

Formation and Structure of Low-Density Exo-Neptunes

Leslie A. Rogers, Peter Bodenheimer, Jack J. Lissauer, & Sara Seager

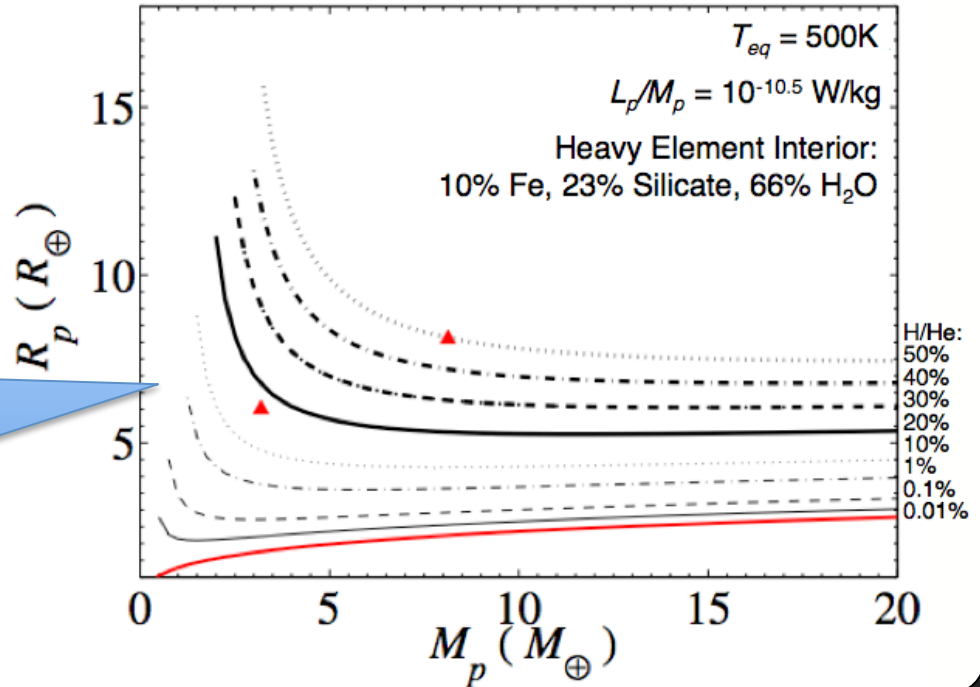
larogers@mit.edu, Massachusetts Institute of Technology, Cambridge MA, 02139

Motivating Question:

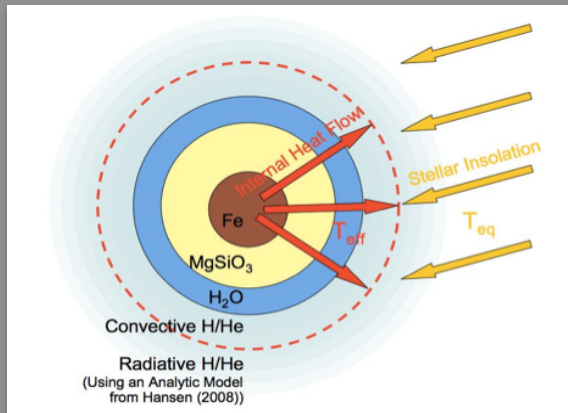
What are the minimum plausible masses of Neptune-size ($2-6 R_{\oplus}$) planets?

Planets with gas layers can get larger as you go to lower planet masses.

Super-Earths with H/He Envelopes

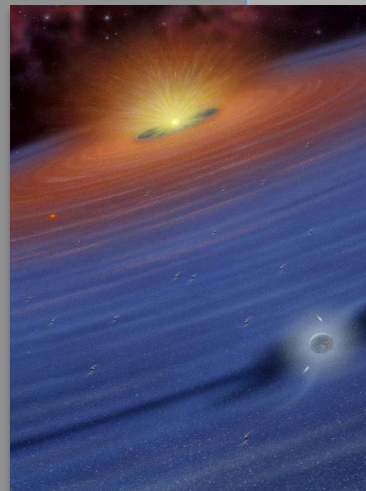


Main Results



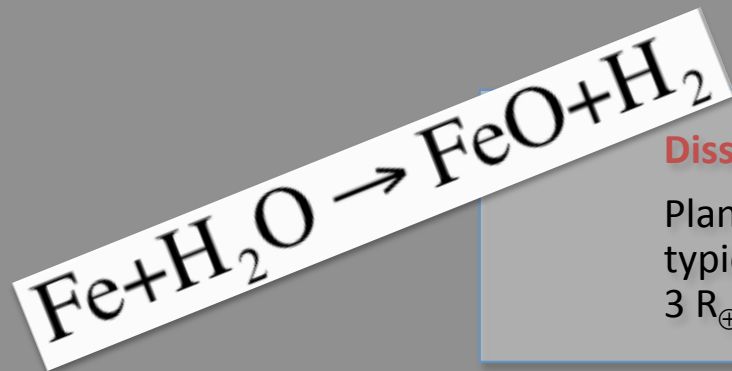
Equilibrium Planet Models:

Neptune-size *Kepler* planet candidates could have low mass (a few Earth masses) at $T_{eq} = 500\text{K}$.



Core Nucleated Accretion Calculations:

Low mass ($3-8 M_{\oplus}$) Planets with substantial H/He envelopes can plausibly form by core nucleated accretion beyond the snow-line and migrate inward to $T_{eq} \sim 500\text{K}$ with their envelopes intact.



Dissociative Outgassing of H₂:

Planets with outgassed H₂ envelopes typically have modeled radii less than $3 R_{\oplus}$.