Dragrath's Radiation and Supernova Explosions

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https://www.youtube.com/watch?v=PJ2QsqqQSeY&lc=UgwmJhLPuqzVMAWtDwd4AaABAg.9gk5gj6fSoi9guPi0180Fp

A Comment on the YouTube Fermilab post:
What happens when you fall into a black hole?
https://youtu.be/PJ2QsqqQSeY?t=4m7s

@GMan, what's most fun with #4 — the one in which the black hole evaporates in front of you at near-light speed — is what happens when you present the idea to a top-notch gravitational or quantum (or both) physicist and ask, "why would this *not* be what happens?" Somewhere in cyberspace, there's a still-unposted live video of me doing just that via the moderator on a channel where Roger Penrose was a regular. I felt rather bad about putting the speaker on the spot; it's not an easy question. I should have asked Roger Penrose when he presented since it's more in his bailiwick, but his presentation was so unrelated to his nice (CCC) talks that my question just seemed too tangential. I like to respect topics. Bill Unruh also gave an excellent presentation on condensed matter modeling of black holes in that same forum, but again, #4 was just too tangential and would have been a bit unfair (plus, I was on the panel that time — even ruder).

In my opinion, the best counter I've seen to my #4 scenario is the Hawking radiation-pressure equilibrium idea @Dragrath1 zipped off quickly here just a couple of days ago. I never considered the impact of the radiation from deeper in the event horizon. Except for Hawking and folks deep into his work, I'm not convinced others have thought much about that aspect of event horizons [1].

Regarding Dragrath1's radiative equilibrium hypothesis, it's worth pointing out that his equilibrium is necessarily turbulent. Why? Because matter has to fall *beneath* the equilibrium layer to generate the Hawking radiation that keeps the rest of the matter out. It's boiling, literally! I would not be surprised if the boiling idea has popped up in the literature — *everything* pops up somewhere in the deep literature, that's my experience if you look deep enough — but it's not likely to be noticeable.

@TheChzoronzon, the "frozen star" idea was, once upon a time and long ago, the dominant interpretation of black holes. That changed when someone — Kip Thorne? — made an excellent and well-thought-out argument that when a giant star collapses, the matter within the event horizon *must* wind up inside the black hole, after which the matter inside the black hole would continue to collapse into a singularity. Internal collapse into a singularity has remained the dominant view for decades. Mostly [2]. Once you "pinch off" a mini-world like that, one with more normal time metrics than the event horizon, it gets tempting to assume that anything infalling "must" follow the same path and "somehow" do it in finite time. That's where quantum uncertainty sometimes is used as one excuse, even though this has to be one of the most classical environments imaginable.

Ironically, the core problem with the pinch-off collapse argument is covered nicely in Kip Thorne's excellent book a few years ago, even though the book advocates pinch-off. It's the difference between the absolute event horizon and the relative one. The *absolute* event horizon is the one that removes all communication, and it is *not* the big one around the star. Instead, it starts as a point at the *center* of the star and moves outwards at near-light speed. If Dragrath's Equilibrium Theorem is correct — I love this — the expanding absolute event horizon would *blow all matter away as it expands.*

Did you catch that?

Here's the bottom line: If Dragrath's Theorem is correct, you suddenly have an excellent explanation for the still-mysterious rebound effect seen in supernovas that form black holes: It's the *black hole itself* that is blowing the star up! Sure, it absorbs much of the infalling mass into the event horizon. However, as the event horizon expands, its Dragrath radiation — the hyper-relativistic Hawking radiation front encountered by matter that gets too close to the event horizon — blasts *outwards* until the entire star self-annihilates.

There's another more subtle but fascinating point about that absolute event horizon and how it expands. It's this: Every time you see a figure that shows a sharp boundary between "past" and "future," as if it was a sharp line of "now," that figure is *necessarily* showing a topology that never existed. Even a single inertial frame must put in colossal work to build up a good definition of "now" — lots of in-synch clocks positioned like little "my frame!" flags over some vast expanse of spacetime — and even then it's never perfect.

The actual past is *always* cone-shaped in spacetime, just like that absolute event horizon that starts as a point. A historical past of irreversible events is real (and my sincere apologies to my philosopher friend RG, I'm using physics words here), but it's *never* flat. It's a weird pointy thing whose apex, remarkably, is always pointed exactly at you, from your point of view. But its apex is also pointed at everyone else.

Yes, that means space and time don't work the way our brains think they do, but that does *not* mean space and time are unfathomably imprecise or mystical. It's just that they are much more interchangeable than we think, despite Einstein, Minkowski, and others trying hard to get everyone to believe just that. The problem is, in no small part, the notations themselves. Every time we write down "$xyzt$," we tell frame-dependent falsehoods. Even as lies go, they are not good if you examine them closely. Without smooth-continuums-must-be-true biases, every $xyzt$ is finite in scope, limited by how much matter and energy it includes, constrained by lightspeed, and never infinitely precise. Those are all primarily pre-fab brain hopes and preferences, not what even special relativity tells us.

If you think instead in terms of three somewhat amorphous quantities but conserved quantities — I call them Lorentz areas, L_x, L_y, L_z — with units of length-duration that get "squeezed" (technical term) into either time or length, you come a lot closer to what is going gone. How they get together to form classical time gets even deeper into some darned exciting weeds. Still, their *lack* of sufficient independent information makes any "pure" $xyzt$ model an inherent falsity.

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[1] A cognitive issue makes it difficult to think about event horizons as layered. That is how easily our brains frame-flip when presented with a point-of-view whose dynamics are exceptionally non-simultaneous. Event horizon layering is a *very* difficult and extremely non-simultaneous point of view. (As best I recall, I've already got some stuff out. I'll have more out on it later since non-simultaneous dynamics symmetry turns out to be pretty important.) In this case, it makes it incredibly tempting, *just for a moment* to frame-flip and gets through that nasty little singularity from the *infaller's* perspective. Problem solved! A whole mathematical industry around that idea, K-K coordinates, assumes that if all singularity issues get concentrated into *one* point on a visual map of the situation, everything else is fine. It's not, of course. That's just our visual processing brain centers kicking in to "help" the analytical parts of our brains. Ignoring singularities based on your ability to make them small visually is nothing more than a brain shortcut. It's *not* a mathematically precise concept, no matter how "good" it feels to our shortcut-prone cognitive systems.

[2] Gerard 't Hooft pops the matter out the other side of the black hole — it's called antipodal, an idea first proposed in 1987 by N. Sanchez and Bernard F. Whiting — but for the life of me, I'm not quite sure if he thinks there's anything inside a black hole or not. He's meticulous in his wording on that one.

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PDF: https://sarxiv.org/apa.2022-10-07.2230.pdf