CALIBRATING THE CHEMISTRY

OF PLANET FORMATION

John M. Brewer - Yale University, Columbia University Know Thy Star, Know Thy Planet - Oct 9, 2017



PRIMORDIAL PROTOPLANETARY DISK COMPOSITIONS

SLOWLY EVOLVING PHOTOSPHERES



Turcotte & Wimmer-Schweingruber 2002

PLANET-METALLICITY RELATION

GIANT PLANETS





MOST STARS HAVE PLANETS

SMALL PLANETS HARD TO DETECT



COMPLETE COMPARISON SAMPLES



1D, LTE, PLANE PARALLEL ATMOSPHERES

FORWARD MODELING OF OBSERVED SPECTRA WITH SME



ADDING THE CKS SAMPLE

SAME ABUNDANCES, MORE PLANETS



Brewer et al (in prep)

METALLICITY — [Fe/H]



Brewer & Fischer (in prep)

ROCKS — [Si/H]



Brewer & Fischer (in prep)

PACKED-MULTIS & HOT-JUPITERS IN KNOWN HOSTS

SILICATES vs METALS — Si/Fe



Brewer & Fischer (in prep)

CHEMICAL TRACERS OF PLANET FORMATION

- Comparing planetary system architectures
- Expanded abundance catalog
- Composition, not just mass important in formation
- Si/Fe ratio may help identify systems with rocky planets



THANKS

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