

# Stars are Dissipative Systems in the General Theory

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*Abstract: In the general theory of stellar metamorphosis stars are essentially the second largest dissipative systems in a galaxy. The properties of a dissipative system match the evolution of a star as it cools and dies into what are called "planets". Explanation is provided.*

Do stars fit the definition of dissipative systems?

A dissipative system is:

1. Thermodynamically open (exchanges matter and energy)
2. Operates far from thermodynamic equilibrium
3. has symmetry breaking
4. forms chaotic structures
5. Has interacting particles forming long range correlations

The Sun and all stars:

1. Are thermodynamically open systems (exchange matter and energy, no matter what stage of evolution they are in)
2. Operate far from thermodynamic equilibrium (outer space is ~2 kelvin, the Sun is ~5770 K at the surface)
3. symmetry breaking manifests as CME's, solar granules, weather and even form life well into their evolution given they do not evolve too fast, etc.
4. The stars are chaotic, the Sun's surface begin a wonderful example
5. solar wind

This delves into the most hideous mistake in solar astronomy, the assumption that the Sun is in thermodynamic equilibrium. It is not, it is a dissipative system far from thermodynamic equilibrium. The mistake is rooted in astronomers assuming there is a Sun inside the Sun, and they are solving for those equations, completely forgetting that the Sun is far from thermal equilibrium on the outside of it (it is in outer space where matter and energy are exchanged freely).

What should also be noted is that since stars are the second largest dissipative systems in a galaxy, they beget smaller dissipative systems (hurricanes, thunderstorm

convection, life) as they were created themselves from galaxy birthing itself (quasars as the largest dissipative system, as the example in this paper, there might be bigger ones.)

Ilya Perigogine was awarded the Nobel Prize in Chemistry for work on dissipative systems, yet did not realize the Earth and life itself is a result of a single star's dissipative nature. Stars themselves are irreversible systems, so the arrow of time becomes apparent as all life and nature that we are aware of rest on the dissipative systems that created us and currently support life. It should be noticed as well that dissipative systems are incompatible with Newtonian and quantum dynamic views as those are reversible. As a jump into trying to understand gravitation, to make Newtonian understanding irreversible, one should look at the largest dissipative structures which are incompatible with it, such as stars, and then draw conclusions from that. In other words, since dissipative systems are natural, observed and involve the some of the largest single structures with the longest range (gravitation), and Newtonian mechanics is reversible, then to give a mechanism for gravitation we must consider some aspect of Newtonian mechanics as being non-reversible, in essence, that means gravitation itself as described by Newton is flawed.

1. Dissipative systems such as stars exhibit long range correlations (gravitation)
2. Dissipative systems are irreversible.
3. Newtonian theory is reversible
4. Newtonian theory does not accurately describe gravitation...

I think what is happening is that stars are so large, that they give the appearance of reversibility (you throw an object up, it comes back down), when in fact, the phenomenon of gravitation is not reversible. Some aspect of objects being attracted to each other is lost when they do work upon each other, and it is replenished, but not in a sense of it loses mass and then gains it back. What this means is that Newtonian mechanics when describing gravitation only works for large structures, when measured on small scales it should fall apart, some really small scale property of matter changes when it "falls". Finding out at what scale Newtonian mechanics falls apart is the key. What this means is that large scale experiments that neglect the true nature of gravitation (this should be upsetting to people), will not bring meaningful results, no matter how much propaganda there is to the contrary (LIGO, Gravity Probe B, black hole theory, spacetime warping, etc.) What this also means is that theories that try to explain/describe gravitation as large scale phenomenon are neglecting a huge piece of the riddle, gravitation is small scale phenomenon. It only appears large scale because the effects are magnified. In short, gravitation has something to do with dissipative, non-equilibrium structures and systems in thermodynamics. I guess this would be similar to the cannon-boring realization of Benjamin Thompson, where he proposed that there was heat produced from friction versus an actual substance exiting called "caloric". There is a property of matter than changes when experiencing "gravitation", which also ties into the idea of inertia, or the increased resistance to movement with additional mass.

Not only that, but radioactive decay also does not have a mechanism, so to do a bit of questioning concerning that dogma, we should do an experiment where we isolate radioactive material and measure the particles with given half-lives inside of human time scales and place them on objects which are more/less gravitationally attracting on the whole and see if there is a difference.

*We have to set up a Moon base to do more experiments.*