

Exomoons in Stellar Metamorphosis

Jeffrey J. Wolyński
Jeffrey.wolyński@yahoo.com
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Rockledge, FL 32955

Abstract: A "moon" is an object that orbits a larger object, not classified as a "star" in the mainstream. This is problematic though, as stars are young hot exoplanets in the general theory. This means the Earth, Jupiter, Uranus, etc. are all "moons" of the Sun. The word Moon originally just meant "month", where the phases of the Moon signaled the months, or simply passing of time in stages. This leaves us questioning the term "exomoons". It is suggested instead of going off the deep end as astronomers have done with big bang, black holes and dark matter, we correct the simple, important issues by using the general theory. This simple correction will allow us to be more consistent and accurate (scientific) with our terminology, as the original word "moon" was never intended to describe what is currently being discovered.

The usual English proper name for Earth's natural satellite is "the Moon", which in nonscientific texts is usually not capitalized.^{[16][17][18][19][20]} The noun *moon* is derived from Old English *mōna*, which (like all Germanic language cognates) stems from Proto-Germanic **mēnō*, which comes from Proto-Indo-European **méh₁ns* "moon", "month", which comes from the Proto-Indo-European root **meh₁-* "to measure", the month being the ancient unit of time measured by the Moon.^{[21][22]} Occasionally, the name "Luna" is used. In literature, especially science fiction, "Luna" is used to distinguish it from other moons, while in poetry, the name has been used to denote personification of Earth's moon.^[23]



The moon was just a unit of time. It had nothing to do with the composition, chemical characteristics, mass, etc. of the object that describes it, the object orbiting the Earth. Using the term "exomoon" therefore is kinda outdated. It brings inconsistency to the sciences. For instance, if Earth had another slightly smaller Earth orbiting it with life, would it be a moon or a planet? What about if the Moon lost its orbit with the Earth (which it will one day), and started orbiting the Sun directly? Would it then not be a moon, or would it be a planet? What about an object that previously orbited a very young Sun-

like object, and had the classification of "exoplanet"? Would that object if captured by a more evolved star similar to Jupiter then be labeled a "moon"?

Surely astronomy has moved beyond defining the rich histories of all stars as totally dependent on ancient time telling techniques and the words used to describe them and orbits alone? What if the Moon was never here, from a strictly word use standpoint? Would we even have a name for objects that orbit other objects in a different fashion? Would Io be a planet just as much as the Earth? Where do we make the cut off from satellite to satellite to satellite? What counts as the one and only true "Moon" of a star? It seems the word is ill fitting for current understanding of the stars, esp. inside of the general theory where this issue is solved.

A "moon" or satellite is just another name for the remains of a dead or highly evolved star. Just like human beings can be called animals or organisms. All three have their own connotations and are correct, but their level of abstraction on the ladder is different. Organism then animal, then human being, then man, then Jeffrey! With moon though its different and needs to be addressed, because the term exo-moon is going to run into the same issues as defining "planet", it is the issue of consistency. There are polymetamorphic systems that have Earth like objects orbiting brown dwarfs, which in turn orbit Sun-like objects. So, being that Earth is classified as a "planet" is it now a "moon" or a "planet" being that it orbits a brown dwarf "star"?

I think this gets to the root of the issue. Planet, star, moon... they were never scientific terms in the first place. They were linguistic tools (words) we had to share meaning of what appeared to be. Now that we know that the appearances have deceived us, we need to change tune. The stars, planets and moons, are all one in the same. What appears to be different types of objects are in fact, objects with similar pasts, but have vastly different histories. Not to be too morbid, but to stress the issue, we can draw an analogy with childbirth.

All human beings have mothers, we all came from a woman's womb. We have the exact same beginning histories, but as we grow in the womb, changes occur to us which bring about differences, some more apparent than others. Sometimes, the child growing in the womb doesn't quite make it and a miscarriage occurs, which is totally horrible for an expectant mother. This isn't to lighten up the fact that back before modern medicine, miscarriages were not the only issue, childbirth itself brought early mortality, to the child and/or the Mother. I can also remember reading about early mortality of children, and how Mothers wouldn't even name their children until after they reached a certain age. They would just call them baby girl or baby boy. Even then, children younger than 12 had a high mortality rate. It was common for people to not quite reach adulthood due to sicknesses, and diseases we have been able to inoculate against.

We can use the growth of a planet/moon inside of a star (the Mother) as the example in this case. When a star is born it expands outwards and then stabilizes. If it goes too large it become a giant nebula and the remains dissipate back into space, and no objects can

be formed in its interior. Given the expansion stabilizes from blue giant phase, it then can start contracting and forming the planetary embryo in its interior, seeded from asteroids most likely. Those asteroids if they can enter the stellar "egg" will settle into the interior and start growing the planet. The core will begin forming and growing with the purified iron/nickel ions that collect in the interior.

If the star can remain stable for long periods of time, and doesn't get ripped apart from orbiting a hotter host when it is in Jupiter sized stages of evolution, then the planetary embryo can continue growing in its interior. This is to signal the growth of an object that will become Earth sized and eventually host life. Though, if the gas giant is ripped apart too quickly, and takes up orbit around a hotter host, then the embryo in the interior will miscarry, and only a very small rocky remains will be left over. The womb, the star, has to remain stable long enough so that the planet can form in the interior. The likelihood of success of the planet formation process to life hosting world increases when the star can go "full term", meaning at least 2 billion years.

Neptune and Uranus are full term stars, and when they take up orbit around a hotter host, they can then transition faster to their ocean world stages of evolution, and host life. Though, there are some miscarried worlds in orbit around other foster planetary mothers in our system, they are called "moons" by astronomers, such as Io, Ganymede, Titan, Pluto, etc. Though there is a main difference between the analogy of human mothers and babies. A star in nature can only form just one planet. It only has one chance. With human beings, there are many chances to make up for children that are miscarried. The reason why there is only one chance is because the time required is too great, and the resources the star provides can only be provided once. Just imagine if it took a woman 65 years to grow a baby. What a strange idea, it would be similar to if she got pregnant at 20 years of age, and then when she was about to pass away at the nursing home at 85 then gave birth to a baby. Can you imagine all women having only one chance to grow a baby, and carrying and growing babies for their entire lives in their wombs very, very slowly. Just imagine 65 years of constant morning sickness. It's a good thing babies grow fast in the womb, really fast, 9 months tops! As well, the percentage of miscarriages would be much higher too, as the mother would need to carry the baby full term, and many women don't live to be 85 years old. I guess in that sense the analogy would stick to explain why there are so many miscarried moons wandering the solar system and galaxy. The conditions required to form Earth-like objects (and babies) are fantastic, regardless if they are common. Natural processes are sometimes both fantastic miracles and common, and planet formation and babies growing in the womb share those attributes.

To go back to the exomoon portion of this paper though, it is clear, we are dealing with a very different worldview. This one totally surpasses the "moon" definition of older civilizations and our need to keep track of time. We can now look at moons as being miscarried planets, as their wombs evolved too fast and could not support the energy and time intensive process of planet formation.

For the reader it should be noted, we are not in a galaxy that forms planets outside of stars, we are in a galaxy that has planets forming because of stars. It is the star that forms the "planet". Stellar evolution is the process of planet formation. To keep the womb analogy, we live in a galaxy that has hundreds of billions of mothers, forming hundreds of billions of children, internal to their structure. This is the same as a mom and a baby in her womb. Nature doesn't form her most valuable treasures out in the cold.

