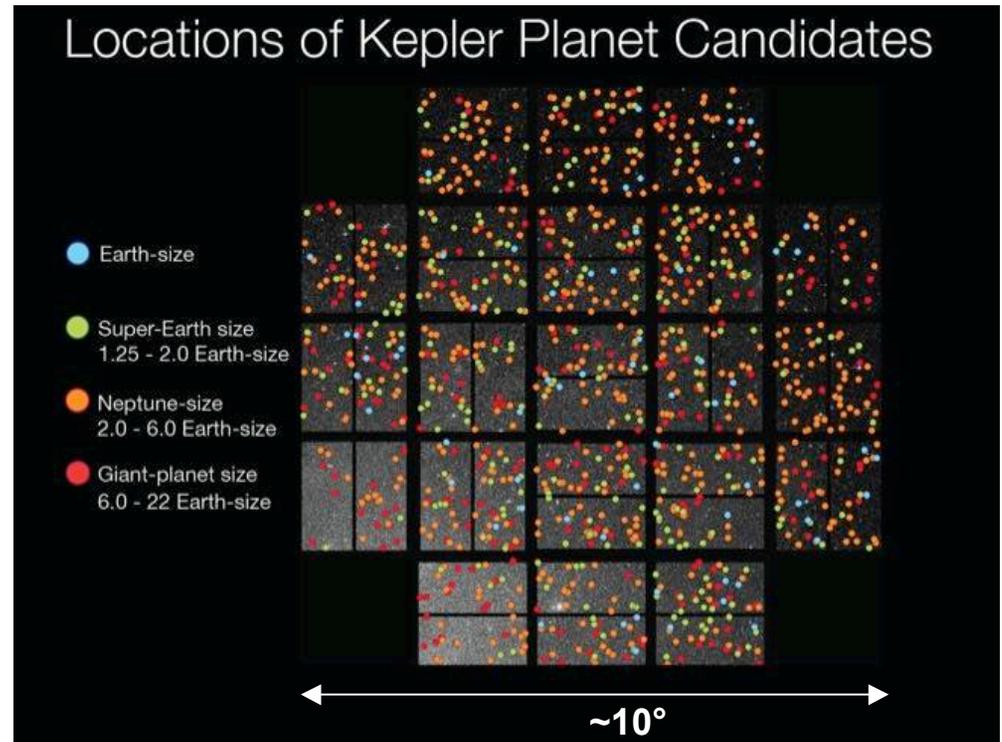


# A Thousand New Planets

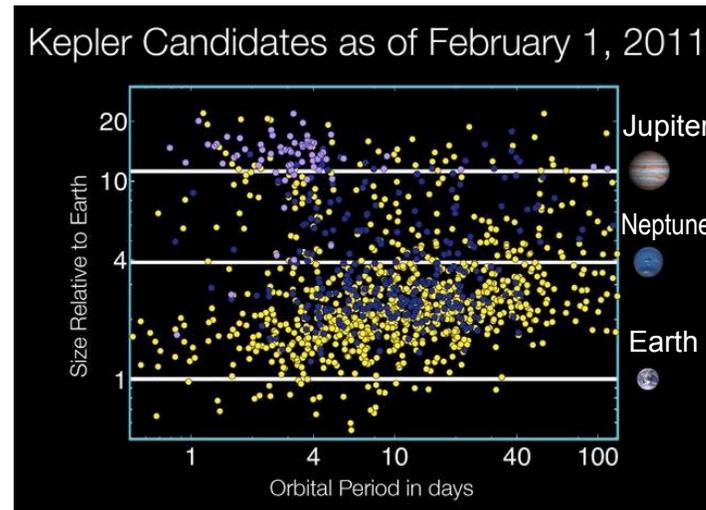
- Prior to 2011, scientists knew of about 500 planets around other stars, detected over 15 years
- NASA's Kepler spacecraft has been monitoring more than 150,000 stars since 2009 for repeated, brief dimmings from a planet passing in front of a star
- Results from the first four months of Kepler observations were recently announced, adding more than 1200 probable new planets to the list



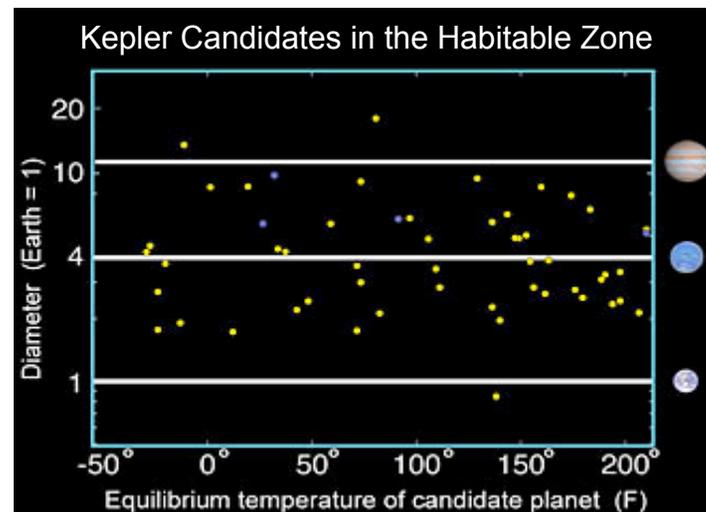
*Kepler's field of view, with the locations of likely planets colored according to their size. Kepler has discovered myriad planets in a small portion of the sky in only four months.*

# How Many Earths?

- The **frequency** of the dimmings gives the **orbital duration**, and therefore the planet's **distance from the star**. The **amount** of dimming gives the planet's **size**.
- Kepler has detected about 70 Earth-sized planet candidates - many more than known previously
- Kepler has detected about 50 candidates in the 'Habitable Zone' of their star (the orbital distance where temperatures should be about right for liquid water and possibly life), compared to about 5 known previously



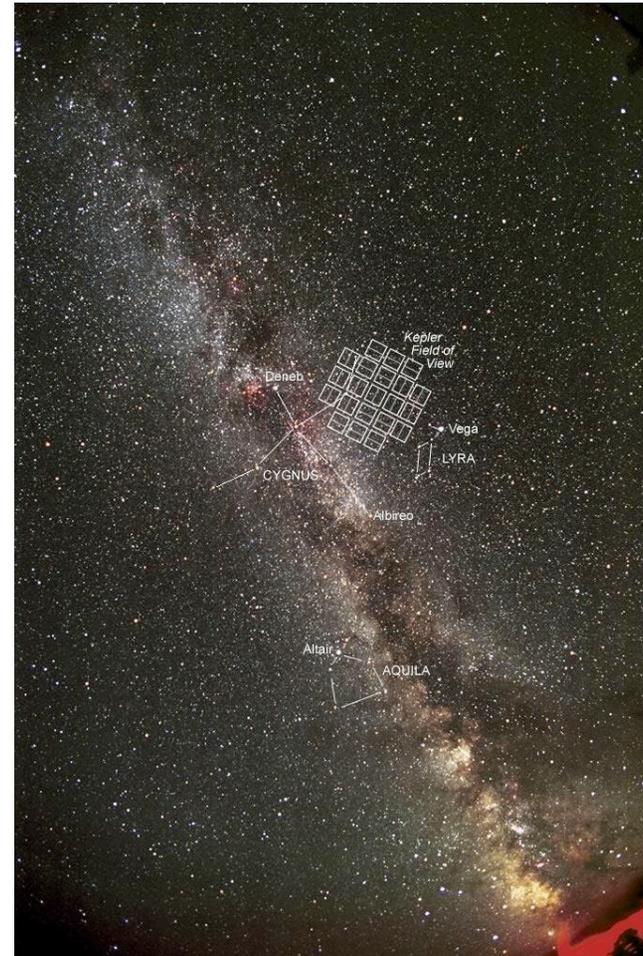
*Size vs. orbital period of 1200 new planet candidates (yellow), with previously known transiting planets (purple) and previously announced Kepler planet candidates (blue) for reference*



*Size of Kepler planet candidates determined to be in the Habitable Zone of their star. Sizes range from smaller than Earth to larger than Jupiter, with most comparable to Neptune.*

# The Big Picture

- Follow-up observations using other techniques are necessary to confirm the Kepler planets and (in most cases) determine their mass
- Only short period (close-in) planets are detectable using four months of data. Kepler's entire 3-year mission should find planets farther out, including many more in their stars' Habitable Zones



*Kepler's field of view covers only a small portion of the sky. The discoveries it has made in only four months suggest that planets commonly form around other stars. Image courtesy Carter Roberts.*

# For More Information...

## Press

- NYTimes.com - 02/02/11 - "Kepler Planet Hunter Finds 1,200 Possibilities"  
<http://www.nytimes.com/2011/02/03/science/03planet.html>
- NASA Kepler Mission Site - 02/02/11 - "NASA Finds Earth-size Planet Candidates ..."  
[http://www.nasa.gov/mission\\_pages/kepler/news/kepler\\_data\\_release.html](http://www.nasa.gov/mission_pages/kepler/news/kepler_data_release.html)
- NASA Kepler Mission Site - 02/01/11 - "NASA Announces 1,235 Planet Candidates, ..."  
<http://kepler.nasa.gov/news/index.cfm?FuseAction=ShowNews&NewsID=98>

## Images

- Slide 1 image courtesy NASA / Wendy Stenzel  
[http://www.nasa.gov/mission\\_pages/kepler/news/kepler\\_data\\_release.html](http://www.nasa.gov/mission_pages/kepler/news/kepler_data_release.html)
- Slide 2 images courtesy NASA / Wendy Stenzel  
<http://kepler.nasa.gov/news/index.cfm?FuseAction=ShowNews&NewsID=98>
- Slide 3 image courtesy Carter Roberts (1946-2008)  
[http://www.nasa.gov/mission\\_pages/kepler/multimedia/images/kepler-field-of-view.html](http://www.nasa.gov/mission_pages/kepler/multimedia/images/kepler-field-of-view.html)

## Source Articles (on-campus login may be required to access journals)

- Borucki et al., 'Characteristics of planetary candidates observed by Kepler, II: Analysis of the first four months of data', *Astrophysical Journal*, submitted, 2011.  
<http://arxiv.org/abs/1102.0541>

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