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The Specter of Reality:
A Supernatural Solution to the Quantum Quandary

In the larger realm of science today, the naturalist standpoint is generally taken as a basic premise for any meaningful scientific work or rational thought. Naturalism assumes that all of everything is completely confined within nature, and that we, along with our wills, desires, and beliefs, are and can be explained by the laws of nature as the results of material interactions, atoms crashing together. According to this common view, there should be no non-physical God, no soul, and certainly no life after death (although there is some debate about the veracity of the “human spirit”). And this belief is not unsupported by evidence. All of classical physics (otherwise known as Newtonian physics) tells us that reality exists in verifiable quantities, proceeding in an orderly pattern of cause and effect, and never wavering from a clear and predictable path. For example, according to the observed laws of gravity, we have no reason to doubt that when dropped from a hand, a rock will accelerate towards the ground at approximately 9.81 meters squared per second squared every single time. If the universe was simply material and causal, we would expect this, since a universe defined only by absolute and predetermined values, such as the gravitational constant, should not on its own deviate from those values. Even considering that a God might have intentionally made this universe in the specific order that we see, there still remains the fact that in a world governed completely by classical physics there is apparently no inherent need for anything like the providential and caring God of the Bible. He is simply not needed, since the universe already functions independently of anything else, using its own well-defined laws. God may have built and wound

up the clock, but the pieces are quite capable of working on their own without any continuing interference, thank you very much. But how then can we possibly hold on to any type of religious belief in the face of such a cold, empirical, and Godless reality? The often-misunderstood realm of quantum physics may be able to provide us with an answer to this quandary.

Quantum physics, simply put, is the scientific explanation of the subatomic world; the unique set of rules governing reality at its smallest and most basic level. The validity of this area of science has been clearly confirmed and verifiably demonstrated, yet many scientists are either unable to or do not want to accept its implications – Albert Einstein himself, when faced with the findings of quantum physics, adamantly denied their effect upon his causal and corporeal understanding of reality, famously exclaiming “God does not play dice” (Hermanns). I will explain the basic workings of quantum physics in my paper, but for now, it is only important to understand that the reality of quantum physics, in contrast to classical physics, does not rely upon self-defined quantities and qualities of matter. Instead, by the laws of quantum physics, the qualities of these very small particles are statistically determined along a wave function containing all possible positions; the electron could be one foot away, or five, or ten. The wave function for that particle can predict the statistical probability of certain outcomes, but it is impossible to know which outcome has occurred until we observe the electron itself. In short, instead of giving a definitive and certain result for a set of preceding actions, as the laws of classical physics do, the laws of quantum physics predict a statistical range of infinite possibilities. Considering this, my thesis is as follows: a thoughtful exploration of quantum physics refutes the claims of naturalism because the inherent uncertainty found in the laws of

quantum physics and the apparent certainty of reality suggests that there must be some entity outside of nature that works beyond the laws of nature to make reality certain.

To defend this thesis, I will first explain the premises of naturalism and show why nature and its laws must be self-sufficient for naturalism to be valid. Second, I will explain the uncertainty predicted by the laws of quantum physics and show how this does not accurately describe our apparently certain reality, while fielding and refuting the multiverse thesis. Third, I will explain how this incongruity between the laws of nature and reality requires some entity to make reality certain. Fourth, I will field and refute two naturalist explanations for this quandary. Finally, I will explain why this entity must be supernatural – outside of nature. Before I fully enter into my argument, it must be understood that this essay is not a proof for the Christian God’s existence from science. It would not be reasonable for any observation about the natural to attempt to prove something about the supernatural, so I will not do this in my essay. This essay simply points out the universe’s inherent need for something outside of nature, without going into specifics concerning what exactly that entity might be. I will not answer every logical objection that could be raised, but will instead work from some assumptions about reality that most rational people hold – like the fact that in some way the universe exists – to reach a reasonable conclusion. Further, I will work from the current state of scientific knowledge, noting the possibility that some future scientific breakthrough may debunk this argument altogether.

NATURALISM

Naturalism is necessarily reliant on the inherent self-sufficiency of nature. In other words, for naturalism to be valid, the entirety of this universe must be contained within itself and completely free from outside influence – because of course the ‘outside’ would not exist (Papineau). Every action in the universe must be completely explainable by the laws, qualities,

and properties inherent in nature – the laws of nature. For example, because a rubber ball is a part of nature it must every single time follow the law of nature dictating that it will gravitate toward the significant mass of the earth when dropped. In fact, these laws of nature must be so absolute that they can allow no other result from the one we see. If the ball were to shoot upwards and fly out of the earth's atmosphere, we would have to say that something outside of the known laws of nature is acting upon the ball, assuming that our understanding of the laws of nature is at least mostly correct. Similarly, if the laws of nature cannot by themselves describe and explain reality as it is there must be something outside of these laws to explain reality fully, like in a computer where the parts (CPU, memory chip, etc.) by themselves cannot explain the functioning computer as a whole, but instead require something outside (humans) that must assemble and power it. This inability to fully explain reality would not necessarily disprove the laws themselves – in fact according to all relevant scientific experiments and observations, the laws of quantum physics do appear to be perfectly valid, at least with respect to their probabilistic understanding of the varying positions of particles on the photon level (see below) – but it would mean that there is something more than just the known laws of nature at work. Thus, in a naturalist world, the laws of nature must completely match and explain the apparent reality without any outside interference.

THE UNCERTAINTY OF THE LAWS OF NATURE

Extending these same principles further, according to classical physics and naturalism, the actions of a subatomic particle like a photon or an electron should then also be explainable by the laws of reality just the same as the rubber ball. Since an electron is also a part of nature, it should always act and be described according to the directly causal and predetermined laws of nature. But it does not and cannot be. In reality, the action of a particle on the quantum level

simply cannot be definitively determined by natural laws because by their very nature, the laws of quantum physics, which are applicable to all of nature, cannot themselves provide absolute certainty. Instead they can only predict a general probability of a set of outcomes. Research into this difficult field, most notably shown in the double slit experiments¹, has demonstrated that particles on the quantum level are indeed governed by probabilistic laws, and that these laws cannot provide a definite prediction of the outcome for a given particle. In other words, according to the governing equations of quantum physics, the certainty of any individual outcome never actually reaches 100%, no matter how many defining variables (velocity/position/mass) are known. For example, using the laws of quantum physics, we can calculate that there is a set percent chance (i.e., 75%) that a given electron is a set distance (i.e., three feet) from the device measuring its position, yet there is a distinct – though minute – possibility that the photon is instead one foot or three million light years away. When these same laws are applied to larger masses, this probability becomes incredibly tiny, yet it still remains. The laws of classical physics definitively require that a ball set in an uninterrupted velocity of three feet-per-second for one second will have moved a total of three feet after that second. Yet, the verified and tested laws of quantum physics reveal that although this outcome is extremely likely (the probability is so high in fact that the same result should occur every single time until the universe ceases to exist), there is a real nonzero possibility that the ball will only move two feet, or one, and so on. Vivally, there is nothing found within the known laws of quantum physics that actually determines whether one of these infinite possibilities is in fact the final outcome (Barr). Without some outside determining factor, each and every one of the ball's possible positions is simultaneously predicted as a legitimate outcome of the interaction between the laws of quantum

¹See PBS Space Time's "Quantum Entanglement and the Great Bohr-Einstein Debate".

physics and the physical world. Indeed, relying only upon these laws, one ought to predict that reality exists in an inherent uncertainty, a chaos where no one outcome is truly decided to the exclusion of others. The ball is never actually and definitively in one position, but instead exists at all possible positions at the same time. In short, the known laws of nature – the laws of quantum physics – can alone only predict uncertainty. To reiterate, by certainty I mean the state of an object in which it exists at and possesses one specific point in space. By uncertainty I mean the state of an object in which it simultaneously possesses all possible positions (or lack of position) predicted by the laws of quantum physics, and in which no one position is defined as the exclusive reality. The use of these terms and their derivatives is strictly limited to this definition. Neither term refers to a given level of human perception or understanding.

THE CERTAINTY OF REALITY

Needless to say, reality does not exist in this state of uncertainty but in a defined state of certainty. This truth is made clear by the simple act of seeing the universe around us. To use the earlier example of the ball, the ball is there and the ball is three feet away. No one with any sense would say, “Well, I see the ball is there, but the ball is definitely also not there because the laws of quantum physics tell me so.” That would be absurd, since there clearly appears to be one reality in this case, and the one reality in this case is that the ball is there. The assumption from the laws of quantum physics that nature exists in uncertainty would not only violate the law of non-contradiction, but it would also defy the validity of any perceptual observations about nature. The law of non-contradiction is broken by this uncertainty because at least two contradictory outcomes, such as “the ball is there” and “the ball is not there” are claimed to be true. The validity of perceptual observation is denied by the assertion that reality exists in uncertainty because by all known methods of human observation reality appears certain.

Admittedly, some might argue that there is no need to uphold the integrity of perceptual observation because it is not absolutely verifiable, as mathematical laws are. Instead, the argument goes, man's perceptions are merely his attempt to impose certainty upon reality, and they cannot be counted as sufficient evidence for the certainty of the universe. However, noting that this essay is not a logical proof but a reasonable conclusion based upon some assumptions held by most rational people, the sheer weight of the perceptual evidence of the human race must be taken as a fact. This is not to say that all humans observe reality in exactly the same way. In fact, according to Einstein's theory of relativity, our observations depend upon gravity and velocity, among other factors, which may vary from person to person. However, the differences in man's observational conditions and capabilities does not disprove the fact that each and every person is still observing the same one reality, just in a different way, from a different angle. Thus, we must assume that reality exists in one defined state of certainty. This reasonable assumption is necessary for the act of engaging in any physical science, so for the purposes of this argument perceptual scientific evidence must be taken as a legitimate authority. Considering this, we must say with confidence that reality does exist as a certainty. Thus, we find an incongruity between the laws of nature and the reality that we see: the uncertainty predicted by the laws of nature (quantum physics) does not fully represent or explain the certainty of the universe.

THE MANY WORLDS INTERPRETATION

At this point, a great number of laymen, philosophers, and even scientists make the mistake of trying to embrace both the uncertainty of the laws of quantum physics and the apparent certainty of reality at the same time by assuming that each and every one of the infinite possibilities allowed by the rules of quantum physics exists within its own universe. Under this

theory, called the Many Worlds Interpretation – or multiverse theory – of quantum physics, there exists a reality in which the ball is two feet away, one in which it is three feet away, and so on indefinitely. This proposal does away with both the problem of perceptual observation and the law of non-contradiction by simply isolating each of the infinite possibilities in its own universe. Perceptual observation is upheld because each possible outcome can be perceived to be true – and is true – within its own reality. Multiple contradictory facts can exist at the same time because each fact exists isolated within its own universe. This theory has gained significant traction in the common psyche and the nomenclature of the “multiverse” pervades popular culture. Consequently, it has risen to the fore as an explanation for the disconnect between the laws of quantum physics and apparent reality (Vaidman).

The principle issue with this concept is that it attempts to satisfy the problem of quantum uncertainty by simply avoiding the problem altogether. When examined, it is revealed that the Many Worlds Interpretation does not really provide a scientific answer to the problem at all but has instead simply brought forward an unsupportable, untestable, and unnecessarily complicated proposition. It is just as impossible, if not more so, to prove the truth of the Many Worlds Interpretation as it is to prove that some god exists who made things the way they are. Both are simply outside of the realm of possible observation. For the god, how would we examine a supernatural being using natural means? For the multiverse, how would we even begin to examine something outside of and irreversibly separated from our universe. The truth is we can't. Honestly, it seems that the only difference between the plausibility of this theory and that of a god is that while one might also infer the existence of a god from other aspects of nature, such as its inherent order, the multiverse theory possesses no other merit besides the fact of its own existence. If nothing else, at the very least we can move past this interpretation by bringing

its complexity and lack of evidence against Ockham's razor – the proposition that the simplest answer is usually the best one – because this theory is in a very real sense infinitely complex and unjustified. Almost any other answer to this quandary would be simpler, including the theistic explanation, which at least provides God as the one definitive answer. Therefore, this interpretation, despite its popularity, cannot be entertained as having any particular merit, and thus we must continue with the more plausible assumption that there is just one certain reality.

THE NEED FOR SOMETHING ELSE

So, it appears that there is an inherent uncertainty within the laws of nature, but there also seems to be one certain reality. What now? How can uncertainty produce certainty? The answer is that there must be something that makes the uncertain certain, that collapses the infinite possibilities presented by the laws of quantum physics into one defined reality. If by themselves the laws of nature predict an infinite number of realities yet there appears to be one certain and distinct reality, it stands to reason that someone or something acts in some way so as to make this uncertainty certain. The very incongruity between the laws of nature and the observed reality begs a resolution, and that resolution can only come if something works to synthesize these two contradicting concepts. Because these laws of nature cannot explain the reality that we see, there must be something else that does provide an explanation for the apparent certainty of the universe.

HIDDEN VARIABLES

Now some have argued that perhaps this entity is itself contained within nature or within its laws, thus preserving naturalism. Perhaps there exists some hidden quality or law of the universe that determines each certain outcome. The strongest version of this concept was championed by Albert Einstein himself, alongside famed physicists Boris Podolsky and Nathan

Rosen in the Einstein–Podolsky–Rosen (EPR) paradox, and it proposed that certain “hidden variables” existed that empirically determined one certain reality. These yet undiscovered laws would show that the quantum world – and everything else – could be certainly defined by laws present within nature. They would themselves bridge the gap between uncertainty and certainty by defining the certain outcome that the existing laws of quantum physics left only as a possibility. Instead of the chaos of infinite possibilities, the laws of nature – with these “hidden variables” – would show a certain, orderly, and self-sufficient reality, fully explainable by the laws of nature alone and free from the need for any outside entity (Einstein)².

The principal issue with this theory is the fact that these “hidden variables” have not yet been found, and indeed every attempt to find them has only reinforced the conclusion that such a discovery may never occur. The only reasonable explanation for these undiscovered laws was a set of inequalities developed by famed scientist Dr. John Bell, appropriately called the Bell Inequalities. Bell developed these guidelines in an attempt to explain tendencies within quantum physics through a concrete and definable set of laws. Indeed, for some quantum level experiments, these inequalities did provide an accurate depiction of the data, as they predicted general outcomes with some accuracy. Nevertheless, Bell’s theories have been proved inapplicable and downright wrong in many subsequent quantum experiments, most notably in the double slit experiments, and even in those experiments for which they could be applied, they only predicted the most general tendencies, not actual certainty. Bell himself accepted the violation of his inequalities and built further upon that failure. Seeing the inability of natural laws to define a certain reality, he would go on to develop one of the most insightful scientific

²For a *succinct* explanation of hidden variables, see David Bohms’s “A Suggested Interpretation Of The Quantum Theory In Terms Of ‘Hidden’ Variables.”

proposals ever written, Bell's Theorem: "no physical theory which is realistic and also local in a specified sense can agree with all of the statistical implications of Quantum Mechanics" (Shimony). This theorem essentially declares that no theory affirming the inherent and independent certainty of nature and its laws can accurately explain the quandary that quantum physics presents. Thus, the most effective attempt to provide an explanation for reality within the laws of nature fails utterly to do just that. Considering this and all scientific knowledge up to this point, there is no apparent explanation within the laws of nature for how the uncertain possibility becomes a certain reality. We must look somewhere else for our answer.

THE COPENHAGEN INTERPRETATION

It is at this point that we come to one final naturalist explanation. If all else fails, according to the naturalist, perhaps there is some inherent property within man himself that makes reality certain when he observes it. All else is chaos and uncertainty but that which man observes. In this context, to observe broadly means to experience through the senses and through scientific experimentation. (There is some debate over whether man alone has this power as an observer or whether other entities, like animals, also are observers, but this distinction is hardly meaningful within the context, in addition to being hard to substantiate). In essence, reality only exists as a certainty when it is being observed. This concept, called the Copenhagen Interpretation, was championed by Niels Bohr in direct competition to Einstein's theory of "hidden variables". Instead of trying, as Einstein did, to prove that uncertainty did not exist within the laws of nature, Bohr embraced the uncertainty found within the laws of quantum physics as a fact of nature. According to Bohr, nature is uncertain outside of the observer, and only the observer makes reality certain. Bohr's interpretation takes this observational quality of man as a given fact, unexplainable and inherently mysterious. Following this theory, one would

say that before it is observed an object does not exist as a defined quantity, but instead exists at all possible positions in at the same time. In this state, the object exists in an infinite set of possibilities, disregarding the law of non-contradiction. To borrow the famous illustration of Schrodinger's cat, before we open the box holding a cat and a precarious bottle of poison, the bottle of poison has both broken *and* not broken and the cat is both dead *and* not dead. When the box is opened and the cat observed, at that moment the set of all possible outcomes collapses and one or the other reality is made certain by the very act of observation. The bottle is now broken *or* not broken, and the cat is now dead *or* not dead. Just so, one would say that all of reality exists as this kind of "Peek-a-boo universe" that is only brought into actuality at the time of observation, and at all other times remains in uncertainty. According to this theory, man himself makes the uncertainty certain by the very act of observing nature, and when he does not observe nature, nature does not enter into certain reality. In a very real sense, when a tree falls in the forest and no one is around to see or hear it, it does not fall at all until it is observed lying upon the ground (PBS Space Time).

Aside from the fact that this theory is impossible to test (we cannot test that which is outside of the realm of observation), the principle problem with this theory is the fact that man is an inherently imperfect observer. In fact, according to scientific law, most notably the Heisenberg Uncertainty Principle developed by quantum physicist Werner Heisenberg, it is impossible for man to observe or know reality fully. As Heisenberg puts it, "one cannot assign exact simultaneous values to the position and momentum of a physical system" (Heisenberg). In essence, it is impossible to know both the position and momentum (velocity times mass) of a particle on the quantum level. Man cannot exactly observe all aspects of the reality in which he participates. Before continuing, it is important to note that the inability of man to perfectly

observe reality does not invalidate man's perceptions about nature. Although we may not know the exact position and momentum of a system, we can still see that the object we are observing still exists in one defined position. Measurement of absolute values is not necessary for the validation of an object's certain existence. The same is not the case for the assumptions of the Copenhagen interpretation. If man were to make any object in reality absolutely certain, he would have to perfectly observe every quality of the object, including values such as position and momentum, in order to make those qualities the defined actuality. If that object is to be certain, man would have to simultaneously and exactly define values that he cannot even observe. The Copenhagen interpretation rests on the assumption that man is able to fully observe his environment, but the Heisenberg Uncertainty Principle demonstrates that man is not at all complete in his observation of nature. If this is the case, then we return to the exact same problem we began with; although it may be possible for man to make certain some aspects of nature, by scientific law at least some part of reality must always remain uncertain and contradictory if man alone is the observer. By himself man cannot observe – and thus make certain – all of the reality in which he participates. In place of chaos, we have a quasi-chaos that hardly improves the earlier problem. In truth, this theory only complicates our understanding of reality, while failing to actually provide a sufficient answer to the gaping hole within naturalism.

THE SUPERNATURAL ANSWER

Most importantly, we must conclude that whatever entity makes reality certain must be outside of nature, in other words, supernatural. Although the two best naturalistic explanations have been refuted, it is necessary to explain why this entity that makes reality certain cannot be some other thing hidden within nature and not yet proposed as a solution to the problem. This entity must be outside of nature because if whatever made nature certain was contained within

nature, then it would be subject to the laws of nature, and consequently that very entity would be subject to the exact same problem as the rest of nature. By itself, it would be both 'there' and 'not there', and thus it would require some other determining factor to make it definitively 'there'. This new entity would then be subject to the same problem as the cycle continues into infinity. This constant chain of uncertainty making certainty simply results in an infinite regression of entities, each of which is necessary for the existence of the one before it. Some, in defending naturalism, have argued that perhaps such an infinite regression is permissible, and in fact necessary, despite its apparent absurdity. Here again, although these few might disagree, for the sake of argument and basic understanding, we must again apply Ockham's Razor and assume the generally agreed upon truth that infinite regression is illogical, since an objection to the rules of logic themselves is hardly going to lead to a simpler answer. At some point, there must be something absolutely and self-sufficiently certain if there can be any certainty at all. This certainty cannot be found within nature and its laws, so it must be found outside of nature. This is the final blow to naturalism: Simply looking at the universe around us, we can know that there must be something outside of nature for it to exist in the way we see it. We may know nothing concrete or specific about this supernatural entity, but we do not need to have specific knowledge about this entity to understand that it defies naturalism. The fact remains that the quandary of quantum physics demands an answer, and that answer can only come from a truly supernatural source.

CONCLUSION

In conclusion, the laws of quantum physics alone predict uncertainty, but apparent reality is certain. This incongruity requires that there be some entity that works beyond the known laws of nature to make reality certain. This entity is not found within the laws of nature, it is not found

within man, and it cannot be found anywhere else within nature itself. Therefore, there must be some entity completely outside of nature that makes reality certain. So, what does this mean for Christians? How might it apply to our understanding of God? Put simply, this inherent need for some entity outside of nature lines up with the Christian conception of a supernatural and providential God. The Scriptures state that “For [God’s] invisible attributes, namely, his eternal power and divine nature, have been clearly perceived, ever since the creation of the world, in the things that have been made.” (Rom 1:20), yet so often Christian appreciation for this is limited to simply saying ‘that animal is majestic and must have been created’ or ‘everything is so ordered that there must be a God’. But what if behind the very fabric of reality there exists a constant need for God? Quantum physics shows that nature is not self-sufficient and is instead inherently dependent upon something else, something greater, for its existence. And this entity not only exists but is supernatural and constantly working for the preservation of the universe, just like the Christian conception of God. This essay cannot and will not attempt to prove that this entity is the Christian God, but there is something truly beautiful in finding such a fitting solution to such a cosmic quandary within faith itself.

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