

Astrobiology News October 2015: *What Do Comets and Aliens Have in Common?*

Both comets and alien “megastructures” have been offered as possible explanations for the bizarre light curves (graphs showing changes in brightness over time) of the star known as KIC8462852, discovered serendipitously by citizen scientists mining data from the *Kepler* mission in the popular *Planet Hunters*¹ citizen science project. Let me be clear up front – this is NOT an announcement of the discovery of alien life, but rather a well-motivated call for follow-up observations of this curious object.

In September 2013, I wrote about *Searching for WISE Civilizations* for the Clergy Letter Project newsletter. In that article, I described efforts to mine astronomical infrared data for signs of the “heat waste” that hypothetical technological constructs known as *Dyson Spheres* should produce. Although KIC8462852 doesn’t show the infrared signature that would be expected from a *Dyson Sphere* (among other things), the star’s light dims considerably for long periods of time, and the duration of the dips aren’t always the same. The *Planet Hunters* science team has managed to rule out instrumental problems and probably intrinsic variations in the light from the star itself. Most likely, something orbiting the star is the culprit, but there is much work to be done to ascertain what exactly that “something” might be!

The paper describing this discovery is an excellent example of how scientists search for the most plausible explanations based on what is known. The *Planet Hunters* science team methodically discusses several possibilities to explain the strange KIC8462852 light curves. It concludes that the most promising hypothesis involves a barrage of comets in the vicinity of KIC8462852, possibly triggered by the passage of a small nearby star, and suggests that sensitive observations might be able to detect gas released from the comets. Nevertheless, over 100 scientists have looked at the KIC8462852 light curves and have not yet come up with a working solution.

Curiously, a few earlier papers² noted that the *Kepler* mission or future *James Webb Space Telescope* would be capable of discovering planet-sized artificial satellites, and the KIC8462852 light curves are similar to the predictions of some of these models. Of course, this doesn’t mean that a natural explanation that doesn’t involve alien technology won’t be found in time, but it does make KIC8462852 an extremely interesting target for radio astronomers involved in the Search for Extraterrestrial

¹ The research paper has been submitted to the Monthly Notices of the Royal Astronomical Society, but you can read a blog about it at www.planethunters.org.

² Arnold, L. 2005, “On Artificial Transits Feasibility and SETI”, in *Scientific Highlights 2005*, EDP Sciences, p. 207; Forgan, D.H. 2013, “On the Possibility of Detecting Class A Stellar Engines using Exoplanet Transit Curves”, *Journal of the British Interplanetary Society*, 66, 144; Korpela, E. J. et al. 2015, “Modeling Indications of Technology in Planetary Transit Light Curves-Dark-side Illumination”, *ApJ*, 809, 139

Intelligence (SETI)³! In any event, this discovery is another great example of how terrific “ordinary” human beings, not just professional scientists, are at spotting unusual patterns that are often missed by machines.

By the way, the science team has estimated the distance to KIC8462852 to be roughly 1,480 light years. Since this means it takes 1,480 years for light to travel the distance between KIC8462852 and Earth, any alien “megastructure” built around this star would predate the Middle Ages. There should be more than sufficient time in the history of the Universe for such an alien civilization to arise; however, distance and time wouldn’t leave us much hope for an actual conversation!

Until next month,

Grace

Grace Wolf-Chase, Ph.D. (gwolfchase@adlerplanetarium.org)

³ <http://www.seti.org/>