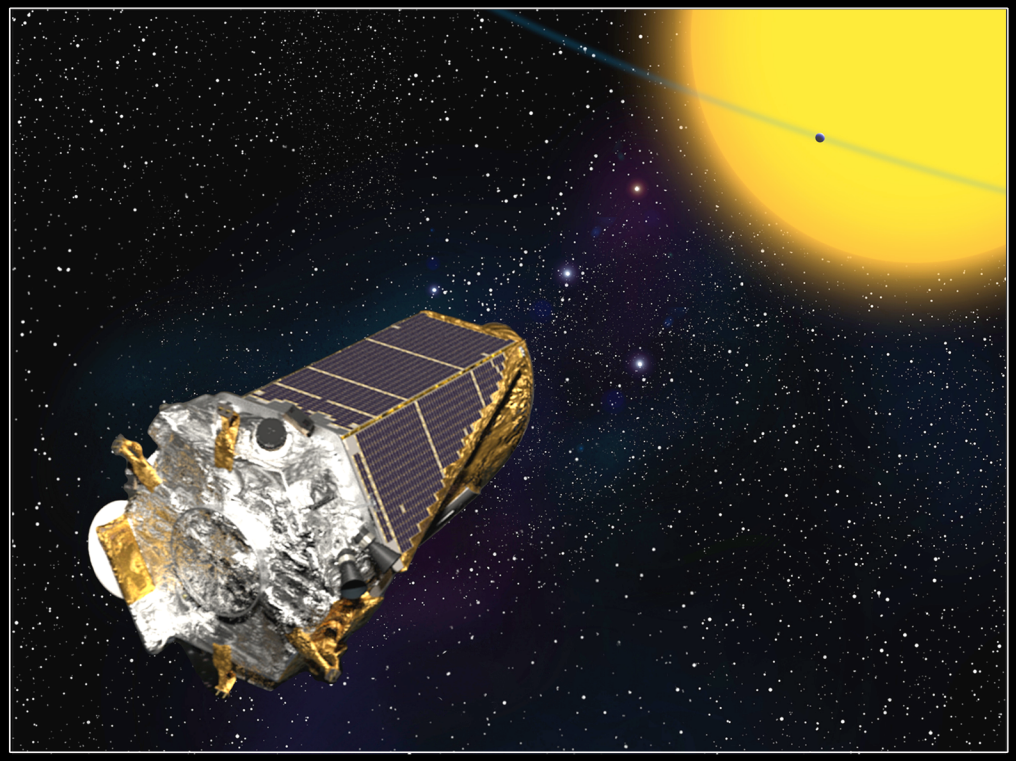
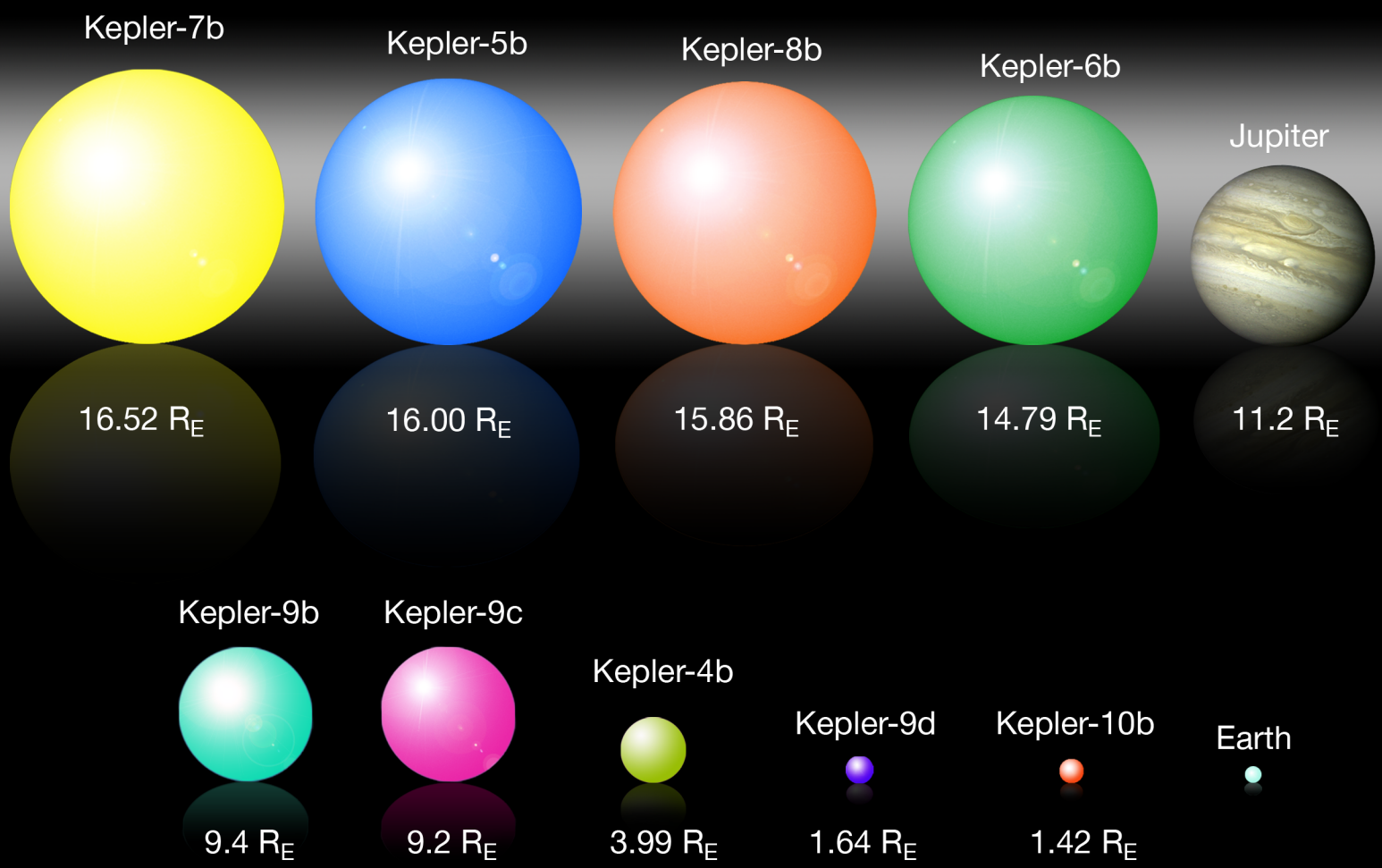
NASA's Kepler Mission

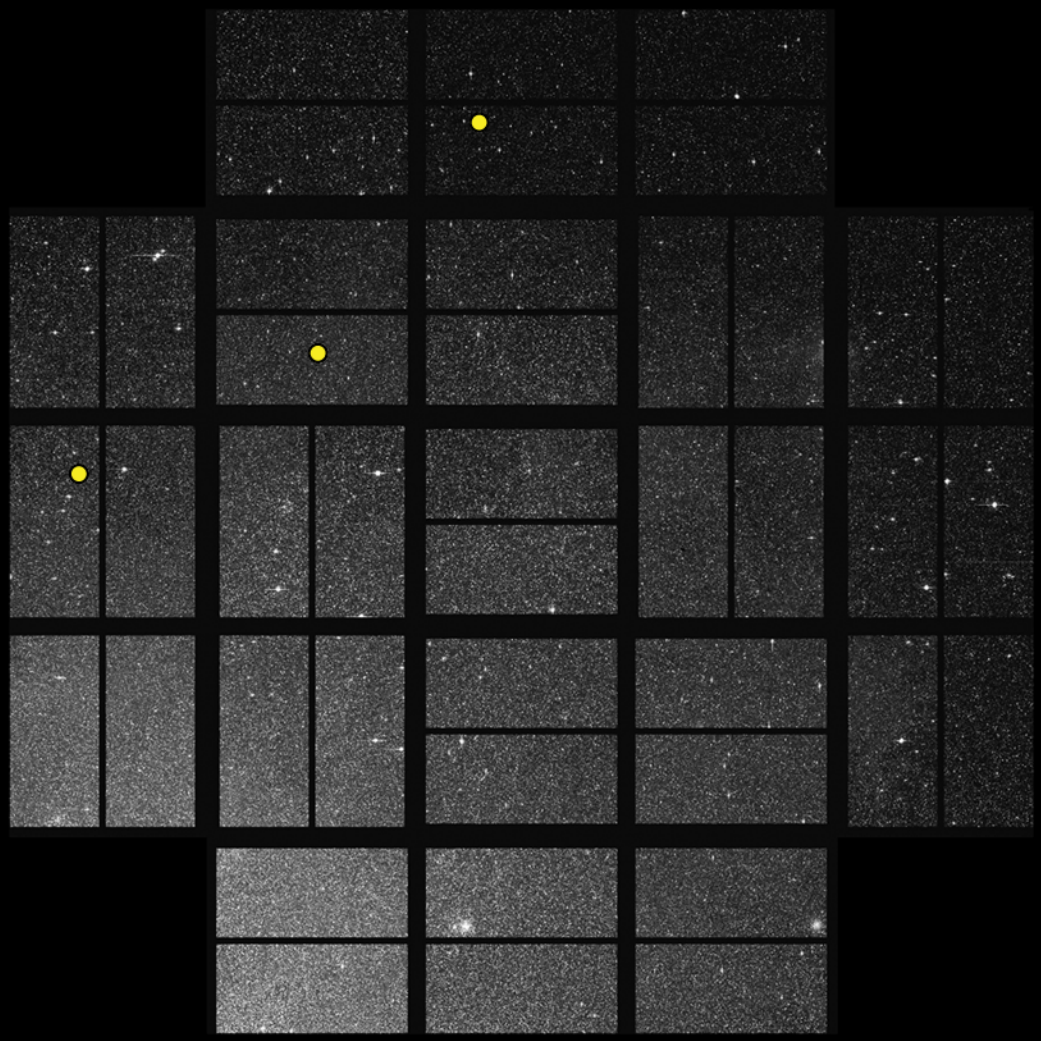
- Determine the frequency of Earth-size and larger planets in the habitable zone of sun-like stars
- Determine the size and orbital period distributions of planets



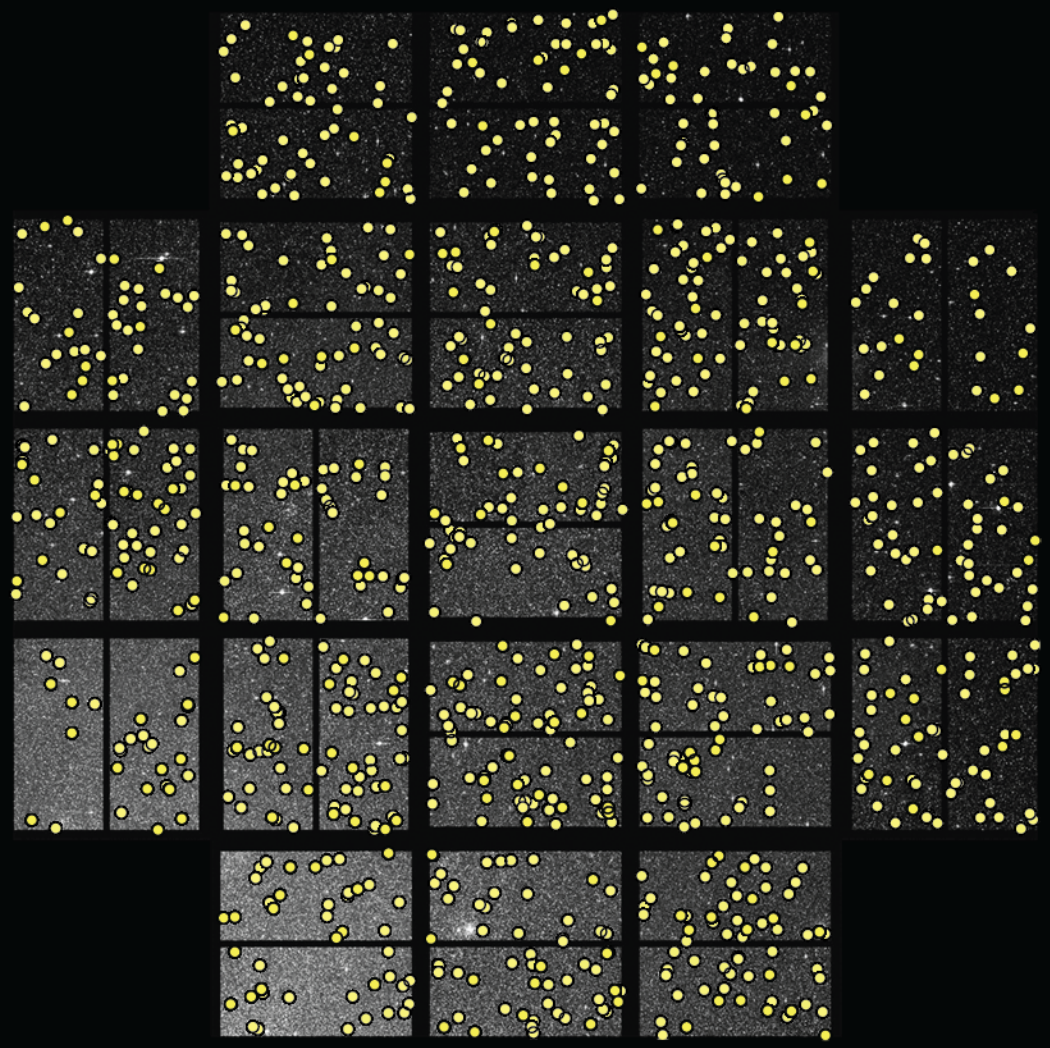
Planet Size


Kepler-7b
16.52 R_E
Kepler-5b
16.00 R_E
Kepler-8b
15.86 R_E
Kepler-6b
14.79 R_E
Jupiter
11.2 R_E
Kepler-9b
9.4 R_E
Kepler-9c
9.2 R_E
Kepler-4b
3.99 R_E
Kepler-9d
1.64 R_E
Kepler-10b
1.42 R_E
Earth

Pre-Kepler Planets in the Field of View

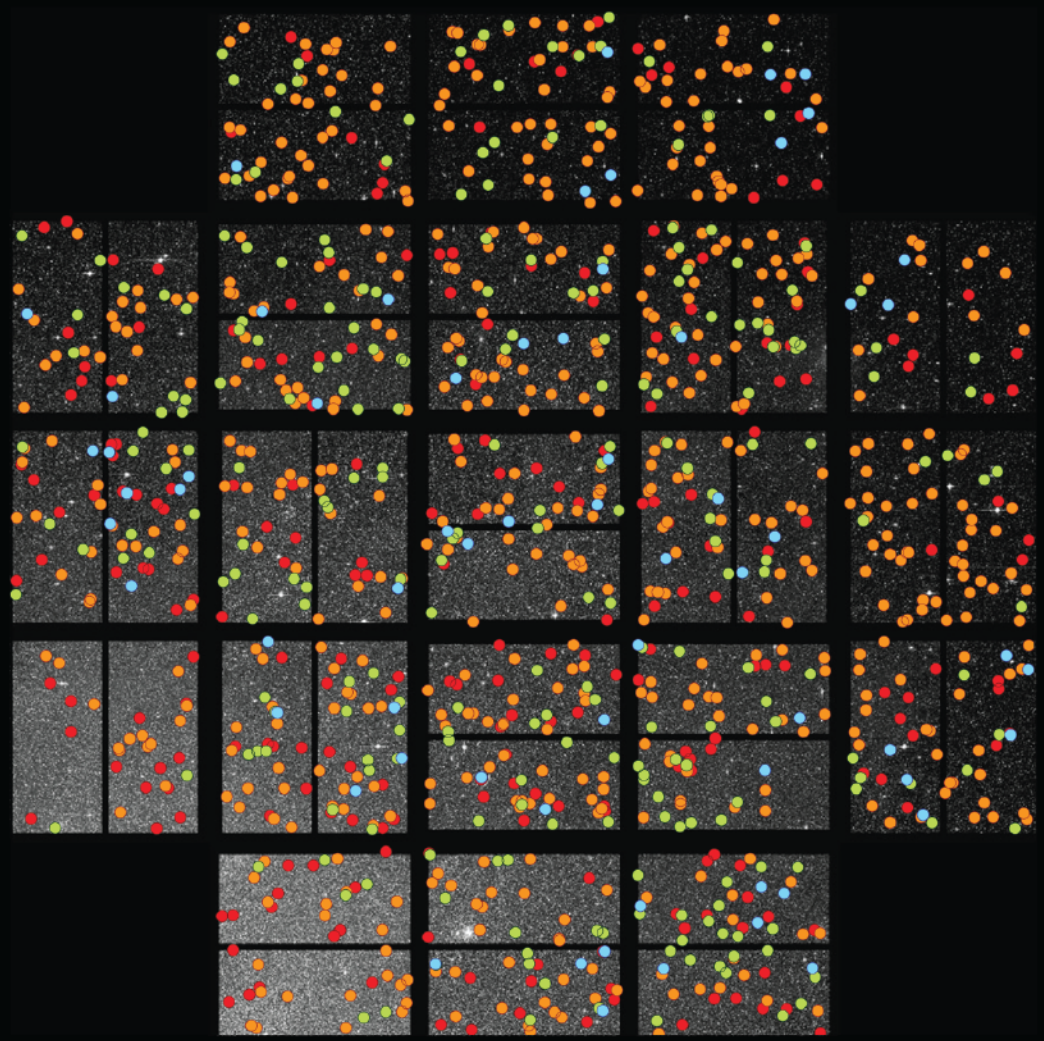


Kepler’s 1,000+ Planet Candidates



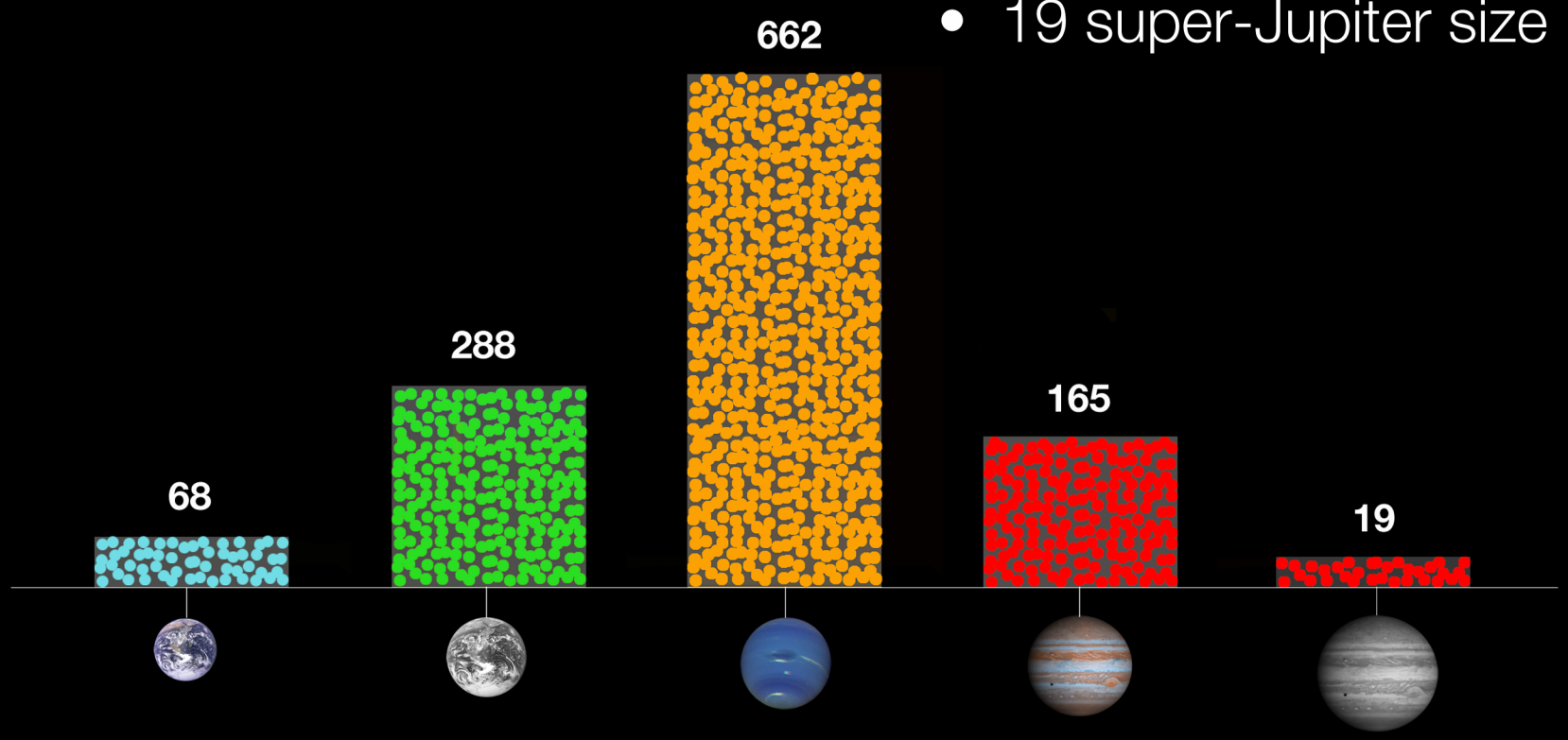
Locations of Kepler Planet Candidates

- Earth-size
- Super-Earth size
  1.25 - 2.0 Earth-size
- Neptune-size
  2.0 - 6.0 Earth-size
- Giant-planet size
  6.0 - 22 Earth-size

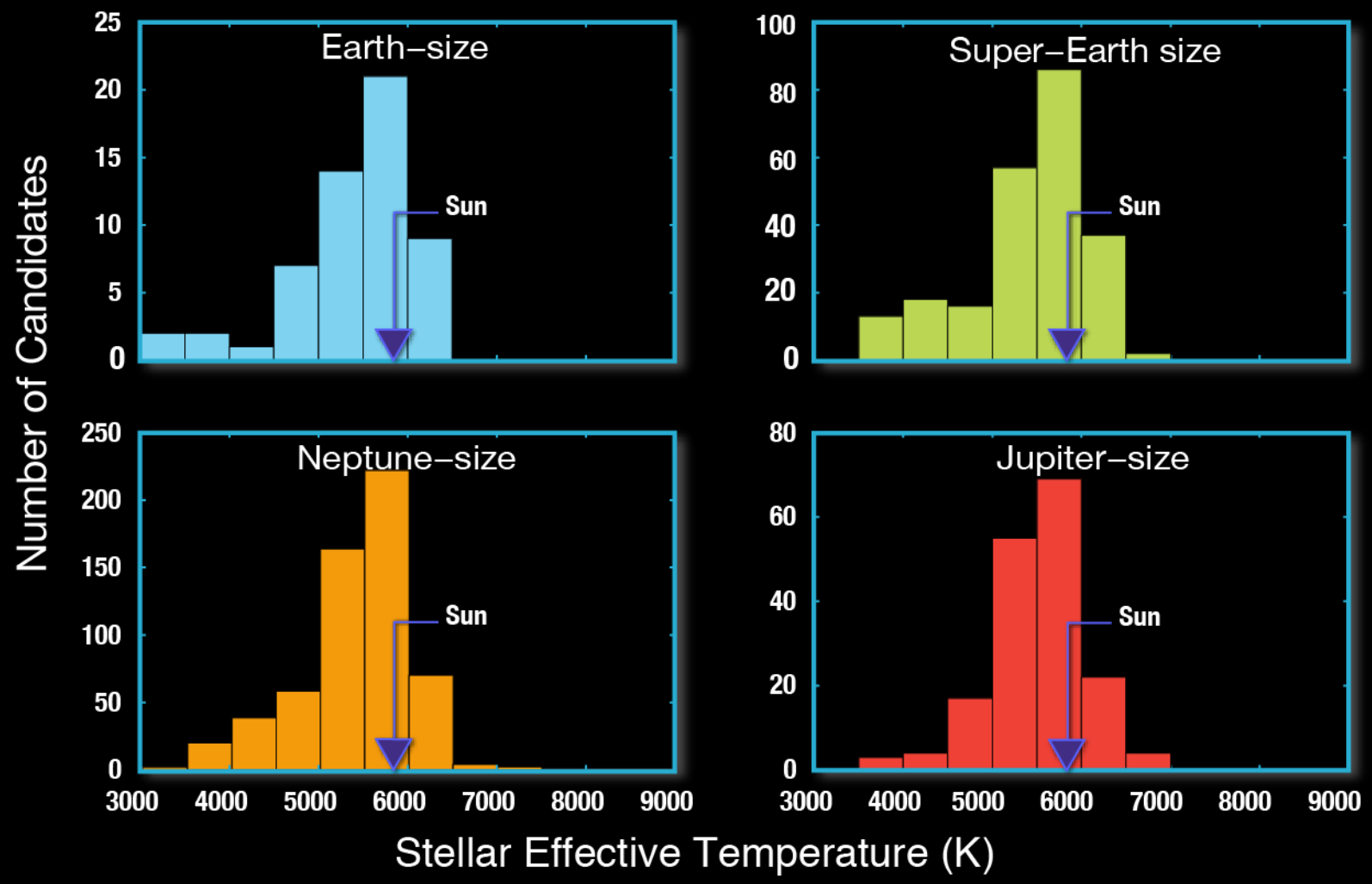


Numbers of Planet Candidates

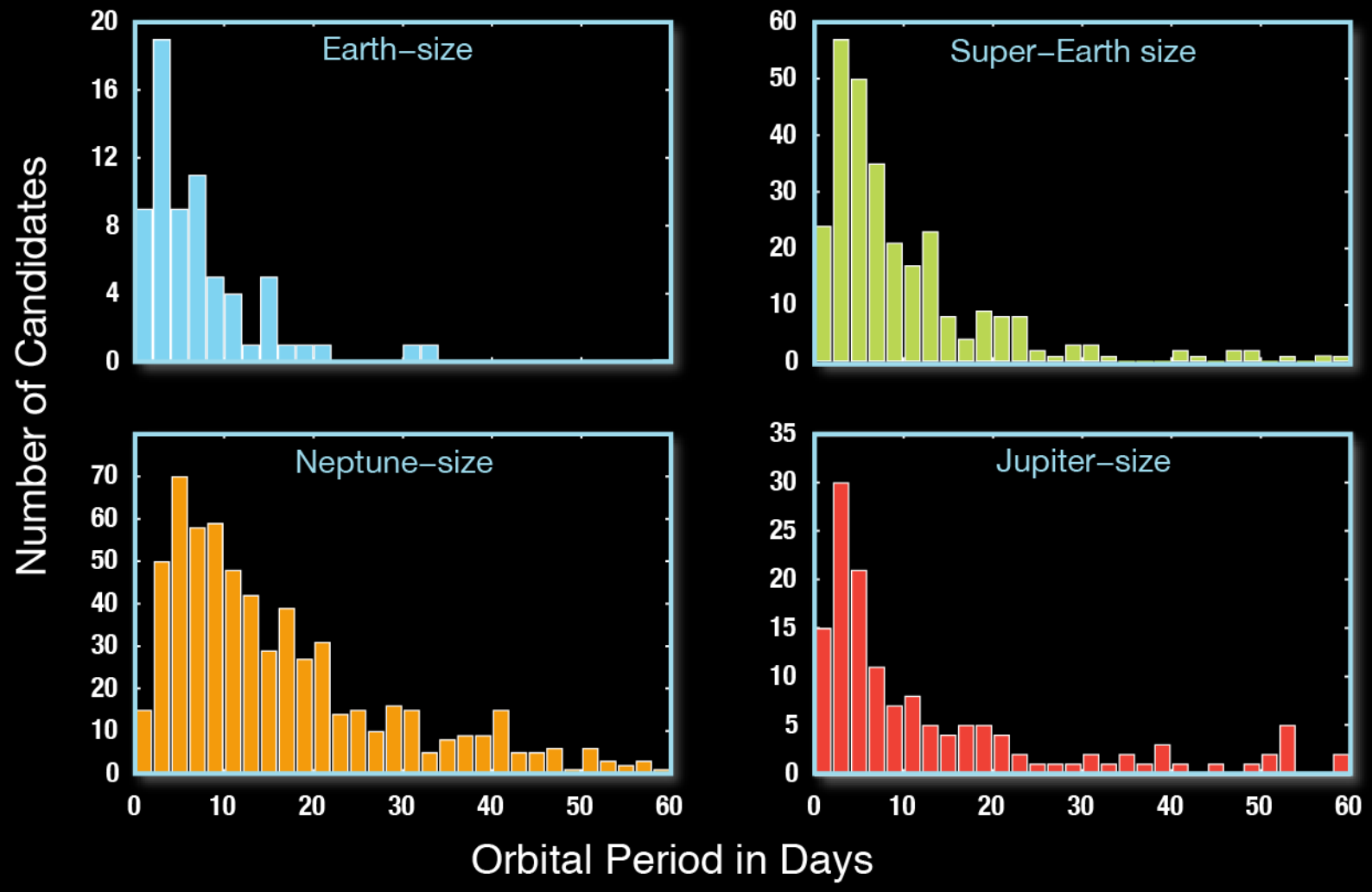
- 68 Earth-size
- 288 super-Earth size
- 662 Neptune size
- 165 Jupiter size
- 19 super-Jupiter size



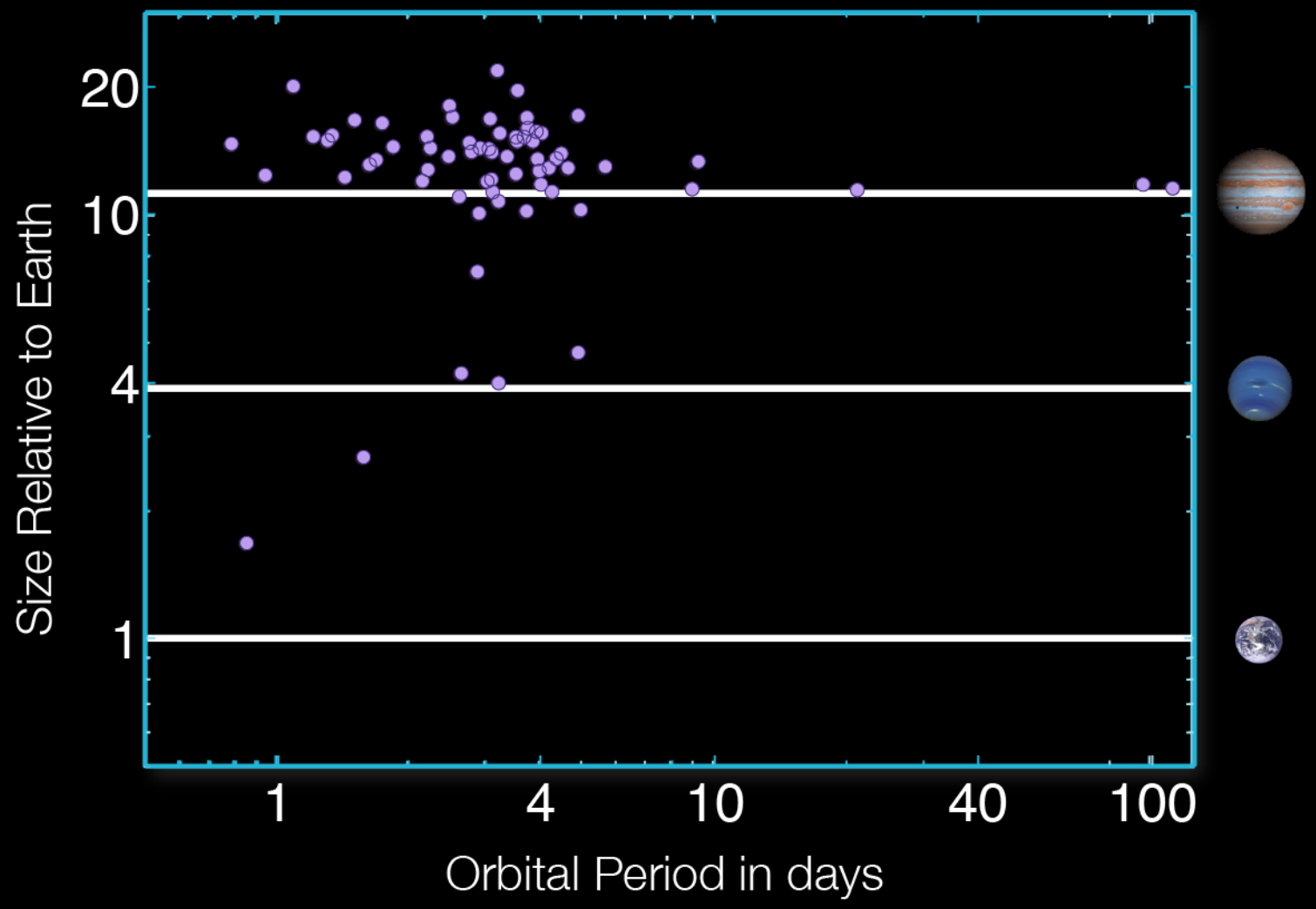
Most of the Candidates Orbit Stars Like our Sun



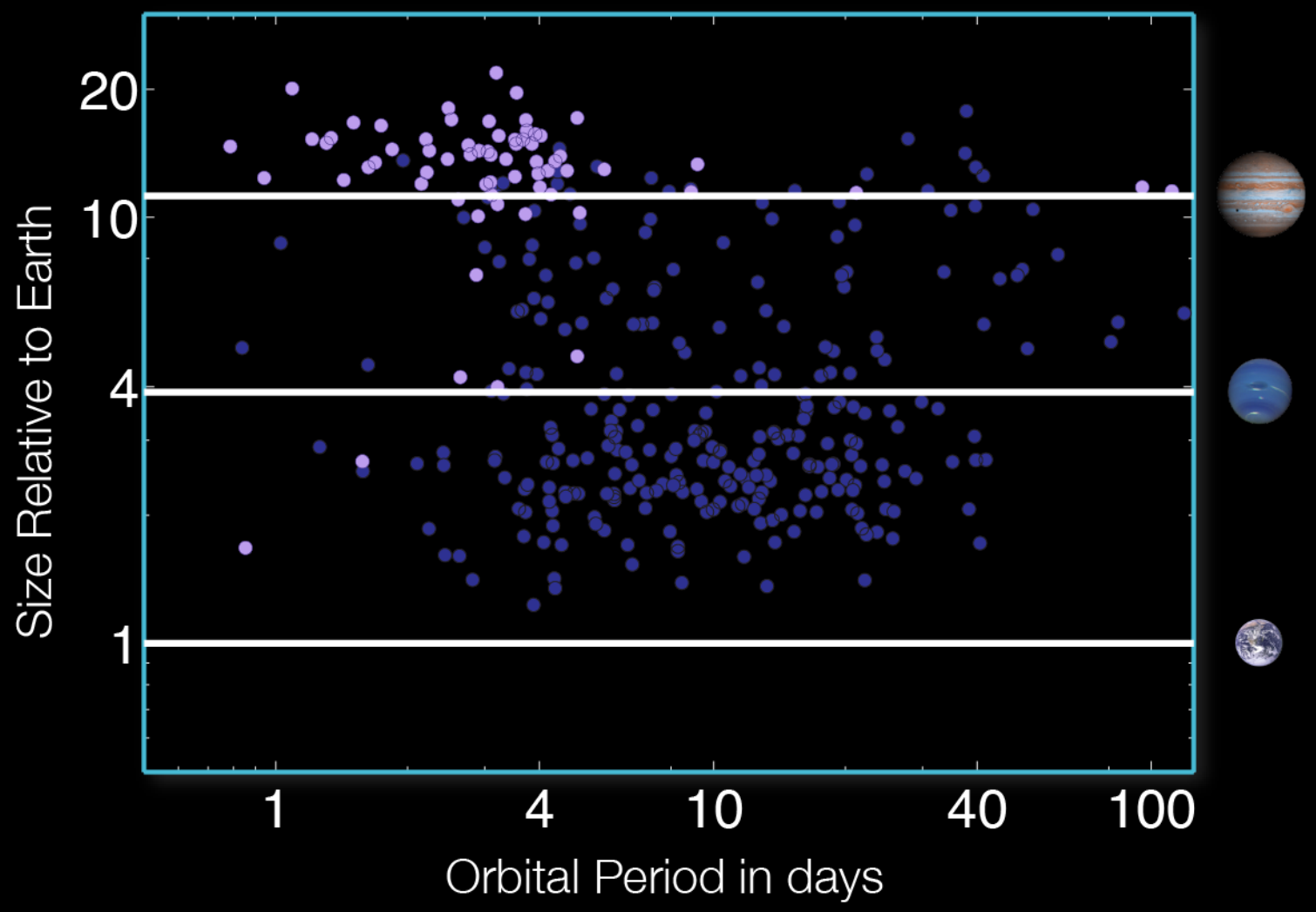
Candidates Show Drop Off for Shortest Orbital Periods



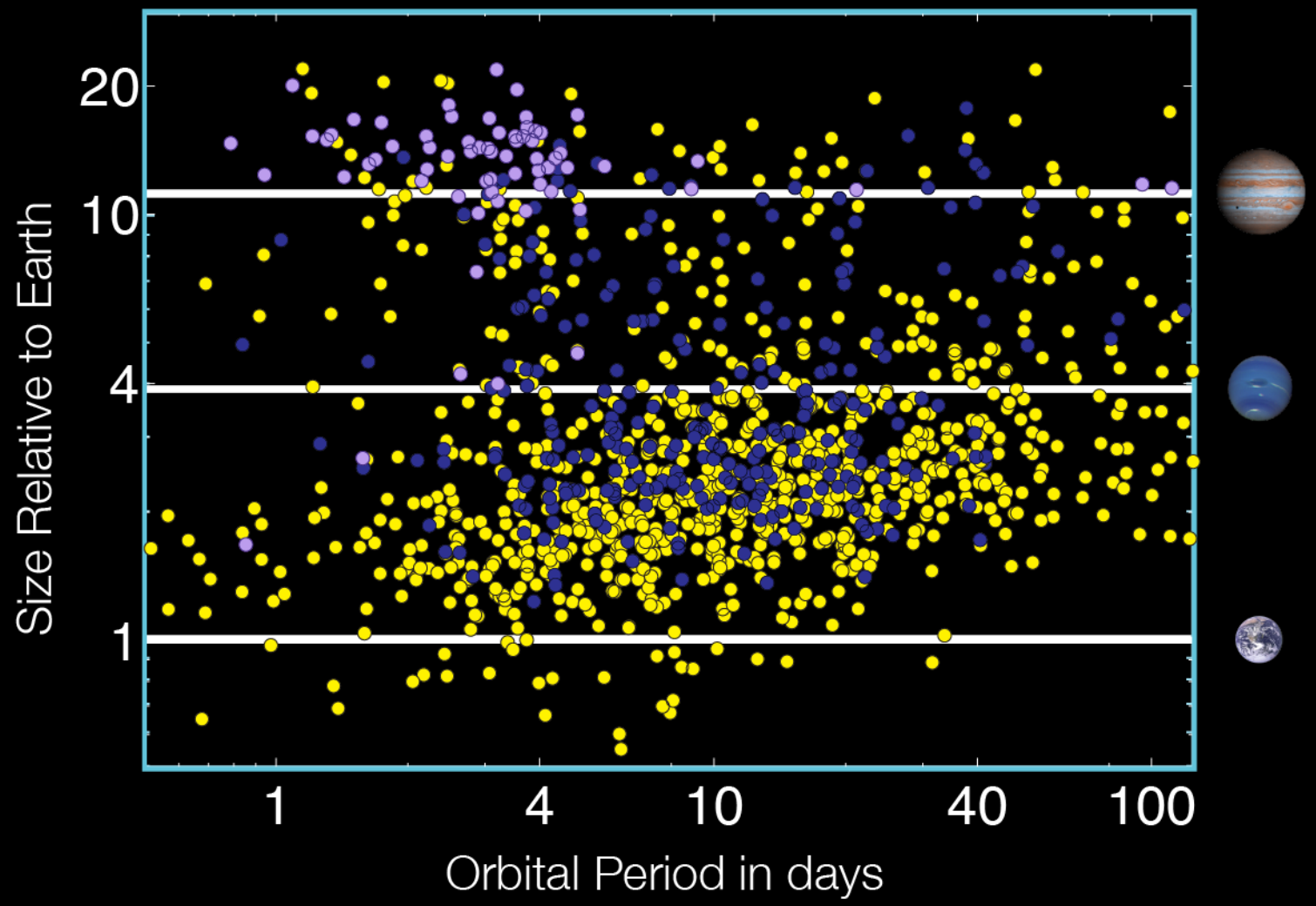
Pre-Kepler Transiting Planets - 2009



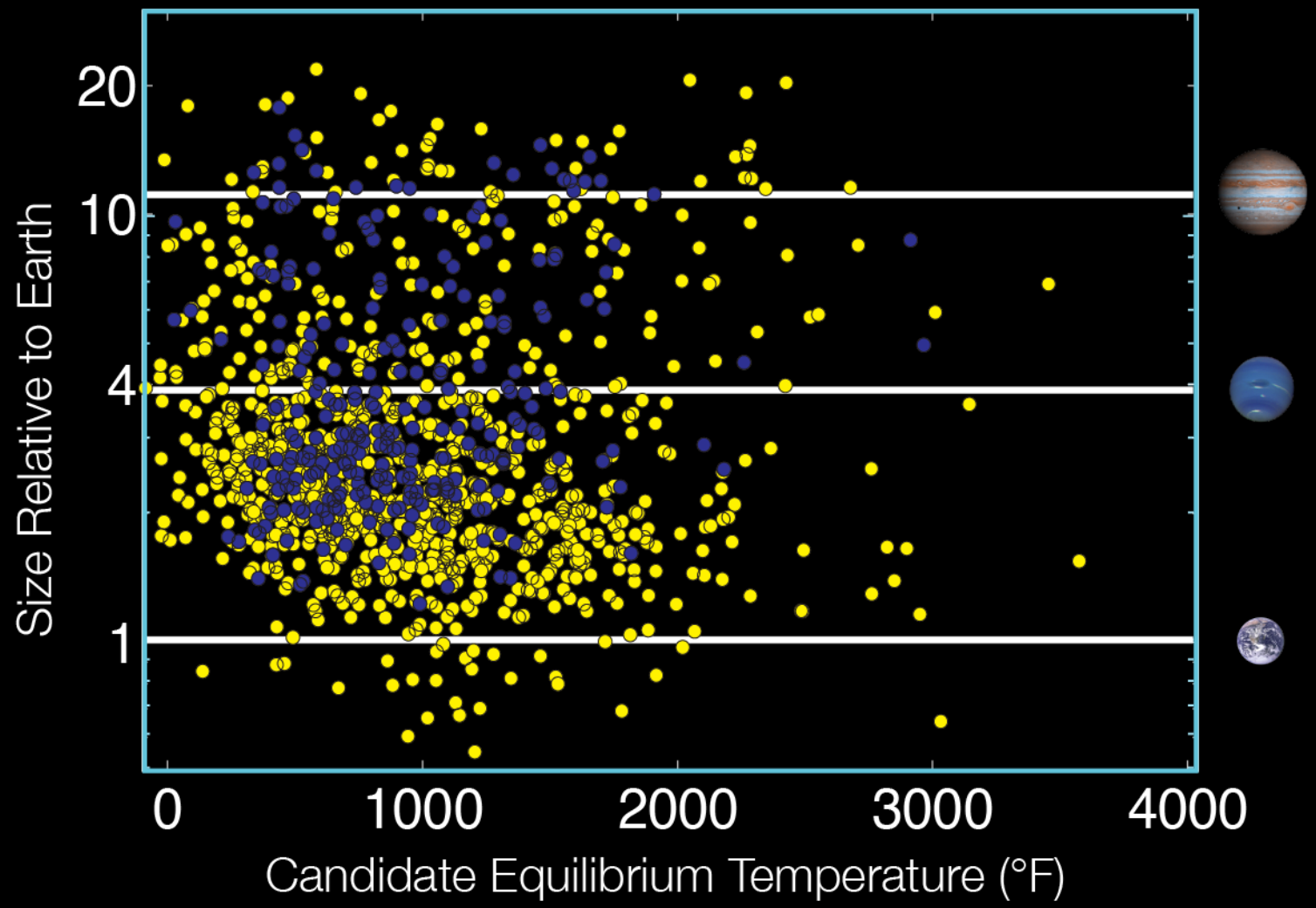
Kepler Candidates as of June 2010



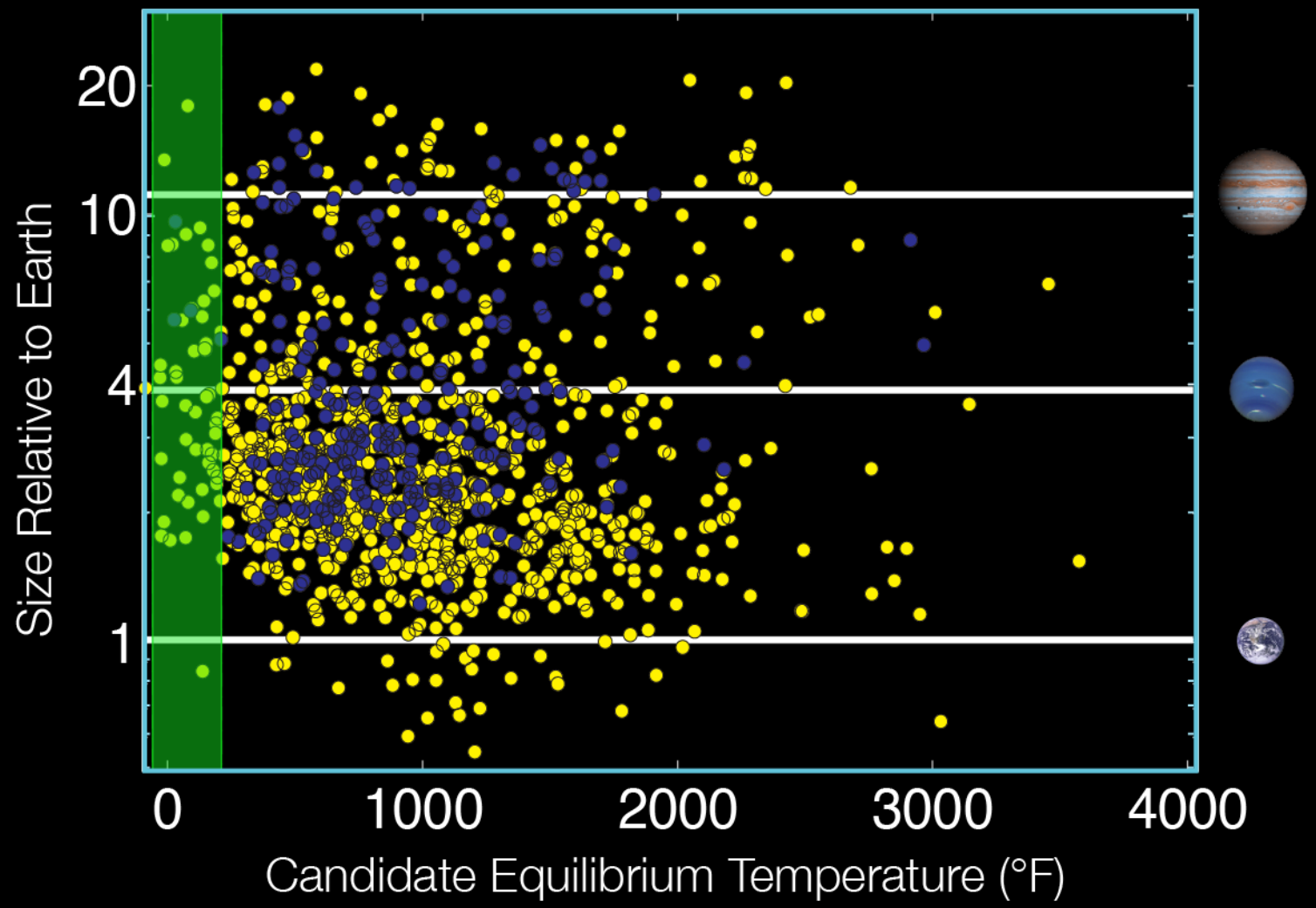
Kepler Candidates as of February 1, 2011



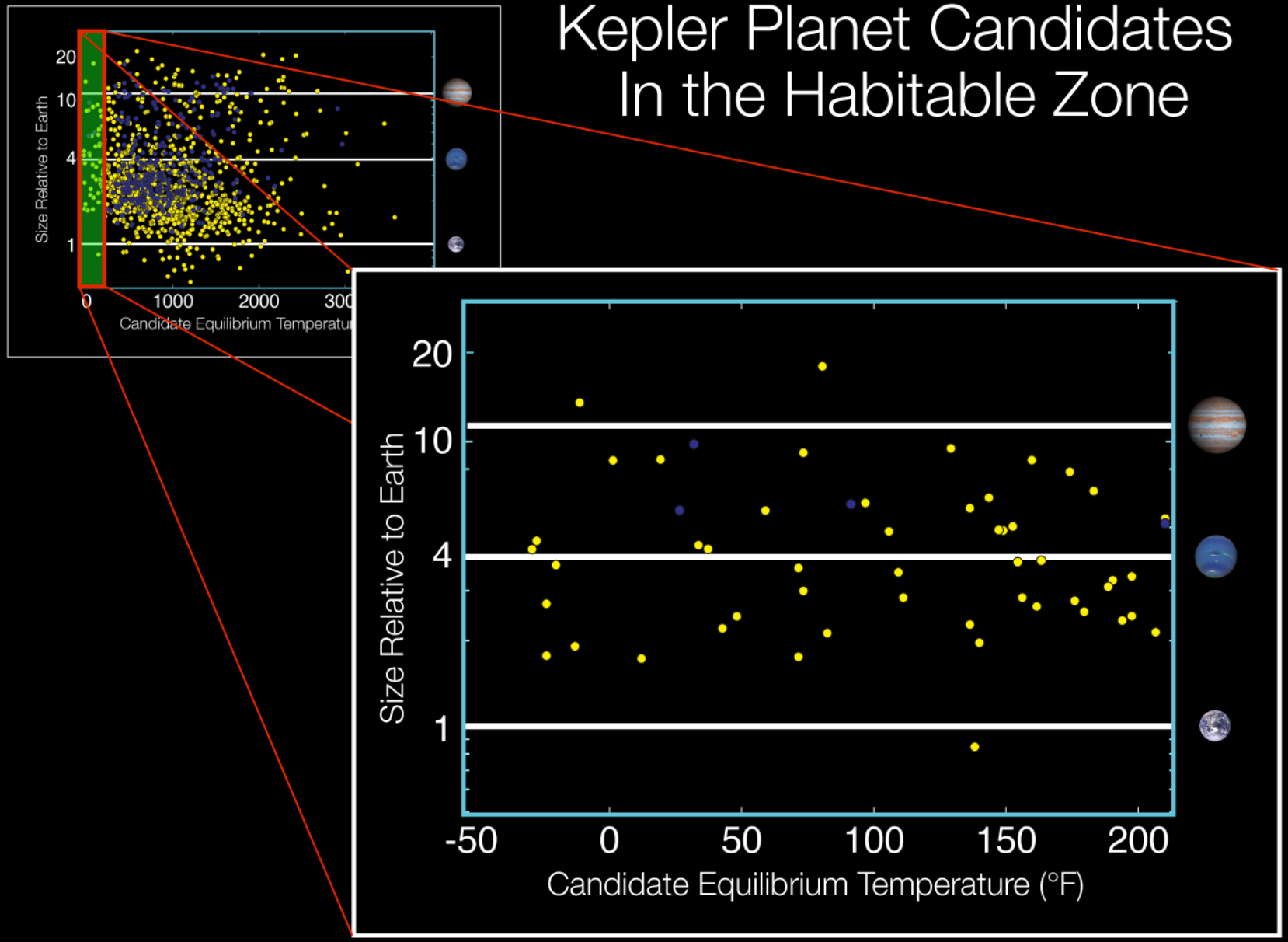
Kepler Candidates as of February 1, 2011



Kepler Candidates as of February 1, 2011

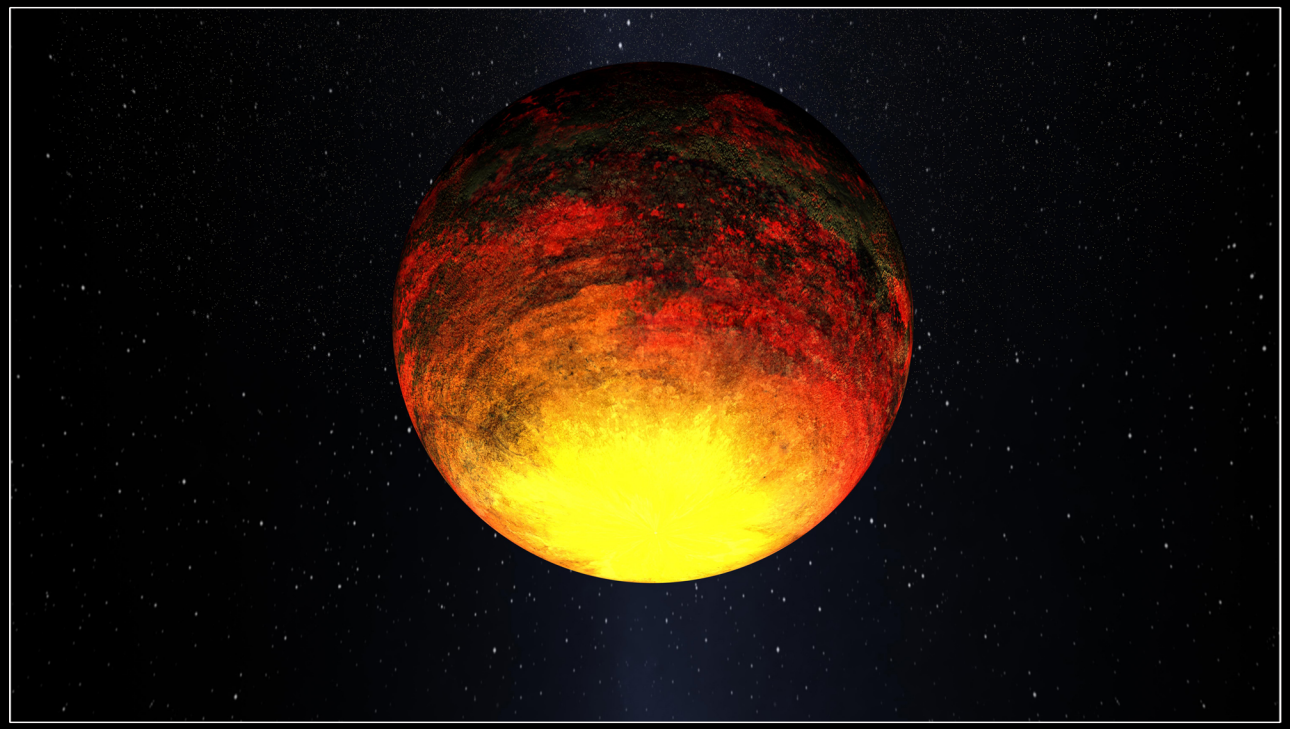


Kepler Planet Candidates In the Habitable Zone



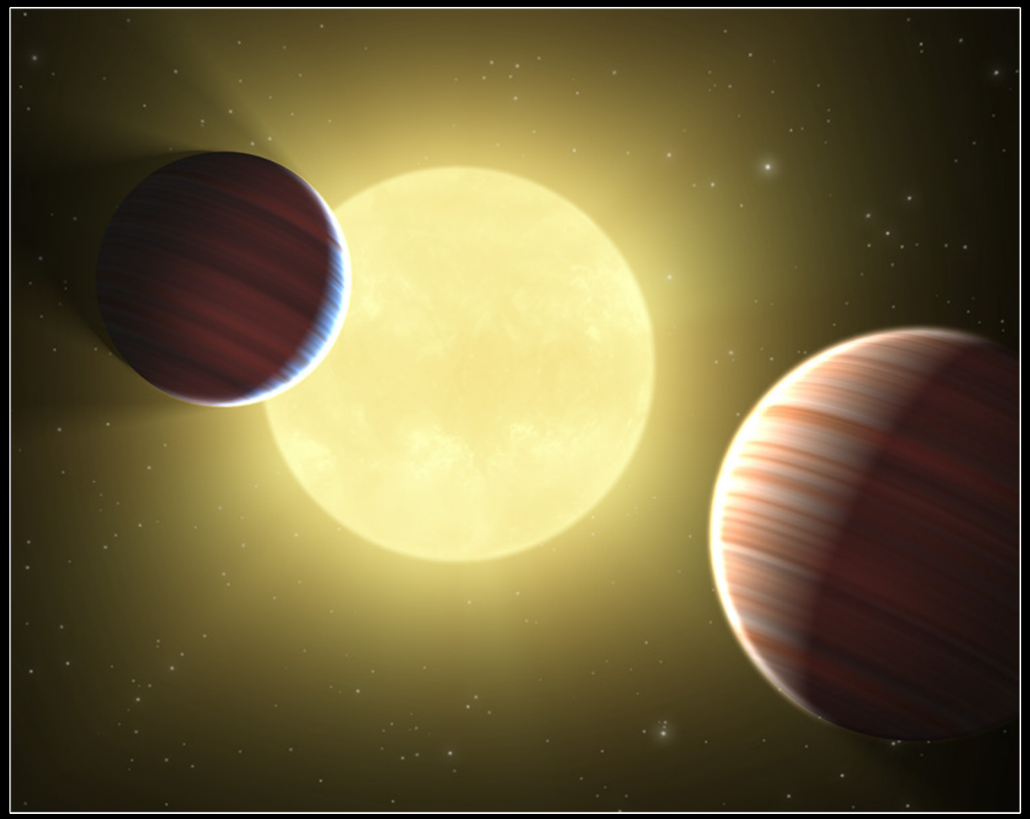
Kepler’s First Rocky Planet: Kepler-10b

Kepler is giving us new knowledge about the frequency of near Earth-size planets.



The Kepler-9 Discovery Provided a New Technique for Planet Mass Determination

The determination of mass and size provides an estimate of the composition of the planets.



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Summary

- Kepler is releasing the data on 155,453 stars and on the 1,235 planetary candidates that it has discovered in the first 4 months of science operations.
- The planetary candidates include 68 of Earth-size, 288 of super-Earth-size, 662 of Neptune-size, and 165 of Jupiter-size.
- 54 planetary candidates are in the habitable zone of their host stars.
- The 5 smallest of these range in size from 0.9 to twice the size of the Earth.
- 170 stars show the presence of systems of transiting planetary candidates.
- Kepler continues to make excellent progress toward its goal of determining the frequency of Earth-size planets orbiting sun-like stars.