

### Offered Title: Planets...They're Everywhere!

From the time we discovered how big our universe is, we wondered if there might be other 'solar systems' out there. We would not find out for sure until 1992, with the first Exoplanet confirmation. The planets are Earth size and orbit a pulsar...a neutron star that spins like a top and sweeps a beam of intense radiation over them. Those planets are cooked!

In 1995 came the planet orbiting 51 Pegasi, a Sun – like star. It is a Jupiter sized planet. Technology now allowed us to find planets around other stars, and there are plenty of stars out there. The primary technologies: Photometry – measuring how the light of a star is affected when a planet transits between it and us, and a spectrograph called HARPS to detect planets movement around their parent star.

HARPS and the transit method from Earth are very good at finding planets...then came Kepler. Launched in 2009, Kepler uses photometry to detect planets. Even with its pointing system failure in 2013 Kepler still finds exoplanets, it's just stuck pointing in one direction, and now called K2. Since the first exoplanet discovery astronomers have tallied over 3,700 planets, in 2,800 planetary systems, Kepler contributing over 2500. Unfortunately, the Kepler/K2 mission is ending soon, it's running out of fuel.

The planetary systems found so far have forced astrophysicists to re-think how our solar system formed. The first indication that things aren't as we thought was finding many systems with gas giant planets close to their parent star. It had been dogma that gas giant planets formed in the outer regions of a planetary system. Now we see them up close to their star, their atmosphere getting stripped away by heat and radiation pressures.

The variety of planet types found so far indicates that the process of formation is dynamic. Rocky, gaseous, large, small, they all provide data to chew on. The smallest, just twice the size of our Moon. The largest, 30 times the size of Jupiter...maybe a brown dwarf?

Of course, we aren't looking for just any planets. A major thrust for these projects is a search for planets able to support life, in a 'habitable zone'. To this end there have been some criteria developed for identifying candidates. Just as with the theory of planetary formation, the concept of a habitable zone has been informed by the data coming in. Unlike our solar system, a habitable zone out there varies, dependent on circumstances such as the type of parent star, it's size and mass. Planetary considerations include its mass, atmosphere, orbit configuration, rotation rate, etc. Nevertheless, several candidates for life supporting planets have been found. Anyone home?

### What's in the Sky?

Well, I missed announcing the Lyrid meteor shower peak that occurred after midnight, sorry. It continues for a few days however, best seen after midnight in the east.

April 27; Dusk: Venus is between Aldebaran and the Pleiades, above the west – northwest horizon.