

# Stellar Metamorphosis: Stellar Shrapnel Exclusion Zones on the WT Diagram

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Abstract: Exclusion zones are outlined and explanation is provided as to why this is important to the development of 21st century astrophysics. The zones are in line with the general theory and can be used in a dynamic fashion. These basic astrophysical facts are up for revision and refinement. In short, ring material from Saturn could be pieces of the Earth's ancient oceans.

The purpose of exclusion zones is to keep astrophysics and astrochemistry in line with the discovery that stellar evolution is planet formation. That said, there are two main reasons shrapnel from a parent body would be excluded from experimental evidence and observations, as coming from that parent body. The first is that the star cannot gain any significant mass to cause it to move back up a transformation curve. It might be able to move slightly up on the diagram, up a phase curve, but that would be extremely rare and inconsequential to the evolution of the star. For example, if Jupiter swallowed an Earth sized object, it would only be slightly more massive, and would not significantly alter the transformation curve. Jupiter would chew Earth up like a giant blender internally, but the instances of this occurring are incredibly unlikely. Even then, Jupiter would have to have the ability to swallow thousands of Earths to gain the mass that it previously lost, as well, gaining all that mass would just move it up a slightly higher, different transformation curve, as moving up the same transformation curve would signal a reversal of time itself. The end result would still allow it to lose the mass that it gained, due to interstellar evaporation and disintegration. Not only that, but the remaining object that it would create would only be so large, with respect to observations, unless a rocky object the mass of Jupiter is discovered. More work is needed to be done to figure the maximum mass of a rocky star at the very end of its evolution. Secondly, age exclusion plays a part.

Stars cannot have shrapnel older than its oldest parts. Say Earth is 4.5 billion years old max, it cannot have shrapnel that is 4.6 billion years old, or 56 billion. Any celestial object that is measured to be older than the Earth, cannot have origins from the Earth. This sums up both exclusion zones.

1. Shrapnel from the Earth has to be less massive than the Earth.
2. Shrapnel from the Earth has to be younger than the oldest portions of the Earth.

Stated differently,

1. Shrapnel cannot have come from the Earth and be more massive than it.
2. Shrapnel cannot have come from the Earth that is older than the Earth's oldest features.

The importance of these two exclusions zones is that we can now determine facts that are observed in a very, very different fashion that is not allowed by the dogma. One specific case is the D/H ratio of Saturn's rings.

"We find that the D/H in Saturn's rings and satellites is close to the Vienna Standard Mean Ocean Water (VSMOW) and bulk Earth (4% lower than VSMOW) value except for Phoebe, which is 8.3 times the VSMOW value."

Source: <https://www.sciencedirect.com/science/article/abs/pii/S0019103518303580>

This is interesting because it means the ring material from Saturn is could be slightly younger than the Earth, and is made up of vastly smaller particles than the whole body of the Earth. What this could mean is that Earth had some interaction with Saturn at one point, and Saturn's ring material is composed of material found in Earth's ancient oceans. Pin-pointing the exact D/H ratio could even tell exactly when Earth was in orbit around Saturn, or had this interaction. For instance, if the ring material is 1D/6800H, and Earth's VSMOW is 1D/6250H, then the interaction took place ~366 million years ago. That would even place Saturn given its current age of  $590 \pm 141$  million years old, as  $224 \pm 141$  million years old, firmly between orange and red dwarf stages of evolution. What this means is that those rings were there for a long, long time, and are not the result of a completely disintegrated moon, but of a near miss of a much larger object that had material ripped off of it. Of course, these developments are far beyond the dogma, so careful consideration and clear thinking is required. More work will be done in the future. The two exclusion zones for a hypothetical dead star are provided below.

