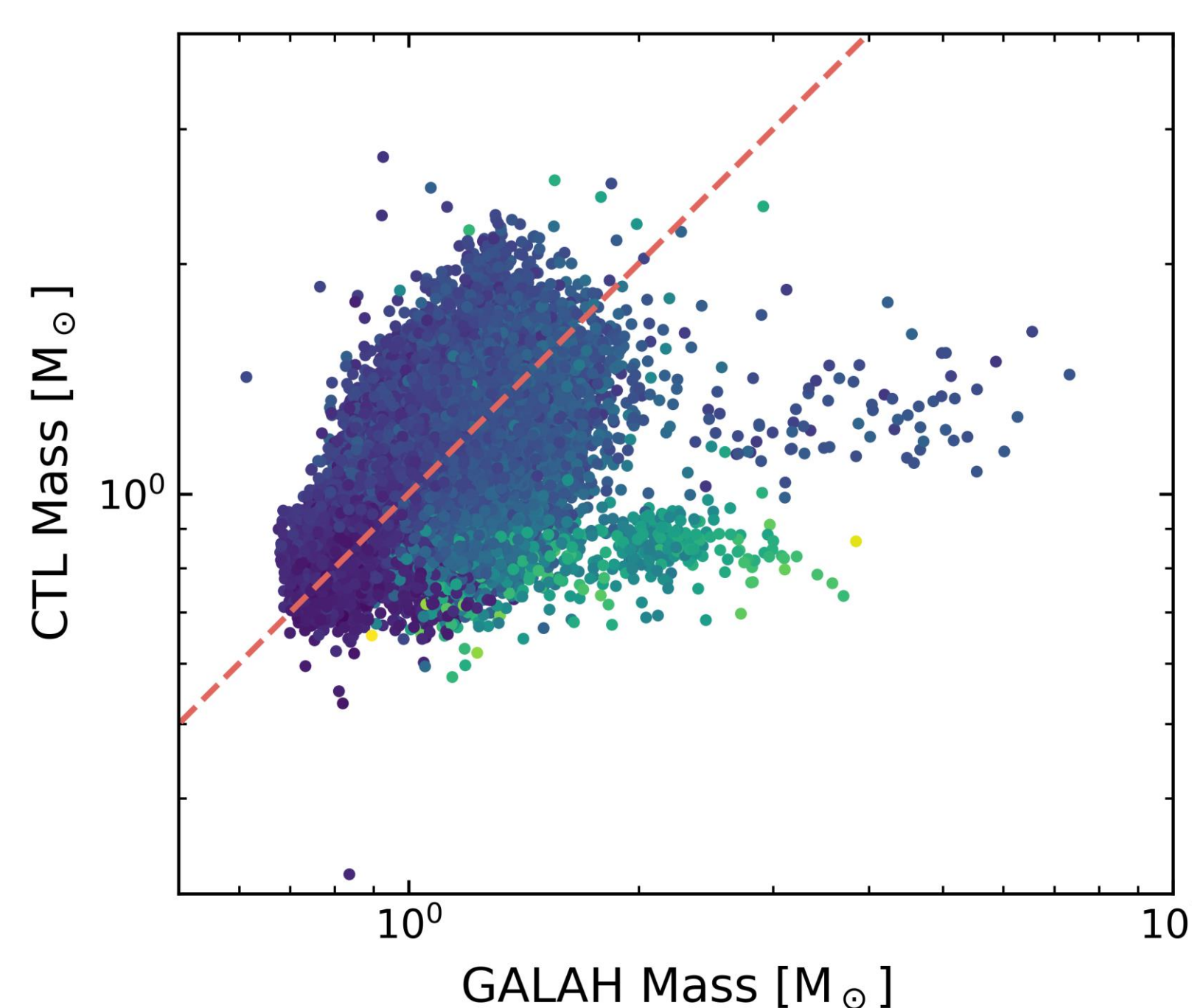
- We crossmatched our Galactic Archeology with HERMES survey (GALAH) DR2 catalog with the *TESS* Candidate Target List (CTL V7.0) and found ~ 40,000 matches
- Using the **isochrones** python package, we've derived self-consistent masses, radii and ages for these target stars
- We have also normalised our abundances to **[X/H]** to fit within the community needs, alongside of calculating **C/O, Fe/Si & Mg/Si ratios** for all **40,000 stars**

Terrestrial exoplanets found orbiting *TESS* targets will likely have Earth-like compositions

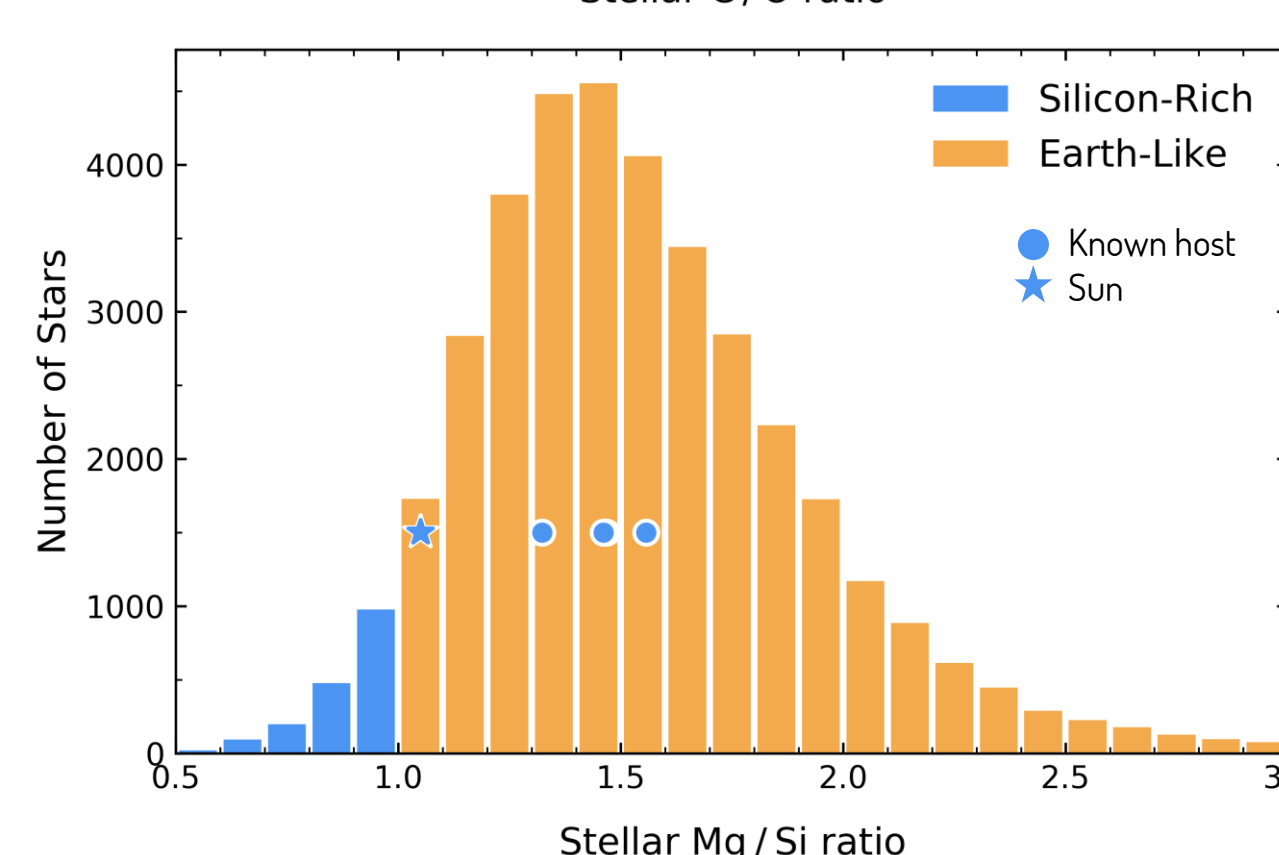
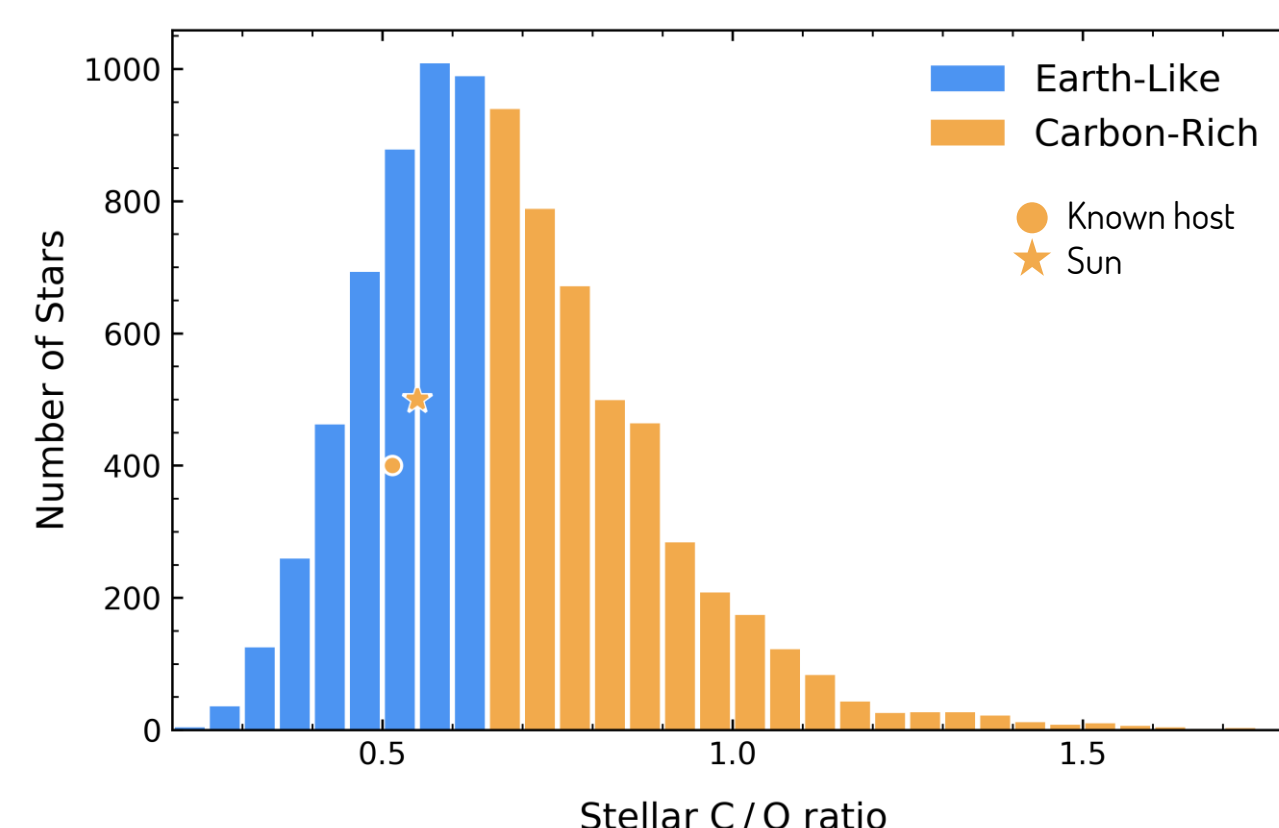
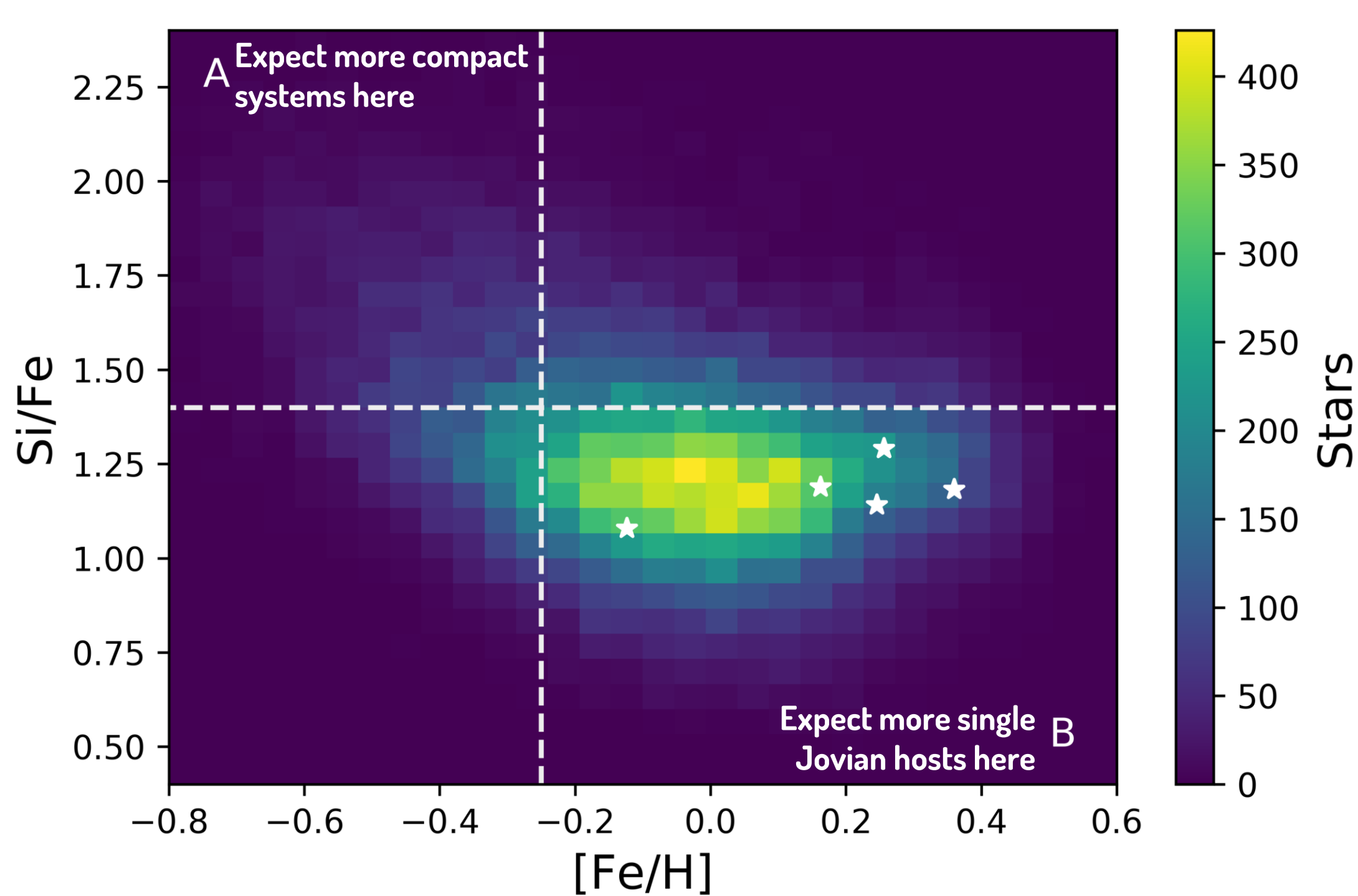
MASS AND RADII FOR CTL STARS

Our results show the importance for spectroscopic surveys, as a **significant fraction of CTL stars** have been **misclassified** which could potentially misclassify the exoplanets they host

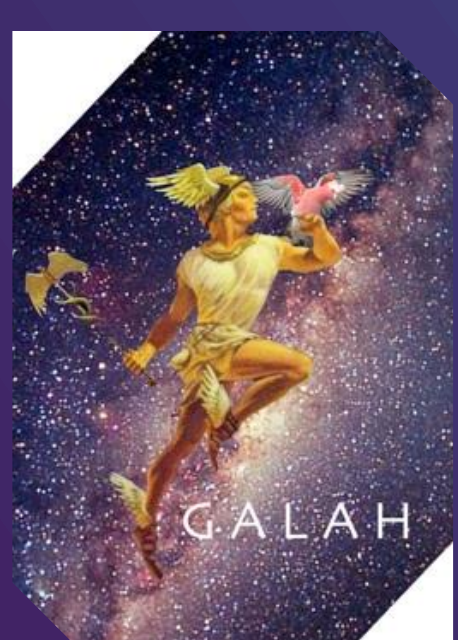
| | Lit Mass (M_{\odot}) | Our Mass (M_{\odot}) | Lit Radius (R_{\odot}) | Our Radius (R_{\odot}) |
|----------------|--------------------------|--------------------------|----------------------------|----------------------------|
| HATS-34 b | 0.941 ± 0.072 | 0.936 ± 0.072 | 1.43 ± 0.19 | 1.017 ± 0.135 |
| WASP-61 b | 2.68 ± 0.02 | 2.060 ± 0.145 | 1.41 ± 0.22 | 1.365 ± 0.015 |
| HD103197 b | 0.09 ± 0.02 | 0.097 ± 0.005 | NA | NA |
| HATS-7 b | 0.120 ± 0.012 | 0.119 ± 0.012 | 0.563 ± 0.04 | 0.563 ± 0.03 |
| TIC234504626 b | NA | NA | NA | 0.469 ± 0.021 |



I NEED MORE PLANETS CAPTAIN!



- **4 known exoplanets and 1 exoplanet candidate** within our 40,000-star sample. Too small of a population for now to suggest trends
- **Stellar Mg/Si and C/O ratios** show potential **terrestrial worlds** found orbiting GALAH-TESS targets will likely have **Earth-like compositions**
- **Single Jovian systems** found thus far **conform** with **known abundance relationships**
- Paper to soon appear on an arXiv near you!



This is what I look like



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