THE NEW PHILOSOPHY OF SUPERDETERMINISM ON QUANTUM RANDOMNESS

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The philosophy of superdeterminism is based on a single scientific fact about the universe, namely that cause and effect in physics are not real. In 2020, accomplished Swedish theoretical physicist, Dr. Johan Hansson published a physics proof using Albert Einstein's Theory of Special Relativity that our universe is superdeterministic meaning a predetermined static block universe without cause and effect in physics. Scientists have observed purely random behavior at the quantum level, which has led some physicists to claim that our universe started out as a purely random quantum fluctuation. While quantum randomness makes a real appearance in our static block universe, such predetermined quantum randomness does not prove a random cause for our universe. With good scientific evidence supporting the belief that our universe was created despite the absence of cause and effect in physics, one can infer that a non-temporal non-physical cause was responsible for the creation of our universe. However, this non-temporal cause would logically have to know of and understand everything about the universe it was creating before it created our universe. Consequently, this creator would have had to already know about the appearance of quantum randomness in our universe in order to create our universe to exhibit that quantum randomness in our static block universe. The philosophy of superdeterminism supports the existence of such a Creator God, who created our static block universe outside of time without the use of any natural causal forces to exhibit predetermined quantum randomness disproving any random cause for our universe.

The new philosophy of superdeterminism is based on a single scientific fact about the universe, namely that we live in a predetermined static block[1] universe without cause and effect in physics.[2] In 2020, accomplished Swedish theoretical physicist, Dr. Johan Hansson proved by applying Albert Einstein's Theory of Special Relativity to what has already been scientifically

[1] Imagine a cosmic four-dimensional block, where the three familiar dimensions of space (length, width, and height) are combined with a fourth dimension of time. Every single moment in history would occupy a specific location within this block. From this perspective, there is no special "now" moment that separates the past from the future. They all exist equally.

[2] Hansson, Johan. "Bell's theorem and its tests: Proof that nature is superdeterministic – Not random." *Physics Essays* Vol. 33, No. 2 (2020). Dr. Johan Hansson, a professor at Luleå University of Technology in Sweden, has been awarded the "Honorable Mention Award" by the Gravity Research Foundation, a prestigious foundation aimed at advancing the understanding of gravity in fundamental physics. This recognition places him among a group of previous winners that includes Nobel laureates and world-renowned physicists. www.ltu.se/en/latest-news/news/news/2023-05-23-awarded-prestigious-prize-in-gravitational-research#:~:text=Johan%20Hansson%2C%20a%20professor%20at,of%20gravity%20in%20fundamental%20physics.

verified about spin measurement correlations observed in entangled particle pairs[3] that cause and effect[4] in physics[5] are not real.

Dr. Hansson demonstrated that the opposite spin measurements observed in entangled particle pairs cannot occur unless cause and effect in physics are not real. Experiments have shown that when the spin of the first entangled particle is measured, then the spin of the second entangled particle will always be the exact opposite spin regardless of how far apart you place the particles when measured.[6] However, the spin of the first entangled particle measured for spin-1/2 particles, like electrons, will always be a purely random 50-50 result between Up or

[3] Dr. Hansson's version of superdeterminism proves the we live in a predetermined static block universe without cause and effect in physics. The other version of superdeterminism posits hidden causal variables responsible for the correlations observed in quantum entangled particles, and thus relies on cause and effect in physics. Indeed, Dr. Hansson's version of superdeterminism disproves any competing version of superdeterminism that relies on cause and effect in physics to posit hidden causal variables.

[4] Dr. Hansson wrote that "[e]verything is predetermined, including the experimenters (non) free will, the 'random' orientation of the spin-analyzers at either end, and anything else you can think of. Each measurement does not create but merely uncovers what already is embedded in space-time. All events leading up to, and including, the 'act of measurement' itself are already there. . . . Bell's theorem and its many experimental tests thus are proof that nature at its fundamental level is superdeterministic – not random. A 'cause' cannot alter the 'effect.' The events in global space-time are predetermined and fixed, much like pebbles cast into a concrete block. . . . What an experimenter seemingly 'chooses' to do at either end A or B is the only thing she can do, and cannot 'cause' either the event at her own position or the event at the other end. All events in the global space-time 'block' we call the universe (past, present and future), observed or not, are superdetermined and unalterable." Hansson, Johan. "Bell's theorem and its tests: Proof that nature is superdeterministic – Not random." *Physics Essays* Vol. 33, No. 2, at 217 (2020).

[5] Physics is the fundamental science that studies matter, energy, motion, and force. Physics explores everything from the incredibly small (subatomic particles) to the unimaginably vast (the cosmos).

[6] Aspect, A. et al. "Experimental Realization of Einstein-Podolsky-Rosen-Bohm *Gedankenexperiment*: A New Violation of Bell's Inequalities" *Physical Review Letters* Vol. 49, No. 2 (1982).

Down spin. This raises an inconsistency with Einstein's Special Relativity when observed from different inertial frames of reference.[7]

Observers in different frames of reference can observe a different entangled particle measured first due to the relativity of simultaneity.[8] As a result, two different observers each observing a different entangled particle measured first can observe conflicting spin measurement results for the pair. If Observer 1 sees particle A measured first with an Up spin, then particle B must show a Down spin for Observer 1. But, if Observer 2 sees particle B measured first with an Up spin, then particle A must show a Down spin for Observer 2. Observers 1 and 2 would see inconsistent spin measurement results for the pair of entangled particles. This potential conflict in spin measurement results occurs because of the random 50-50 chance of observing either an Up or Down spin on the first particle observed to be measured.

The only way to explain how the spin measurement results can be consistent for all observers regardless of inertial frames of reference is to say that the spin measurement results

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[7] An inertial frame of reference is a frame of reference in which an object at rest remains at rest and an object in motion moves in a straight line at a constant speed unless acted upon by an external force. Essentially, it is a reference point that is not accelerating. Think of it like a smoothly moving train: if you're inside and not near the windows, you can't tell if the train is moving at a constant speed or stationary. This is because the train is an inertial frame of reference.

[8] The relativity of simultaneity in Einstein's Theory of Special Relativity means that two events that occur at the same time for one observer may not occur at the same time for another observer who is moving relative to the first. This idea challenges our intuitive understanding of time. In our everyday lives, we tend to think of time as absolute, flowing uniformly for everyone, regardless of their motion. However, special relativity tells us this is not the case. This happens because the speed of light is constant being the same for all observers regardless of their motion. To visualize this, imagine two lightning strikes hitting opposite ends of a moving train simultaneously from the perspective of someone standing on the platform. To someone on the train, the lightning strikes might appear to happen at different times due to their motion relative to the platform. This concept might seem counterintuitive, but it is a cornerstone of modern physics and has been experimentally verified.

must be predetermined for all observers.[9] If Observer 1 is predetermined to see particle A measured with an Up spin, and Observer 2 is predetermined to see particle B measured with a Down spin, then the spin measurement results between the two Observers can always match even though the spin measurements still appear to the Observers to be completely random results. This is an example of predetermined randomness and not caused randomness. If the random spin measurements were actually caused when the first entangled particle observed was measured, then there would be an inconsistency in spin measurement results which would violate the principle that there is no preferential frame of reference in Special Relativity or quantum mechanics. Consequently, Dr. Hansson proved that actual cause and effect in physics cannot be real using Einstein's Theory of Special Relativity, because eliminating cause and effect in physics is the only way to explain how the spin measurement results can be consistent when viewed from any inertial frame of reference.

Scientists have observed purely random behavior at the quantum level, which has led some physicists to claim that our universe started out as a purely random quantum fluctuation.[10] A quantum fluctuation is a temporary random change in the amount of energy at a point in space.[11] However, the cause of the quantum fluctuation is the Heisenberg uncertainty principle and the intrinsic probabilistic mathematical framework of quantum field theory. Consequently,

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[9] Dr. Hansson concludes that "[t]here is no other possibility than that the outcomes at A and B both are predetermined." Hansson, Johan. "Bell's theorem and its tests: Proof that nature is superdeterministic – Not random." *Physics Essays* Vol. 33, No. 2, at 217 (2020).
[10] Tyron, Edward P. "Is the Universe a Vacuum Fluctuation?" Nature Vol. 246, pp. 396-397 (1973).

[11] The fundamental cause of quantum fluctuations is the Heisenberg uncertainty principle. This principle states that it is impossible to know both the exact position and momentum of a particle simultaneously. As a result, there is an inherent uncertainty in the energy of a system at any given moment. These tiny uncertainties manifest as quantum fluctuations.

the purported cause of quantum fluctuations is not an actual physical entity, but only a mathematical construct. Science has never directly observed or proven the existence of any quantum fields as a fundamental reality.

Quantum field theory is very successful at predicting the behavior of the physical quantum world, but it does not prove the physical existence of quantum fields. Indeed, because cause and effect in physics are not real, then quantum fields could not actually cause quantum fluctuations. If quantum fields could not possibly cause quantum fluctuations, then there is no reason to believe that these unobservable quantum fields are real. Quantum field theory (QFT) is only a mathematical framework that does an excellent job at predicting behavior in the quantum world, but the universe can exhibit behavior consistent with QFT without being caused by QFT.

Dr. Hansson proved that the universe is a predetermined static block universe without cause and effect in physics. Our universe is simply predetermined to exhibit behavior at the quantum level consistent with QFT without any actual quantum fields causing such behavior. So, the random behavior observed at the quantum level is not actually caused by quantum fields, but rather the result of a predetermined appearance of random behavior at the quantum level in our static block universe consistent with QFT. Random causal forces in physics do not actually exist, because cause and effect in physics are not real under superdeterminism. While quantum randomness makes a real appearance in our static block universe, such predetermined quantum randomness does not prove a random cause for our universe.

Indeed, in the absence of cause and effect in physics, there is no natural process of causation from which one can infer a natural cause to our universe.[12] One might ask why any

[12] The Copenhagen interpretation of quantum mechanics says that a quantum system can exist in multiple states simultaneously (superposition) until it is measured or observed. When a

given random behavior at the quantum level was one way and not another? But, in the absence of any natural cause to random behavior, there is no need to ask why this non-existent cause did not produce a different behavior. There is no need to wonder why our particular universe exists and not another in the absence of any natural causal process that can give rise to universes. In the absence of cause and effect in physics, there are no potentialities for other universes besides our own.[13]

However, there is an abundance of scientific evidence which suggests that our universe was created despite the absence of any natural causal process available for creating universes.

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measurement or observation is made, the wave function of the system "collapses" into a single definite state. The Copenhagen interpretation posits that the act of measurement or observation causes the wave function to collapse from a superposition of states to a single, definite state. However, the act of measurement or observation cannot actually cause the collapse of the purported wave function in the absence of cause and effect in physics. Superdeterminism disproves the Copenhagen interpretation of quantum mechanics.

By disproving the Copenhagen interpretation of quantum mechanics, superdeterminism finally answers the paradoxical thought experiment known as Schrodinger's Cat. A cat is placed in a sealed box with a vial of poison, a Geiger counter, and a radioactive atom. If the atom decays, the Geiger counter triggers and releases the poison, killing the cat. According to quantum mechanics, until the box is opened and observed, the atom is considered to be both decayed and not decayed simultaneously. This implies that the cat is simultaneously both alive and dead until observed. But, under superdeterminism, the cat already exists in our block universe either alive or dead – but not in a superimposed state of being both alive and dead. Dr. Hansson wrote that "[t]his type of superdeterminism solves all 'paradoxes' of quantum mechanics: no 'spooky action at a distance,' Schrodinger's Cat is really dead or alive, position of hit on the screen in a double-slit experiment is uniquely determined, etc." Hansson, Johan. "Bell's theorem and its tests: Proof that nature is superdeterministic – Not random." *Physics Essays* Vol. 33, No. 2, at 217 (2020).

[13] The Many-Worlds Interpretation (MWI) is an interpretation of quantum mechanics that proposes that every possible outcome of a quantum event occurs in its own separate universe. Essentially, MWI suggests that there are countless universes in a vast multiverse, each corresponding to a different outcome of every quantum event. However, superdeterminism does away with any need to account for every possible outcome of every quantum event, because there is no natural causal force of nature causing the random outcome which could have possibly caused a different outcome in the absence of cause and effect in physics. Thus, the philosophy of superdeterminism does not draw on the necessity of a multiverse discrediting the MWI.

Quantum randomness itself is such evidence, because randomness by definition is a result that could have been different.[14] Indeed, the quantum randomness supposedly responsible for the quantum fluctuation giving rise to our universe would have only a chance of 1 in 10 to the power of 10^{123} of ever happening.[15] The Big Bang theory also implies the creation of our universe when a near singularity popped into existence from nothingness.[16] As one regresses backwards in time to find that the universe gets smaller and smaller even to a sub-atomic size, the reasonable inference is that this near singularity popped into existence as a quantum fluctuation. The scientifically verified flatness of spacetime also implies a zero energy universe with a perfect balance of positive energy (mass and radiation) and negative energy (gravity). When one cancels the positive energy out with the negative energy, one is left with nothing which suggests that our universe came from nothingness. But, nothingness cannot have the power to create our universe in the absence of cause and effect in physics, which only leaves a non-temporal[17] cause for the existence of our universe. The cause must be non-temporal, because nothing can be caused to exist in time in the absence of cause and effect in physics.

With good scientific evidence supporting the belief that our universe was created despite the absence of cause and effect in physics, one can infer that a non-temporal non-physical cause was responsible for the creation of our universe. However, this non-temporal cause would

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[14] By definition, randomness implies unpredictability. If a result could have been different, given the same initial conditions, then it is considered random. This is a fundamental concept in probability and statistics.

[15] Penrose, Roger, 1989, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics.* Oxford: Oxford Press, pp. 339-345.

[16] The Catholic Church teaches that "[i]n the act of creation, God calls every being from nothingness into existence." CCC 2566.

[17] Non-temporal or atemporal means something is independent of or unaffected by time**.** It is a concept often used in philosophy, theology, and physics to describe things that exist outside the constraints of time.

logically have to know of and understand everything about the universe it was creating before it created our universe. Consequently, this creator would have to already know about the planned appearance of quantum randomness in our universe in order to create our universe to exhibit that quantum randomness in our static block universe. Such predetermined quantum randomness implies the existence of a supremely intelligent Creator,[18] who must have already known how that quantum randomness played out its role in the static organization of our block universe in order to give rise to humanity. The question as to why this Creator decided to create our universe with its particular quantum randomness and not another is answered simply by referencing the Creator's freely willed choice.[19]

Some might claim that the quantum randomness at play in Darwinian evolution through random genetic mutations prevents any possibility of God knowing that our universe would give rise to human beings. However, because quantum randomness is not the result of causal forces of nature, then God could certainly predetermine our static block universe to exhibit quantum randomness that God already knew would lead to human evolution. Quantum randomness would be useful to God by increasing the scope of available physical structures under our laws of

[18] Supreme intelligence is just another form of decision making that can be utilized in creating the universe. There is no reason why the metaphysical reality responsible for the creation of the universe must engage in purely random decision making. There are no physical mechanisms in this metaphysical reality, which arguably would only be capable of purely random decision making.

[19] A divinely simple metaphysical Creator not made of parts is not bound by deterministic or even random laws of physics, and therefore being unbound must have free will in making choices.

physics, because more possibilities are available under quantum mechanics than under classical deterministic physics.[20]

Many have used quantum randomness as an argument against the existence of God. For example, one could argue that the reason something exists rather than nothing is because something is infinitely more likely to exist and hence nothingness infinitely less likely to exist. The idea is that one can always imagine something else or something additional giving rise to an infinite variety of possible somethings that might exist, but one can only imagine a single nothingness without something at all. If something is almost certain to exist, then there is no need for a God to create what is almost certain to exist anyway. However, something is contingent on nothingness under the zero energy universe theory, and therefore, nothingness must logically precede something. In order for something to exist, nothingness must have preceded something in existence. Because something exists, then nothingness was not infinitely unlikely to exist, but certain to have existed. And one needs a God to non-temporally create something from nothingness, because nothingness has no power to create something in the absence of cause and effect in physics.

Others have argued that quantum randomness indicates that the creator of the universe must have been supremely stupid by essentially throwing a dart at a board when deciding to

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[20] Classical physics is deterministic, meaning that given a complete set of initial conditions, the future state of a system can be precisely predicted. Quantum mechanics, on the other hand, is inherently probabilistic. At the quantum level, events are described by probabilities rather than certainties. This introduces a vast number of potential outcomes for any given situation. God could use the greater possibilities available under quantum mechanics in order to predetermine our universe under our laws of physics to exhibit a much more flexible predetermined plan for universal history, including the predetermined occurrence of miracles.

create our particular universe. However, the knowledge and understanding of our whole block universe must logically precede the non-temporal creation of our universe, including the knowledge and understanding of the consequences of quantum randomness on the entire history of the universe. God who knows everything being omniscient[21] must always know the consequences of predetermined quantum randomness logically prior to creating our universe. As Albert Einstein correctly observed, "God does not play dice with the universe."

[21] God must know everything, because God must know Himself and everything God creates leaving nothing else available for God to know. God must know Himself, because God being uncaused cannot be caused to acquire or lose any knowledge about Himself. God must always know and understand everything He creates in order to predetermine its existence in a static block reality.