Episode 10 – Almost as if it were designed…

Welcome back to the companion piece for this exciting episode of the podcast!
We're in episode TEN of this Keep the Faith series – TEN!
We're back now with our new argument, a re-formulation of the old Teleological argument known as the Fine-Tuning argument.
Let's look at it to remind ourselves of it:

P1. The universe is fine-tuned for life
P2. Fine-tuning can potentially be explained by chance, necessity or design
P3. It is not due to chance or necessity
C. Therefore, the fine-tuning of the universe is the result of design

Last week, we were in our second premise, the idea that the universe has really only got 3 possibilities for why it is the way it is. In that episode, we saw that there are only three options for the universe's fine-tuning (no one contacted me with a new one, unfortunately), and we have a duty to explore each. We looked at whether they are *possible*, not whether they are *probable*. So, this week, in our episode we went one step further and tried to review how likely each of these possibilities are.
Reminder: we are dealing in this episode with premise 3 – 'it is not due to chance or necessity'.

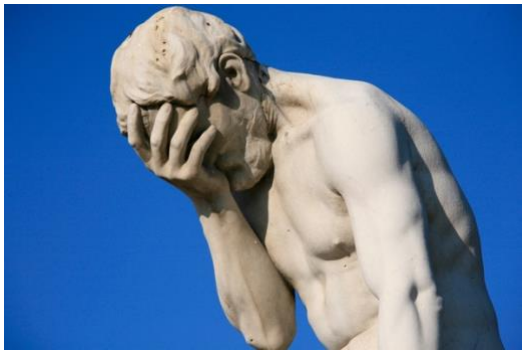
Essentially, the whole premise is just a negation of 2/3 of the premise before so, to keep this simple, I just looked at our cosmological constants and quantities from week 1.
Let's jump into it!

Chance

We start with chance.
We looked at this in prior weeks to a good extent, so to refresh your memory please click here and here.
If you recall, the chances of each of the cosmological constants and quantities we looked at (gravity, expansion rate & the ratios of mass and energy) have astronomically small chances of occurring - 1 in 10^{60}, 1 in 10^{120}, and 1 in $10^{10^{123}}$, respectively.
We also talked about these being only 3 of 26, and the fact that when you have an unlikely thing and add another unlikely thing, then the chances of both occurring goes down dramatically.
So, we can look at this one of two ways – either to say "wow isn't it amazing the universe overcame those odds" or "well, that's just not likely enough to be plausible".
I think, in this instance, an appeal to authority might be appropriate.
Noted theoretical physicist Lee Smolin once stated:

"In my opinion, a probability this tiny is not something we can let go unexplained. Luck will certainly not do here; we need some rational explanation of how something this unlikely turned out to be the case"

The key part there is a theoretical physicist saying luck, aka chance, does not explain the fine-tuning of the universe.
This should be enough to rule it out, frankly. The mathematical likelihood issues are bad enough, I've heard them referred to as 'mathematically impossible' in the past by mathematicians and statisticians, but to add to that the fact that theoretical physicists are also saying we need another explanation… that should be checkmate.
Often, you'll hear people attempt to explain this away in two ways – one, that quantum theory allows for truly random things to occur, which I will deal with in in a moment, and two, that the many worlds theory can account for the occurrence of such a low chance, which we dealt with in the episode.
So, what does it mean to say that quantum theory allows for truly random things to occur? This is something I read in an article quite recently – it was supposed to be a refutation of 8 of William Lane Craig's arguments for the existence of God (which, like most of these types of articles, was 20% name-calling, 50% decrying the basic belief set, and 30% outdated refutations that have been answered already elsewhere). The article was so poor I actually clasped my head in my hands when this professor of ethics trotted out the old Euthyphro's dilemma.


Pictured: Euthyphro, upon reading this bloke's article

Anyway, bashing that bloke's article aside, let's talk quantum mechanics, shall we?
The idea that there are truly random occurrences in quantum mechanics is one you'll hear a lot.
In fact, quantum mechanics, as you get older, will (I believe) become one of the most popular 'rebuttals' for Christian belief.
Why?
Allow me to explain.
We are taught in schools (those that go to this depth at least) that quantum mechanics is essentially the under-girding realm beneath the sciences we observe with the 'naked' eye. This is where sub-atomic particles live, and peculiar practices of particles and nuclei take place (unless you're looking – more on that later). That's a ridiculous over-simplification, but it'll do for now.
We're also told that the quantum realm, unlike what we see in Marvel's Ant Man, does not have a massive volume of orderly things happening at all times, because observing the particles within the realm causes them, basically, to cease existing as they were. Well, not cease existing, but cease being one thing and become another. It's all very complicated.

Pictured: The quantum realm in Ant Man and the Wasp
Not pictured: Something approaching accuracy – those guys observing it would have (in theory) caused it to cease being what it was and be something else, never mind the fact that we the audience are observing them observing it…

What I'm, more or less accurately, referring to is something called quantum superpositions. I know, I know, it sounds like a nightmare. I'll try and put this across as basically as possible. This details states of affairs that are neither one way or another, it is indeterminate, a particle is not in one state or another.
Hopefully that makes sense. If not, I'll give an illustration using 'Schrödinger's Cat'.
'Schrodinger's Cat' was a thought experiment in which a cat is locked inside of a box that is filled with a vial of poison gas that will kill the cat. Whether the vial is broken depends upon the indeterminate decay of a radioactive isotope. The question is: is the cat dead or alive? According to quantum physics (specifically the Copenhagen Interpretation), that question has no determinate answer. The cat is neither dead nor alive. It is in this superposition of states because it is indeterminate whether the radioactive isotope has decayed and broken the vial. What determines whether or not the cat is dead or alive? The Copenhagen Interpretation says whether you make an observation – whether you open the box and look at the cat. That will collapse this indeterminacy to make the cat either dead or alive.

Does that make sense? The state of the cat is indeterminate, neither one thing nor another, neither dead nor alive, until you open the box. Only **then** does the cat become one or the other.

You'll be familiar with this if you have watched the show 'The Big Bang Theory' on Channel 4.
The thought experiment, I mean, not this picture – I just thought this was cool.

Additionally, we're also told that quantum mechanics scientists have observed so-called "virtual particles" emerging, apparently without a cause, from an empty vacuum.
Let me try to explain this, because it's **mega** complicated (why do I do this to myself in these companions? I get absolutely mind-melted trying to explain it all).
A vacuum is basically a space that is devoid of matter. That's the simplest way of explaining it. A poor vacuum only reduces the matter, or air, by a small percentage (so the vacuum you use around the house will reduce air pressure by around 20%), but a really good vacuum, like in space, reduces this massively. A perfect vacuum would be one in which absolutely nothing exists, though this may not be possible. Wikipedia explains it this way – *"According to modern understanding, even if all matter could be removed from a volume, it would still not be "empty" due to vacuum fluctuations, dark energy, transiting gamma rays, cosmic rays, neutrinos, and other phenomena in quantum physics."*
This might seem like I'm waffling, but it is very significant – especially the last part of that quote.

Let me explain why these two random pieces of quantum mechanical trivia have reared their confusing heads in this article:
Firstly, the idea of quantum superpositions, to those who ascribe to this Copenhagen Interpretation, could be seen as a way to refute God's existence.
Secondly, the idea that 'virtual particles' have been observed emerging, apparently without cause, from this quantum vacuum, means the whole idea of God being required for something to begin existing (as we saw in our Kalam argument earlier in this series) is no longer credible.
Let's take each at a time.
We'll begin with this idea of quantum superpositions.
Warning: intense science and philosophy are about to mingle.

The way someone might try to refute God's existence based on these superpositions is to say that the concept of God is one that is 'all-seeing'. However, observation collapses quantum superpositions, and we observe that quantum superposition particles are *not* collapsed, therefore God AKA an all-seeing entity does not exist.
It's complicated at first, but once you see the run of the objection it begins to make sense. Until it doesn't.
The issue here is that 'we observe quantum superpositions are not collapsed'. How can that be true? If you observe them, they collapse! This is the so-called measurement problem of quantum physics – you can't observe how these superpositions work because you collapse them by looking at them!
This objection, therefore, is self-contradictory.
I also think it fails as an argument because we don't describe God as 'all-seeing', as in we don't say he has a set of eyes with which to observe something as we do, but rather all-knowing (omniscient).
However, you can go one step further! I'll let William Lane Craig explain, as he does in this article:

"What is interesting (and I think uncomfortable for the person pressing this objection) is I think this actually implies the existence of God if you adopt this interpretation. Because, you see, the finite observer looking into the box [Schrodinger's Cat's box] *can himself be given a quantum physical description. As a physical object, he can be described by quantum physics. That means he exists in an indeterminate superposition of states unless somebody else observes him. But then the same thing is true of that person, and you get a chain where nobody is collapsed! There is no reality, and yet classical reality obviously exists. Here we are! So what collapses the ultimate indeterminacy of the whole universe? Ultimately it leads to a kind of ultimate observer who collapses the indeterminacy in the universe and therefore is implied by the Copenhagen Interpretation. Otherwise it would never get collapsed and nothing would ever truly exist. So this Copenhagen Interpretation, I think, ultimately implies the existence of such a being which is necessary to collapse the indeterminacy of the universe and halt the infinite regress of measurers. That is the answer to the measurement problem – you halt it with a non-physical observer. Because the observer is non-physical he cannot be described by the equations of quantum mechanics. Therefore that is why the chain of observation stops with the ultimate observer who transcends the physical world and collapses the indeterminacy in the universe.*

So this is actually, I think, a good argument for the existence of God if you embrace this Copenhagen Interpretation of quantum physics."

That lays that to bed, but what about this idea that quantum mechanics allows for things to pop into existence, uncaused, all the time?
Defendants of this idea, particularly people like Lawrence Krauss in his book 'A Universe from Nothing', will say that quantum vacuums have things pop in and out of existence, uncaused, all the time. This, they will say, means we don't need God to explain how the universe came from nothing.
What *doesn't* get said, however, is that a quantum vacuum isn't 'nothing', it's a 'something'. You see, people like to play with the word 'nothing', or they just don't understand it – ask someone what they would be in a room that had literally nothing in it and they'll like say

‘bored’. The correct answer is ‘dead’, of course, because if there’s nothing in it then there’s no air.
This makes my point – people mistake nothing for a sort of ‘lack of things’, as opposed to a ‘lack of anything’. There cannot be a ‘nothing’ if there is ‘something’ at all.
In regards to quantum vacuums, these are not ‘nothing’ at all – they’re very much containing ‘something’ as we saw in our Wikipedia entry – (*“it would still not be "empty" due to vacuum fluctuations, dark energy, transiting gamma rays, cosmic rays, neutrinos, and other phenomena in quantum physics”*).
Therefore, when someone like Krauss says things pop into being from nothing, he means a special kind of nothing in which there is something – a quantum vacuum.
David Albert explains this very well, saying:

“[V]acuum states — no less than giraffes or refrigerators or solar systems—are particular arrangements of elementary physical stuff...the fact that particles can pop in and out of existence, over time, as those [quantum] fields rearrange themselves, is not a whit more mysterious than the fact that fists can pop in and out of existence, over time, as my fingers rearrange themselves. And none of these poppings—if you look at them aright—amount to anything even remotely in the neighborhood of a creation from nothing."

It's a great article, you can read it by clicking on this button:

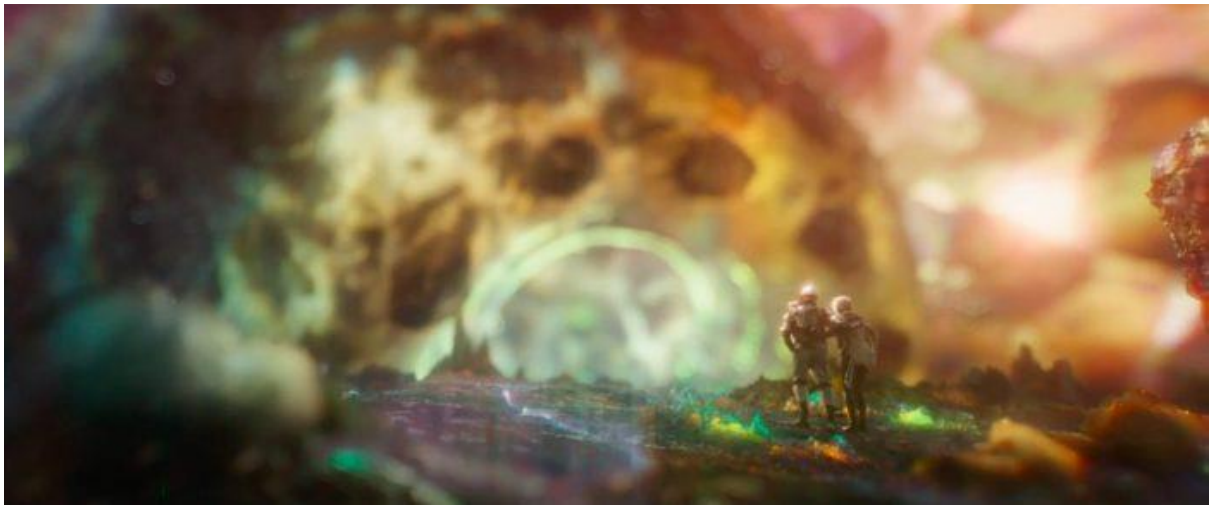
Another issue arises here when you consider that quantum physics details ‘events’ that seem to occur without cause, but there’s no explanation of ‘things’ appearing without a cause!
Let me put it this way – just because the event of an atomic particle slipping out of existence is uncaused (which we don’t even have to assume might be the case), that doesn’t mean the particle *itself* is uncaused.
For a *way* more robust explanation of this, follow through to this magnificent article, because my brain hurts and I need to stop this particular segue.

Pictured: Me, after that mind-melting tangent

So, all that is to say that the idea that quantum mechanics somehow undercuts the existence of God, or the existence of the universe, or *creatio ex nihilo*, is simply not the case. Let’s move on.

In the episode I discussed the many worlds theory, so let’s pick it back up there:
In case you don’t know, the many worlds theory is, according to the Stanford Encyclopaedia of Philosophy, the theory *“of quantum mechanics* [which] *holds that there are many worlds*

which exist in parallel at the same space and time as our own. The existence of the other worlds makes it possible to remove randomness and action at a distance from quantum theory and thus from all physics."
If you're struggling to imagine this, just think of the latest Marvel movies, with their multiverse, and you'll be on the right track.



Oh look, Ant Man's back…

So, on this theory, the chance hypothesis is simply removed because, with all those many worlds, one was bound to beat the odds! In the same way as you might assume that, given enough monkeys and enough time, they would eventually write the entire works of Shakespeare.
I'm not going to spend a load of time explaining why this is nonsense; instead, allow me to share a short story which I think will make the point of how chance isn't this kind of zero-sum game:
I once watched my brother, who had a mild addiction to scratch cards at the time, buy 10 cards for the whopping price of £50! I asked him why he did this and he explained, quite rationally, "the lowest prize is £50, right? And it says 1 in every 10 is a winner on the card, so if I buy 10 I'm basically guaranteed my money back!"
I looked at him quizzically and said "that's insane. If that were the case they'd go out of business. Each card is a 1 in 10 chance, if you buy 10 the odds reset each time, not multiply – the universe doesn't say 'oh man, it's his 10th card, quick – make it a winner!', you just get a 10% chance again."
Suffice to say, he kicked his scratch card habit pretty quickly thereafter.
This is the same issue faced by the many worlds theory, unless you assume a literal infinite amount of worlds, which we know from the Kalam isn't logically possible, and it's not even the biggest issue – the biggest is that we have literally no evidence for the existence of multiple worlds!
One of the big issues Christians face when arguing with atheists is that we have no physical, concrete evidence of God's existence – you can't get a lump of God and put it in a test tube to see what's what as the scientific method requires. This is the major reason cited by atheists as to why they reject God as a hypothesis… but then on the other hand they say "the many worlds theory of quantum mechanics can explain the fine-tuning of the universe" without a hint of irony.
"Oh, really, sir?" you might respond, "please, show me a lump of proof or shred of evidence

in a test tube for this".
"Oh, I can't, it all happens in the quantum mechanic realm which is subatomic and can't be properly observed".
Oh, that's convenient, isn't it… very convenient. You can't observe subatomic particles or their effects because, apparently, they only occur when no one is looking.
Helpful.
Yes, I'm being flippant, but it makes a good point – the same standard or criteria of evidence for God's existence should apply to quantum mechanics.
Besides *all* that, this much order and fine-tuning, if it happened by chance, would mean we would be VASTLY more likely to only see a tiny little universe, with one tiny observer, than this huge one. Small pockets of order are more likely than gargantuan universes of it.
So, we don't have a good reason to believe chance is the probable reason for the universe's fine-tuning – let's move on!

Necessity

If you recall, necessity is the idea that the universe couldn't possibly have been any other way than it is now. We discussed in the companion some of this, particularly looking at the potential necessity of the spacetime fabric and the laws of nature, and saw that these fall flat.
The major question for us to ask, however, is *could* the universe have been different? If so, it's not necessary, if not, it *could* be.
Anyway, since we went through a lot of this in the companion, and spent ages on chance, let me appeal to authority again!
Professor of astrophysics, Geraint Lewis, builds computer-generated universes for a living at the Sydney Institute for Astronomy – he has gone one record in an article stating:
"those few parts [meaning the constants and quantities] are exquisitely machined. If we tinker with their settings, even slightly, the universe as we know it would cease to exist. Science now faces the question of why the universe appears to have been "fine-tuned" to allow the appearance of complex life, a question that has some potentially uncomfortable answers."
Even a bloke whose livelihood revolves around building hypothetical universes can't work out how this one happened!
Let me put this even more clearly for us – the fact that we can even hypothesise and test alternative universe make-ups means this universe is not necessary.
Even Stephen Hawking said the same, and he's way smarter than me.
Big up the Hawking.
Let's move on to our final option next week – design!

That's where we ended with our argument for this week, and dived into the scripture of the week!
Mark 4:35-41 – *"That day when evening came, he said to his disciples, "Let us go over to the other side." Leaving the crowd behind, they took him along, just as he was, in the boat. There were also other boats with him. A furious squall came up, and the waves broke over the boat, so that it was nearly swamped. Jesus was in the stern, sleeping on a cushion. The disciples woke him and said to him, "Teacher, don't you care if we drown?"*

He got up, rebuked the wind and said to the waves, "Quiet! Be still!" Then the wind died down and it was completely calm.
He said to his disciples, "Why are you so afraid? Do you still have no faith?"
They were terrified and asked each other, "Who is this? Even the wind and the waves obey him!"

Why have I brought this up, of all things, in a session when we're discussing the fabric of the universe?!
Well, let me explain.
This is one of my favourite stories and examples of Christ showing the disciples who He is. We've read or heard this story so many times as Christians, from our very first days in mini-cogs for example, that I think we've actually become sort of desensitized to its importance and meaning.
Think for a moment what exactly is happening here – Jesus is *rebuking* the weather. What does that mean, to 'rebuke'? Well, the dictionary says it means to *"express sharp disapproval or criticism of (someone) because of their behaviour or actions"*. Its synonym is to scold, like a parent does to a naughty child.
Now , I scold Seth sometimes and I have the right to do so because… well, I made him. I have authority over him, and that authority is given to me by God.
Jesus scolds the weather – because He made it.
In this instance, Jesus doesn't just pull a cool trick, He doesn't just impress His mates, He doesn't just save His mates; He reveals the power He has over the fabric of the planet, the very thing humanity simply cannot control, and these 1st century Jews would have known full-well that this sort of power is only wielded by God the Almighty.
In exercising this power, which only God can hold, Jesus also showed His authority, which only God can claim. The authority over something which was made by His own words in Genesis 1.
This ties into our study today because it is a great example of the power and authority of God over all creation, which includes the universe.
I also love this story because it is such a great confirmation for Jesus being the messiah. One of my favourite sessions I have ever done with any youth group is the session on how Jesus fulfils the Jewish criteria of a messiah.

Anyway, our question of the week – what would it take to convince you that the universe is this way because of chance?
That's all! Just have a think. Does the many worlds hypothesis do it for you? Does quantum mechanics do it for you? Do you think the chances are high enough to just accept them? Let me know.

That's all for this week, guys!
As always, don't be afraid to get into the youth whatsapp chat and let us know how you are, what you're up to and what you're thinking. Get your prayer requests ready for Thursday and get involved in our Bible study! And you can grab us on Instagram @chawnyouth.

Speak to you in the next one!