

Planetary Wonderings
December Focus: Exosolar Planets
By Mary-Frances Bartels, NASA Solar System Ambassador

Until 1995 the existence of planets outside of our solar system had not been verified. Since then 329 have been discovered. It seems that almost weekly, a new announcement of yet another extrasolar planet around a neighborhood star makes the news. Just a few weeks ago the very first direct photographs of exosolar planets were released. Researchers using the Hubble Space Telescope unveiled a picture of a young planet orbiting the star Formalhaut, and scientists using the Keck Earth-based telescopes confirmed pictures of three exoplanets orbiting the star HR8799. It is also possible that European Southern Observatory's Very Large Telescope has also captured an exoplanet visually.

In addition to these visual finds, other methods are also used to detect exoplanets. The European Southern Observatory's HARPS (High Accuracy Radial velocity Planet Searcher) uses *stellar spectral changes, or Doppler*, to detect planets. The French's COROT (CONvection ROTation and planetary Transits) space telescope uses a camera sensitive to tiny variations of the light intensity of a star indicating the *transit* of a planet. When the transit occurs, astronomers can detect the mass and distance of the planet. The transit method also makes it possible to study the atmosphere of the transiting planet through studying how the star's spectrum changes. The Spitzer Space Telescope has been employed to detect planets using the transit method. Due to launch in early 2009, the upcoming Kepler mission will use the transit method to detect Earthlike planets. Scientists have used the Hubble Space telescope to detect exoplanets using *astrometry*, a method that uses a slight change in a star's position to find planets massive enough to make such a wobble detectable. *Gravitational microlensing* occurs when the gravitational field of a star acts like a lens, magnifying the light of a distant background star. If the foreground lensing star has a planet, that planet's gravitational field adds to the lensing effect. This method was tested by Polish astronomers in Project OGLE (Optical Gravitational Lensing Experiment) and is being used by the PLANET (Probing Lensing Anomalies NETwork)/RoboNet project. *Dust disks* can indicate the presence of planets and surround many stars. They can be detected via infrared observations, and have been discovered by both the Hubble and Spitzer space telescopes as well as the Keck ground-based interferometer.

Resource of the Month: Are you into widgets? Do you want THE most up-to-date count of extrasolar planets discovered? If so, then check out NASA JPL PlanetQuest's Planet Counter at <http://planetquest.jpl.nasa.gov/widget.cfm> . You need to install Yahoo!'s Widget Application first.

Activity of the Month: Collegiate Case Study: The Hubble Legacy
<http://www.usatoday.com/educate/hubble/index1.html>

USA Today has a nice resource on the Hubble Space Telescope. The compilation of its own coverage includes a history of the telescope, problems, solutions, rewards, and critical inquiry. It is broken down into parts roughly 700 kb in size, so even dialup users can take advantage. The critical inquiry section allows students to use the information presented as well as other internet resources listed to research Hubble further, answer questions, and learn about the upcoming

Hubble servicing mission. This is a great science and English exercise appropriate for high school and advanced middle school students.

Suggestions, questions, and comments about “Planetary Wonderings” are welcomed and may be directed to stargazer @ keeplookingup.net (remove spaces). Past columns may be found at www.keeplookingup.net (click on “Planetary Wonderings” on the right side of opening screen) and at <http://www.freelists.org/archives/astronomyed/> (columns from Jan. 2007 to the present).

Remember to *keep looking up!*

Sources (not mentioned in the article):

<http://www.livescience.com/space/080619-seti-extrasolar-earths.html>

http://www.novacelestia.com/space_art_extrasolar_planets/mission_extrasolar_planets.html

<http://planetquest.jpl.nasa.gov/>

<http://smc.cnes.fr/COROT/>