

Stellar Metamorphosis vs. Columbia University and Forbes Magazine

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Abstract: There is a clear disconnect between Columbia University and writers for *Forbes Magazine*. The problem that media causes astronomy is made clear. The statement is very simple so as to not confuse the public. In a paper written by Columbia University researchers there are 4 types of worlds, in a *Forbes* article writer Ethan Siegal states that there are only 3 types of worlds, which directly references the very article that contradicts his statement. This means there is a direct disconnect between writers/editors of magazines and researchers. This issue can be cleared up with stellar metamorphosis. There are no distinct types of worlds, as stellar evolution is continuous, stars cool, shrink and lose mass becoming planets/exoplanets and moons. Explanation with pictures from the arxiv site and *Forbes* are provided with references.

Ethan Siegal has written an article for *Forbes* that misquotes the original document from arxiv.

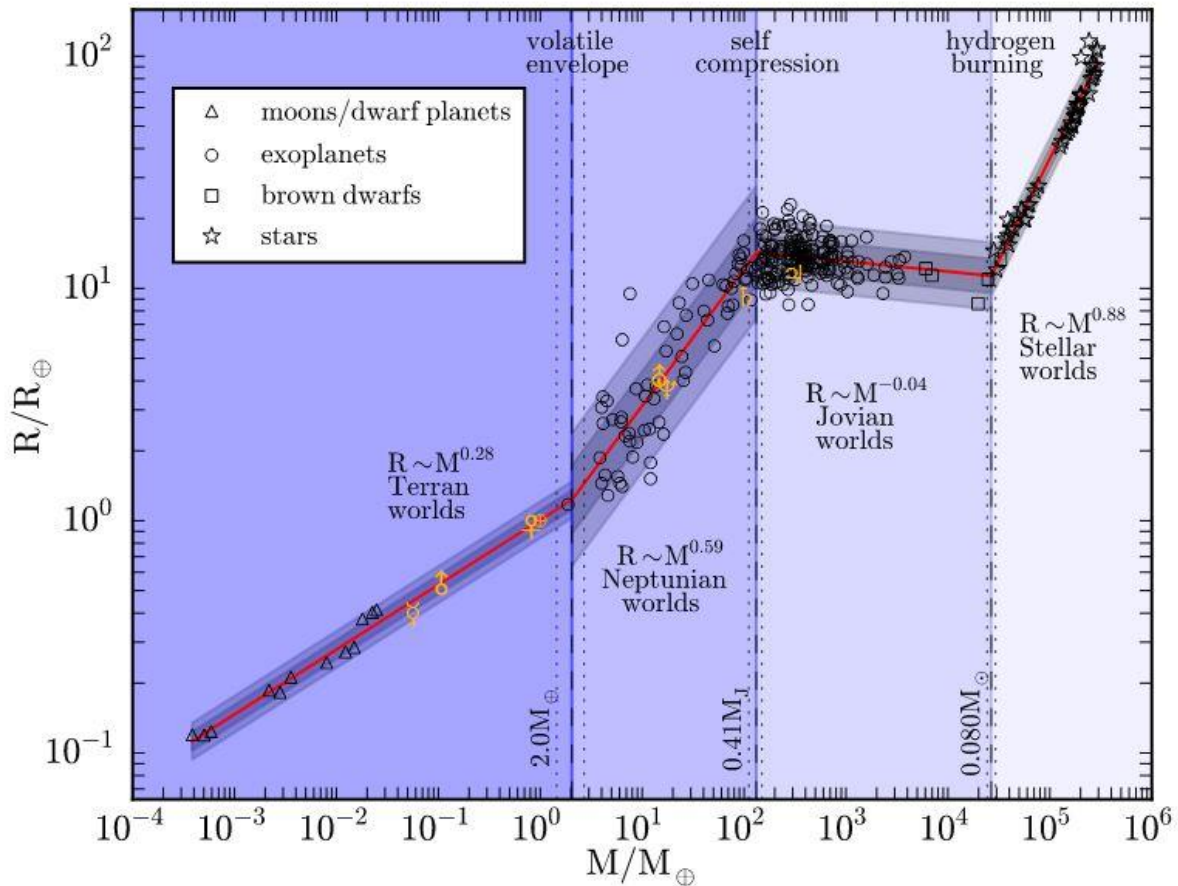
Forbes article here:

<https://www.forbes.com/sites/startswithabang/2018/03/02/sorry-super-earth-fans-there-are-only-three-classes-of-planet/#23148f6d78c4>

Arxiv paper here:

<https://arxiv.org/pdf/1603.08614v2.pdf>

The arxiv paper has this graph:



As the reader can see, there are 4 types of worlds in the graph written by Columbia researchers, Terran, Neptunian, Jovian and Stellar worlds. It is pretty clear how it is written. For those who know simple math, 3 is not 4. Yet Ethan writes this:

As their research (and the above graph) shows, there are only three different types of world that exist! According to their classification schemes, there are:

1. **Terran worlds** — these are worlds akin to the rocky worlds in our Solar System. They may have oceans, ices, and/or atmospheres, but don't have a hydrogen/helium envelope around them.
2. **Neptunian worlds** — these are planets akin to Saturn, Uranus and Neptune, and are dominated by a large atmosphere of hydrogen, helium, and other atoms/molecules that are easily boiled-off. They may have rocky interiors, but they obey a different mass/radius relationship than the Terran worlds.
3. **Jovian worlds** — akin to Jupiter, these worlds are so massive that they begin to compress on the inside; as you add more mass, their radius shrinks. This effect, of gravitational self-compression, is why Jupiter is only about 20% larger than Saturn, but is three times as massive.

It is clear what is happening. Ethan ignores stars, yet it is right there in the graph, stellar worlds. Astronomical researchers have realized the obvious, yet they can't come out and say it like I can because they'd put their careers in jeopardy. Stars cool, shrink and die, becoming different types of worlds as they evolve. They undergo metamorphosis. The steps for the reader even in this case are easy to see.

Step 1: The star is born extremely energetically and remains a Stellar world.

Step 2: The star shrinks, loses mass and radiates an enormous amount of energy away relatively quickly becoming a Jovian world. (begins iron/nickel core formation)

Step 3: The star self-contracts more and continues losing mass becoming a Neptunian world.

Step 4: The star's remaining atmosphere dissipates and exposes the rocky interior that formed in earlier stages of evolution, becoming the Terran world.

So to correct Ethan, the arxiv article has 4 types of worlds. Stars are the "4th" type of world. What is interesting to note too is that they are also plasma, which is by coincidence the 4th state of matter. The stars go from plasma (4th state), to gaseous and liquid (3rd and 2nd state) to solid (1st state). It is quite straight forward and easy to understand. It is unfortunate there is a disconnect though between Columbia which is a large research organization and Forbes which is a large magazine. The facts are right in front of them, yet they can't even say it. Wild stuff. You would think huge universities with billions of dollars and big time magazines can say the truth because they have all the power. Turns out they have little power, so I'll say it yet again:

Stellar evolution is planet formation. Stars are young, hot planets, and planets are old/evolving and dead stars. They are the same things.

They only appear different because they are in different stages of evolution.