

The Case for the Supernatural

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Introduction

When scientists write articles for the general public, their articles often leave the impression that science rejects the supernatural. The “New Atheists” including such authors as Michael Onfray, Ayaan Hirsi Ali, Victor J. Stenger, Dan Barker, A.C. Grayling and many others argue that science and reason eliminate any possibility for the supernatural – particularly with regard to science and religion. The so-called “Four Horsemen of the non-Apocalypse”, Christopher Hitchens, Richard Dawkins, Sam Harris and Daniel Dennett, have written a long series of books in which the supernatural is either assumed not to exist or is said to be proven not to exist. Richard Dawkins tweeted a pretty good summary of the thoughts of the “New Atheists”:

Not only IS there no evidence for supernatural, it's unclear how there COULD be.

Richard Dawkins@RichardDawkins, 9:26am 3 July 2014.

<https://twitter.com/richarddawkins/status/484734910343958529>

“Brights” vs. “Supers”

Paul Geisert and Mynga Futrell co-founded the Brights movement in 2003 to connect those who share a naturalistic worldview, free of supernatural or mystical elements (<http://www.the-brights.net/>). Both Richard Dawkins and Daniel Dennett promoted the idea of “Brights” in a series of newspaper articles providing great publicity for the “Brights” web site. Daniel Dennett in response to the criticism that referring to those who reject supernatural events as “Bright” might imply that those who do not are “not bright” coined a new term:

... we could say if you're not Bright, you're Super. After all, they believe in the supernatural and we don't. That's the difference. Brights are those people who don't believe in anything supernatural.

<http://www.beliefnet.com/Faiths/Secular-Philosophies/The-Spell-Breaker.aspx#y6XfItukWbdOoWls.99>

In this short essay I hope to prove that unless you are willing to reject all we have learned from modern science, you must not be “Bright” – you must be “Super”.

Definition of Supernatural

Before we can discuss the “supernatural”, we need a working definition. A check of many dictionary definitions of “supernatural” will yield a wide range of definitions, but the three

definitions in Webster's New World Dictionary appear to cover the three possible meanings of supernatural:

1. *existing or occurring outside the normal experience or knowledge of man; not explainable by the known forces or laws of nature; specif., of, involving, or attributed to God or a god*
2. *of, involving, or attributed to ghosts, spirits, the occult, etc.*
3. *exceeding normal bounds; extreme: skating with supernatural grace*
<http://www.yourdictionary.com/supernatural#websters#53B64lhEHscVJ4Tt.99>

The third definition above, is not what we are interested in here. It is using supernatural to express unusual capability such as saying someone has supernatural strength to indicate he is very strong.

The first two definitions, however, are relevant to our discussion. These definitions identify key characteristics of something that is supernatural. The primary characteristic is that the event is not explainable by natural causes or not explainable by science or the laws of nature. Examples are characteristics attributed to God, but also to ghosts, spirits, the occult, etc. However, anything not explainable by science could be referred to as "supernatural".

Definition of Supernatural for the Purpose of this Article

For the purposes of this article, we will classify events into three categories based upon the ability of science to explain the events:

1. Events that are currently explained by modern science including quantum physics and relativity.
2. Events that cannot currently be explained by modern science, but that in theory could be explained by science in the future with technological and theoretical advances.
3. Events that science, particularly quantum physics, claims can never, even in theory, be explained or even investigated by science.

Any item that falls into category 1 or 2, will be considered natural. Only items that fall into category 3 will be considered supernatural.

Category 3 – Quantum Physics Greatest Contribution to 21st Century Science

One of the greatest contributions of quantum physics to modern science is the confirmation that category 3 events not only exist, but science can identify which events fall into this category of "supernatural". We shall see later in this article some examples of category 3, "supernatural", events.

However, it is important to understand that the existence of category 3 events was a “paradigm shift” for science. In Newtonian Science, there only existed category 1 and category 2 events, things science has already explained and things science will explain sometime in the future. The “paradigm shift” caused by quantum physics was the assertion that Newtonian Physics was wrong in suggesting that all events could be eventually explained by science. This was a hard pill for scientists to swallow. Einstein went to his grave believing that quantum physics was “incomplete” because it not only allowed for, but required category 3 events. However, Einstein, along with two other physicists, Podolsky and N. Rosen, proposed an experiment which they believed would prove that quantum physics was incomplete because it required category 3 events (A. Einstein, B. Podolsky, and N. Rosen, “Can quantum-mechanical description of physical reality be considered complete?”, *Physics Review*, vol. 47 777, 1935). It took a long time and many verifications of the results of the experiment to prove beyond any doubt that category 3 events do occur, but by the end of the 20th century there was no doubt that quantum physics requires the existence of category 3 events – “supernatural events”.

What do Category 3 Supernatural Events have to do with God?

The “Brights” main focus for rejecting the supernatural is associating God with the supernatural: and they reject God. They also reject the paranormal (ESP, psychokinesis, and similar subjects), ghosts, witches, UFO’s, etc. However, each of these topics has aspects of more than one of the above categories. For example, science has “debunked” many aspects of the paranormal (hence, they are in category 1), yet some remain in category 2 and are being studied by reputable scientists and other aspects may fall into category 3.

God clearly falls into all three categories. Many of the claimed aspects of God have been proven wrong by science (God did not create the earth 6000 years ago, God did not create Adam and Eve as the ancestors of all humans, etc.). Both the Templeton Foundation and the Vatican Observatory fund valid scientific studies attempting to validate certain aspects of God. These serious studies currently fall into category 2, but in the future the events they study may be found to be in category 1 or 3. The efficacy of prayer is one example.

Other aspects of God, however, fall into category 3 and therefore cannot be the subject of any scientific study. For example, we shall discuss in this article two mechanisms typically ascribed to God that are required by quantum physics to be category 3 “supernatural” events. One mechanism would allow God (or some other non-physical entity) to intervene into the physical world in a way that could not possibly be studied by science. The second mechanism would allow God (or some other non-physical entity) to create something from nothing. Both mechanisms must exist according to quantum theory and both mechanisms are typically things that religious people ascribe to God.

Heisenberg Uncertainty Principle

The Heisenberg Uncertainty Principle, one of the bedrock principles of modern science, states the limitations of what science and the laws of nature can explain. The principle states that most measurable quantities in the universe come in complementary pairs like position and momentum or time and energy. The principle says that it is not possible to measure simultaneously both quantities to any desired precision. The more precise the measurement of one of the complementary properties, the less precise the measurement of the other.

This, however, is NOT a measurement problem. This is a limitation on what can be determined by scientific means. For example, Newtonian physics claims that if you know the current position and momentum of a particle and all the forces operating on the particle you can predict the path the particle will take. Quantum physics acknowledges that this is true, but irrelevant because you can never know both the position and momentum of a particle to sufficient accuracy to make such a prediction. If you measure the position accurately enough, you cannot measure the momentum accurately enough and vice versa. In fact, if you know the momentum of the particle exactly, then the particle could be located anywhere in the universe and there is no way to know where.

Furthermore, our intuition is very bad. Intuitively we conclude that the particle MUST be somewhere even if we cannot know where. But this is also wrong. Quantum physics tells us that if we know the momentum exactly, the particle is everywhere simultaneously. Or possibly a better way to state this is that the position of the particle does not exist – it has no position. While the mathematics of quantum physics expresses this concept clearly and unambiguously, there are no words in human language to express this concept – because it is a concept that until the Uncertainty Principle was understood, had never been encountered in human history. The best we can do in human language is to say this is a category 3 event, the position of a particle whose momentum is known is beyond the ability of science to even investigate. No improvement in technology or advancement in theory will ever change this. And because of the Heisenberg Uncertainty Principle, there MUST be lots of category 3 events.

Simple Examples of the Heisenberg Uncertainty Principle

Using the Heisenberg Uncertainty principle, we can immediately identify an enormous number of events that quantum physics requires to fall into category 3: *events that cannot be determined or even studied by science – i.e: “supernatural events”*. This is probably the most misunderstood part of quantum physics, so let me give a few simple examples.

Figure 1 shows a simple experiment where a specially designed laser is placed at point “a” and a photomultiplier (or other detector that can detect a single photon – the smallest possible quantum of light) is placed at point “b”. The laser is capable of releasing one photon at a time on command. Furthermore, the laser is focused so the photon will land on the mirror

somewhere between point “A” and point “O”. The classical analysis of the situation using Newtonian physics is that the photon must take the path to “H” shown in Figure 1a in order to be detected at point “b”. But this turns out to be wrong. Experiments show beyond a doubt that the photon can take any possible path from the source “a” to the mirror between point “A” and point “O”, and then on to the detector at “b”. Figure 1b shows 15 possible paths, but there are actually an infinite number of paths. Quantum physics further says, we cannot know which path the photon will take because any attempt to measure the path the photon takes will be subject to the Uncertainty Principle and will therefore not be a precise enough measurement to determine the path. Hence, we cannot predict what will happen to a single photon.

What we can do, however, is add up all the possible paths the photon can take (this requires integral calculus) and determine the probability that the photon will be detected at “b”. However, this probability applies only to a large number of repetitions of the experiment. There is no way we can know whether or not an individual photon will be detected at point “b” after its release from point “a”. Only after we repeat the experiment many times do we find that a certain, predictable, percentage of the photons are detected at point “b”.

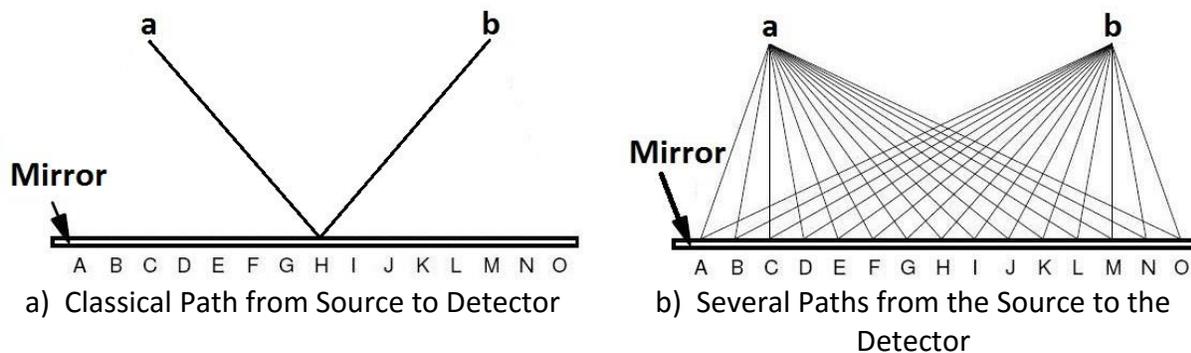


Figure 1. Source: Richard Feynman, *QED: The Strange Theory of Light and Matter*, Princeton University Press, 2006.

To understand this better, let us assume that we determine that 99% of the photons emitted from “a” will be detected at “b”. Hence, if we repeat the experiment 100 times, we would expect 99 photons to be detected. But in practice, it will vary each time we run the experiment. Sometimes 100 photons will be detected, sometimes 99, sometimes 98 and sometimes even fewer. If we increase the number of repetitions to 1000, we would expect 990 photons to be detected. But again, in practice this would vary. Sometimes 991, sometimes 990, sometimes 989 and occasionally more than 991 or less than 989. But the number of photons detected will be much closer to the 99% prediction than it was with only 100 repetitions. Increase to 10,000 repetitions, and the actual experiment will be even closer to the 99% predicted. Hence, as more and more experiments are run, the average result gets closer and closer to the result predicted by Newtonian Physics.

The Path of a Photon is a Category 3 Event (“supernatural” event)

But nothing in this procedure tells us which path the photon actually takes. That is because the path that the photon actually takes is beyond the capability of science to determine. Let me repeat this statement, because it is so misunderstood. Because of the Heisenberg Uncertainty Principle, science has proven (I repeat proven) that it is beyond the capability of science to determine the actual path any photon takes from “a” to “b”. No improvement in technology or advancement in theory will allow the path to be determined. This is because the path falls into one of the category 3 events required by quantum physics. So Quantum Theory is a great advancement in science that has proven correct in thousands of experiments but, as Richard Feynman puts it:

the price of this great advancement of science is a retreat by physics to the position of being able to calculate only the probability that a photon will hit a detector, without offering a good model of how it actually happens.

Richard P. Feynman (2014-10-26). *QED: The Strange Theory of Light and Matter* (Princeton Science Library) (p. 37). Princeton University Press. Kindle Edition.

Two Examples of Possible Supernatural Properties of God

It is one thing to realize that quantum physics has proven that the path of photons from a light source to a detector is “supernatural” in the sense that the path cannot be determined or even investigated by science. However, it is quite another thing to say that properties of God fall into this category 3. Here we present two of many possible examples of “supernatural” properties required by quantum physics that could be properties attributed to God.

A commonly asserted property of God is that God creates something from nothing. Lawrence M. Krauss in his excellent book *Why There is Something Rather Than Nothing: A Universe from Nothing* (Atria Press, 2012) does an excellent job of reviewing the physics that describes how something is created from nothing all the time. The Heisenberg Uncertainty Principle is at the center of the issue. When time is very short, the uncertainty in the amount of energy available for an event becomes very large. If the energy gets large enough, particles will be created. However, most of these particles disappear almost immediately and are referred to as “virtual particles”. The “virtual particles” themselves come and go all the time, but they do affect real particles. For example, they can be the force carriers between real particles. Occasionally, however, right after the “virtual particle” is created and before it can disappear, the same energy that created the particles can cause space-time to go through an extremely fast inflation which can result in anything from a patch of new matter to an entire universe. But just as in the case of the path of the photons in the last section, the creation of something from nothing is beyond the ability of science to measure, study or predict.

Clearly, “virtual particles” that are not measurable, not able to be determined or even studied by science are category 3 “supernatural” events. However, these “virtual particles” can and do

influence other matter. In fact, they can be the force carriers between matter. The supernatural creation of “virtual particles” from nothing that influence other particles is a common property ascribed to God – the ability to intervene in nature in a way that cannot be studied by science. Similarly, creation of something from nothing is a typical property ascribed to God. Both of these properties cannot be studied by science because they fall within the limitations imposed by the Uncertainty Principle. They are category 3 “supernatural” events. This, of course, does not prove God exists or that God makes use of these properties. But it does prove that there exist properties that cannot be studied by science that God could make use of to intervene with nature or to create something from nothing. However, Krauss interprets these scientific facts to conclude that there is no need for God. I suggest that a better interpretation would be that these are two aspects of God that science proves exist and could be used by God, if God exists, yet science will never be able to explain or study.

Conclusions

We have discussed in this article how the “paradigm shift” caused by quantum physics requires science to recognize a category of events, which we call category 3 events, that can never be explained or studied by science. These “supernatural” events are required by quantum theory, but cannot be described or even studied by science. Of course, when we say category 3 events must exist according to quantum theory, we acknowledge that a future paradigm shift in science that nullified the Heisenberg Uncertainty Principle could change this conclusion. Nullification of the Heisenberg Uncertainty Principle, however, is so unlikely that all scientists would agree that this is virtually impossible.

if we are to base our information on the best science available today, we must accept that “supernatural” events are required by quantum physics. And after all, that is exactly what the “Brights” are insisting we do – base our beliefs on the best science available. Unfortunately for the “Brights”, the best science available supports the “Supers” not the “Brights”.

In a short article like this it is not possible to present proof sufficient to establish my main point that modern physics requires the “supernatural”. What I hope the article will do is motivate people to look further into what science has proved. There are at least four things that I hope the reader gets from this article:

1. The Heisenberg Uncertainty Principle requires that certain things are beyond the study of science and hence are category 3 events and hence “supernatural”.
2. Very simple things like the path of a photon are not discoverable by science and hence are category 3 events and thus “supernatural”.
3. Virtual particles, required by the Uncertainty Principle, can effect real particles. Yet virtual particles cannot be measured or studied by science and hence are a category 3 “supernatural” mechanism by which God, if God exists, could intervene in the world.

4. Creation of something from nothing, while required by the Uncertainty Principle, cannot be measured or studied by science and hence could be a mechanism available to God that is in category 3 and hence “supernatural”.

However, I want to be careful not to further polarize the divide between “Brights” and “Supers”. I am one of a large group of progressives who, like the “Brights”, are appalled by statements made by the so called “religious right”, by some fundamentalists and even some mainline religious leaders. Rejection of scientific fact like climate change, evolution, the age of the earth, solar system and universe along with other such scientific facts outrage us progressives just as it outrages the “Brights”. I happen to be a progressive Christian, a long-time member of the Episcopal Church and subscribe to a form of Process Theology. Process Theology focuses on process rather than “answers”. Just as science develops theories and models of those things which science can investigate, Process Theology develops theories and models which include both things that science can investigate and “supernatural” things that science cannot investigate. However, like science, the theories and models are always subject to revision as new data becomes available. Like science where the scientific method is what counts, not the theories and models – in Process Theology it is the process that counts not the theories and models.

I challenge the “Brights” who are still reluctant to acknowledge the existence of the “supernatural” to read a few of the authors of progressive Christianity. Compare your reading of the works of the “Four Horsemen of the non-Apocalypse” (Hitchens, Dawkins, Harris and Dennett) not to the works of the fundamentalist Christians but rather to the works of the “Four Supers of Progressive Christianity” (I made this up): Marcus J. Borg, John Shelby Spong, John Dominic Crossan and Robin Meyers. I suspect that the “Brights” may find more they agree with in the works of Borg, Spong, Crossan and Meyers than in the works of Hitchens, Dawkins, Harris and Dannett.

NOTE: Borg, Spong, Crossan and Meyers are prolific writers and all of their works are highly recommended. However, as a starting point I recommend the following four books, one by each author:

1. Marcus J. Borg, *Speaking Christian*, Harper One, 1989.
2. John Shelby Spong, *Jesus for the Non-Religious*, Harper San Francisco, 2007.
3. John Dominic Crossan, *The Historical Jesus: The Life of a Mediterranean Jewish Peasant*, Harper Collins, 2010.
4. Robin R. Meyers, *Saving Jesus from the Church*, Harper One, 2009.