The Mass Modeling Principle of Stellar Evolution

Jeffrey J. Wolynski
Jeffrey.wolynski@yahoo.com
December 2, 2017
Rockledge, FL 32955

Abstract: In stellar metamorphosis stars lose mass as they evolve, therefore a simple principle can be drawn up regarding their mass loss and modeling for future scientists.

In order to correctly model star's evolution into life hosting stars such as the Earth, or others, the variable of mass loss needs to be included. What this means is that any model of the internal structure of a star is not sufficient to determine its future, as mass loss will change all the other variables over time. This is observed in the different structures and compositions of stars in various stages of evolution found by Kepler and even the classical "planets" in the solar system. In short, trying to determine what the future of a star's physical and chemical structure without significant mass loss as a variable will lead to wildly inaccurate assessments of the star's evolution at most stages of evolution. A star's current structure, elemental/molecular composition, radiance, phase of matter, etc. cannot be used to determine its history unless mass loss is taken into account. That also being said, this principle diminishes in importance as the star stabilizes and loses mass slower, thus older stars such as Mercury will not change considerably, so can be modelled much easier as the mass loss and rate of mass loss will be much less. Basically this means the more massive the star, the more possibilities for its structure to change in different ways. For instance, you could have two sun like stars, and both lose mass at about the same rate, but then they could have their orbits interrupted and one orbit a hotter host losing mass faster, thus not allowing for more material to be deposited in the interior (forming the planet). So two stars that started with the same properties mostly, but one losing mass faster due to evaporation caused by a hotter host will lead to two different sized "planets" far into their evolutionary timelines. This is why all planets will be different sizes and are observed to be different sizes.