

## Big Thoughts

I wish I could find the reference, but a few years ago a housewife whose hobby was reading scientific journals happened across a series of articles on (I think) some theoretical aspect of biology and figured out a solution to the scientists' questions. So she wrote a scholarly article with the correct references supporting her opinion and sent it in to (I think) Nature, the world's "most cited interdisciplinary scientific journal." The article's initial reception was cool. Selection for publication is a peer reviewed process and none of the scientists had ever heard of her. However, a few recognized the truth and value of her opinions and championed her cause. Eventually her article was published.

With that in mind, I thought I'd provide here a Wiki-inspired **List Of Unsolved Theoretical Problems in Physics**. You won't need a zillion dollar laboratory to solve these mysteries, just your noggin. If your Physics is a little rusty and you can't remember the difference between a coulomb and a cumquat, you can begin a refresher with a basic text in physics at a good technical library and work your way down the shelves until every article in Nature or The Journal Of Applied Physics makes sense to your ever-expanding mind. Good luck! You could be the next Einstein, who wrote his early important papers while working at the Swiss Patent Office. With just a pen and paper and his brain he revolutionized our modern world.

Here are the questions, with my initial thoughts following each.

**Vacuum catastrophe - Why does the predicted mass of the quantum vacuum have little effect on the expansion of the universe?** I always thought a vacuum meant there was nothing there, like what my teachers claimed was between my ears. So how could it have any effect, huh?

**Quantum gravity - Can quantum mechanics and general relativity be realized as a fully consistent theory? Is spacetime fundamentally continuous or discrete?** The times I've been spaced I've been very inconsistent, to be honest, and often indiscrete.

**Black hole information paradox - Do black holes produce thermal radiation, as expected on theoretical grounds?** From what I've heard, I wouldn't know what to expect from a black hole, theoretical or not!

**Extra dimensions - Does nature have more than four spacetime dimensions?** I hope so. I'm going to need them if I gain any more weight.

**Cosmic inflation - Is the theory of cosmic inflation correct, and if so, what are the details of this epoch?** Finally, an easy question. The detail of the epoch of cosmic inflation is it's getting bigger.

**Multiverse - Are there physical reasons to expect other universes that are fundamentally non-observable?** None that I can think of, but if they wish to remain unobservable then I guess we better not mess with them.

**The cosmic censorship hypothesis - Can singularities not hidden behind an event horizon, known as "naked singularities", arise from realistic initial conditions?** I've never been very realistic about censorship. I happen to like being naked and if the event horizon is large enough I guess I'd hide behind it.

**Arrow of time - What do the phenomena that differ going forward and backwards in time tell us about the nature of time?** All that back and forth would make me dizzy and not tell me anything.

**Locality - Are non-local phenomena limited to the entanglement revealed in the violations of the Bell Inequalities?** I'm pretty sure Alexander Graham Bell would have limited his entanglements with any non-locals. I've read he never even went to a biker bar.

**Future of the universe - Is the universe heading towards a Big Freeze, a Big Rip, a Big Crunch or a Big Bounce?** I think I know these women! I tried to date Big Bounce back in college. And I did wonder if they had any kind of future, to be honest.

See you at the Nobel Prize ceremonies!

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