

Stellar Metamorphosis: An Alternative to the Giant-Impact Hypothesis for Moon Formation

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Abstract: It was hypothesized that the Earth was hit by a large impactor called “Theia”, which subsequently coalesced into the Moon. Unfortunately, this process was never observed, as well the object Theia has also never been observed. Alternatively, if stellar metamorphosis is used, the Moon can be explained as well as Venus’s lack of one, in accordance with actual observations.

Planets and many moons are dead, evolving and highly evolved stars. The stellar remains are pieces of smashed up dead stars, called meteoroids, asteroids and small moons. Using this insight we only need Earth and the Moon to explain. When the Earth was a much hotter, more massive star it captured the Moon while it was evolving/dead already. It is likely the Moon was far more massive than it is now while it orbited the Earth early on. As it orbited the Earth while Earth was in radiant stages of evolution, the Earth caused lava lakes to form on the near side of the Moon, while disintegrating and simultaneously causing it to experience lots of cratering on the far.

The Earth kept it in its torturous orbit for hundreds of millions of years, easily with an orbital year of 1 day, or shorter, which is observed to occur in 152 star systems.¹ The Moon continued to orbit the Earth rather closely but began moving away slightly as the Earth lost considerable amounts of mass, and its gravitational field weakened. The tighter lunar orbit loosened up, and the moon slowed down and moved away from the Earth slightly. This explains why the Moon has the majority of the angular momentum, 80%, of the Earth-Moon system.² The moon continues to move away from the Earth to this day and will one day break free of its orbit. The evidence for the Moon’s features can now be re-interpreted with stellar metamorphosis.

1. Earth’s spin and the Moon’s orbit have similar orientations. When the Moon was captured by the Earth, the Earth’s rotation and huge mass caused the Moon to take up the same orientation over time, this is tidal locking, where one face is shown towards the orbited body.
2. Moon samples indicated that the Moon’s surface was once molten. When the Earth was much younger, hotter and more massive star, it kept the Moon’s surface molten on the near side.
3. The Moon has a relatively small iron core. This signals it evolved on a faster transformation curve, which is probably due to orbiting close to a hotter host when it was a gas giant.³

¹ Exoplanet.eu <http://exoplanet.eu/catalog/>

² <https://space.stackexchange.com/questions/50502/how-much-of-the-total-angular-momentum-of-the-earth-moon-system-is-due-to-the-mo>

³ <https://vixra.org/pdf/1905.0509v1.pdf> Transformation Curves on the Wolynski Taylor Diagram

4. The moon has a lower density than Earth. When it was forming inside its gas giant phases internally, it had its huge atmosphere ripped away quickly, so that not much heavy material could deposit as opposed to the Earth. This also means the Moon could have at one point been Earth's "hot Jupiter", which are observed in the evolving star data.⁴
5. There is evidence in other star systems of similar collisions, resulting in debris disks. Collision events form debris disks, debris disks are not evidence of planet or moon formation.
6. The stable isotope ratios of lunar and terrestrial rock are identical, mistakenly implying a common origin. When the Moon was orbiting Earth and being ripped apart, a large portion of the exact isotopes the Earth is composed of entered into the Moon's atmosphere and lava over hundreds of millions of years, mixing and giving the appearance of a common origin. The Moon was absorbing the Earth's ejected solar wind at an extremely close distance. The stable isotopes being identical is evidence that can be reinterpreted now with this new theory. If grease is on my hands after working on my car, it doesn't mean the car and I have similar origins, it just means I interacted with it. The grease is evidence that signals the car and I were in close proximity. My origins were in my mother's womb, and my car's origins were in a factory out west. The same with the Moon and the Earth, having similar isotope abundances means they were interacting, not that they have similar origins.⁵

Questions the giant-impact hypothesis can not answer are answered as well.

1. Why is the Moon missing lots of volatile elements?

It technically is not, many volatile elements have combined into rocks and minerals far in the Moon's past when it was forming inside of a gas giant. This means the water is still in there, only underneath the surface, as well, the Earth's intense irradiation when it was a hotter young, more massive star ripped all of the atmosphere away quite violently. This would have happened regardless of the Moon's adopted size as a hot Jupiter or a tiny bit more massive rocky moon.

2. Why does Venus not have a similar Moon?

Venus does not host a Moon because all the larger objects that used to orbit it have ejected themselves. Venus is vastly older than the Earth, between 450-700 billion years old.⁶ Comparable moons probably orbited Venus as well. Venus's lack of a large Moon is Earth's eventual fate. In fact, Earth possessing a large moon is indirect evidence Earth was much more massive, and Venus's lack of a Moon is indirect evidence Earth is going to lose its moon.

3. The iron oxide (FeO) content (13%) of the Moon, intermediate between that of Mars (18%) and the terrestrial mantle (8%), rules out most of the source of the proto-lunar material from the Earth's mantle.

⁴ <https://exoplanets.nasa.gov/resources/1040/hot-jupiter/>

⁵ <https://vixra.org/pdf/1903.0427v1.pdf>

⁶ <https://vixra.org/pdf/1905.0251v1.pdf>

This is because the Moon, Earth and Mars have their own complete evolutionary history. Their iron contents are all different because they are not related to each other by formation whatsoever. The solar system is polymetamorphic.⁷

4. If the bulk of the proto-lunar material had come from an impactor, the Moon should be enriched in siderophilic elements, when, in fact it is deficient in those. Siderophilic elements consist of osmium, platinum, gold, iron, nickel, cobalt, etc.

The moon had its own complete evolutionary history, up until the point Earth captured it, and then started to rip away its atmosphere and melt its surface.

5. The Moon's oxygen isotopic ratios are essentially identical to those of Earth. Oxygen isotopic ratios, which may be measured very precisely, yield a unique and distinct signature for each solar system body. If a separate proto-planet Theia had existed, it probably would have had a different oxygen isotopic signature than Earth, as would the ejected mixed material.

Not only does this show Theia did not exist, it shows that when the Earth was a much, much larger star, its oxygen was being ejected in large quantities from its solar wind, mixing in with the Moon's lava, making the finger print look exactly the same. If you want to find the Moon's actual isotopic finger print, you have to drill deep into it far below where the Earth-star could not irradiate strongly. We could also take measurements of the far side that did not get irradiated strongly.

6. The Moon's titanium isotope ratio ($50\text{Ti}/47\text{Ti}$) appears so close to the Earth's (within 4 ppm), that little if any of the colliding body's mass could likely have been part of the moon.

The fact that isotopic abundances match is not a mystery, as explained in #5 above.

To conclude, Earth was vastly larger, hotter and more massive when it captured the Moon. It is best to look at it with the general theory of stellar metamorphosis as a rough guide.

⁷ <https://vixra.org/pdf/1902.0059v1.pdf> Star system polymetamorphism



Artwork depicting an ultra-hot Jupiter, a massive exoplanet so close to its star that some of its atmosphere is boiling off. Credit: [NASA, ESA, and G. Bacon \(STScI\)](#)