

## *Can Science and Religion Ever Have Anything in Common?*

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### **Abstract**

The Age of Science, Darwinian evolution and methodological naturalism have created an understanding about our world, in which it is understood to have come about through purposeless, material processes. Some believe this has pitted Science squarely against the things of faith and religion. But new scientific discoveries and the reinterpretation of existing phenomena by some scientists have upended traditional views on both sides of the argument. This is due to the discovery of a possible “informational” or even digital nature to our world. Prominent scientists and philosophers such as Max Tegmark (MIT), Nick Bostrom (Oxford University), Brian Green (Columbia) and James Gates (University of Maryland) just to name a few, have written and spoken about such findings, causing consternation for many. Indeed, Dr. Bostrom even imagines a future in which post humanoid beings run ancestor simulations on unimaginably powerful computers of the future and that we might inhabit one of these. In such a case, there would be no material, and we would find programming and mathematics governing everything about our universe. What does all this mean? Such findings completely change the discussion about Science and Religion and the dialogue between them. This paper explores these changes and the evidence responsible for this astonishing reinterpretation of the nature of reality. The implications for our identity as human beings are enormous and are explored in this paper.

Keywords: Informational universe, digital, physics, science, religion, evolution, computers

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## **Introduction**

Early in the Twentieth Century, the first quantum scientists such as Albert Einstein, Neils Bohr, Ernest Rutherford and many others made the most extraordinary of discoveries. Their findings began to upend common assumptions about the nature of reality in ways never before dreamt of. Such shocking concepts included things like – everything solid is mostly empty space; or that subatomic particles could be both waves and particles at the same time; or that they could simultaneously be in two places,; or that all matter is simply made of energy. Or worse yet, that two photons could travel in opposite directions and be separated by very great distances, yet simultaneously respond to a stimuli on applied to only one of them, as if they were invisibly connected, as if distance did not matter at all. Such things were too fantastic to be believed. They also violated the Laws of Physics as people understood them, then and now, because such things were and are physically impossible. So the laws of Quantum Physics were assumed to apply only to the subatomic world and not to the macro world in which humanity inhabits. They were too weird and impossibly strange to have anything to do with our world and reality. Some have pointed out that we are made of things from that level, so we cannot separate them. Yet separation seems the easiest way to handle the discrepancies, so that is how these things are still handled today.

As the Twentieth Century progressed, this strange science was not dismissed but strongly reinforced. Furthermore, it was found that the mathematics of Quantum Physics and the understanding thereof, were absolutely necessary in order to make the computers and other small electronic devices of the late Twentieth Century. With the invention of computers came new ideas about reality. This is because all those impossibilities of the subatomic world are not at all impossible at all if the world is computer –like. Indeed, various scientists such as Ed Fredkin of Princeton University, Seth Lloyd of the Massachusetts Institute of Technology (MIT) and others began to propose that that is the nature of reality. Science fiction writer Isaac Asimov wrote popular novels based on this concept, such as “I, Robot,” (Asimov) in which he imagined a world filled with intelligent machines. He envisioned a world in which the nature of reality was computer-based long before computers were even commonplace. With the advent of the Twenty-first Century came even more theories and discoveries that showed our reality to be strongly informational or even digital in nature. But what if it were true? What does that portend for us? This is where science and the things of faith have a strange collision.

## **Background**

Ernest Rutherford conducted an experiment in which he shot electrons at gold foil, that showed that everything that we perceive of as solid is really 99.99% empty space. This was completely unexpected. It also cast an odd light on the nature of reality. Since gold is heavy and dense, he expected that as electrons hit the foil surface, some or maybe all of them, would bounce off. Instead most of them passed through as if nothing were there. This was due to the fact that each atom’s electrons are at such a ginormous distance from their incredibly tiny, dense nucleus. While the main takeaway was about the nature of the nucleus, the enormous distance between it and the electrons resulting in vast quantities of empty space in everything is just as

relevant to the nature of reality. We cannot detect the empty space, because of its dispersal is at such a small level. But reality in this case, is not what we think.

Niels Bohr also discovered odd things that further challenged the “normal” nature of reality. As he discovered that electrons travel around the atomic nucleus in clouds, called orbitals, he also found them to be strictly “quantized.” That means that an electron can be at certain levels only, in their atomic orbits. They can change levels, but are never observed to be transiting between them. This is physically impossible. Imagine yourself being transported from the airport to your home, without traveling to get between these two locales, and that it happened instantaneously. A great idea, which might be wonderful in concept but does not fit within the construct we have for how the world works. He famously said of his findings, put in modern English, “Anyone who has studied Quantum Physics and is not completely blown away by it, has not understood it.” (Bohr, 1913) The tight conformity to specific mathematics showed how dependent reality is upon them.

Erwin Shroedinger is famous for his thought experiment about a cat, which also upended the staid, stable image of our universe. Imagine that a cat and a bottle of poison are placed into a box and it is closed up. The stopper on the bottle of poison has been loosely placed, so if it were knocked over by the cat, its contents would spill out, killing the cat. So the question is, is the cat dead or alive? The answer is yes, simultaneously, for both possibilities. This thought experiment portrays truths about the electron. When forced to go through a gate, either to the left or the right, the electron will be found on both sides. (Gribbin. 2011) This is something known as superposition. Impossible, but not, because it happens. So they can in two places at the same time, something else physically impossible.

Albert Einstein is famous for many things, many of which shook the nature of reality. In one case, he and two other researchers, Nathan Rosen and Boris Podolsky showed that two particles of light (photons), could leave a light source traveling in opposite directions and could be “entangled,” or connected at the quantum level. Imagine these particles are one hundred kilometers apart. Yet if one of them was deflected, with say a strong magnet, the other one would also deflect as if they were invisibly connected, as if distance did not matter. (MIT Technology Review) Again, this is physically impossible, but not, because it happens. How could it be? He called this “spooky action at a distance.” But another thing he was famous for was his reflection on the nature of reality. He said, “It seems as though we must use sometimes the one theory and sometimes the other, while at times we may use either. We are faced with a new kind of difficulty. We have two contradictory pictures of reality; separately neither of them fully explains the phenomena of light, but together they do.” (Harrison, 2002) Einstein later derived what is probably the most famous equation of all time,  $E = mc^2$  in which he correctly related Energy to mass times the speed of light squared. In this model, matter and energy are completely interchangeable.

These are just a few historical examples from Quantum Physics, which could be said to have a common thread – they describe the things, which we, and our world are made of, yet all of them are physically impossible. These things remained a mystery and a paradox until the Age of Computers dawned. For many the mystery remains. For others, the resolution comes perfectly if ones accepts the findings that there is a

digital or informational nature to our universe. Because, such things as the discrete mathematics of the electrons' energy levels are not a problem in a computer.

A few years before the quantum scientists made their amazing discoveries, Charles Darwin published his revolutionary book, "On the Origin of the Species," (Darwin, 1959). In it he proposed the theory of evolution through common descent and natural selection. This book upended the religious perceptions of a universe created through Divine means. It also released a firestorm of controversy which roils through Western and world societies to this day. It pitted the things of faith against the things of science, as if they were somehow enemy combatants over the nature of reality.

Darwinian evolution evolved into neo-Darwinian evolution in which the universe and all things in it happened through purely material, mechanical means, without any need for divine intervention. Little particles must surely have bumped together by chance, becoming ever more complex, acted upon by the laws of gravity and other physical and chemical laws, and then acted upon by natural selection. Through many small changes or mutations over billions of years, voilà, here we are. No God is needed in this scenario because none is required would be the ten words or less version of this theory. This theoretical and philosophical bent, known as methodological naturalism, materialism or neo-Darwinian evolution has ruled science and scientific academia for many years. But in the ensuing thirty or so years, some major problems have cropped up, because of the informational nature of reality.

### **Current theories**

As science progressed, new theories came to light in Quantum Physics. In the 1970's, plans were made to smash atoms together to see what happened to them. Powerful "atom smashers revealed that sure enough, atoms broke down into a veritable zoo of other smaller particles. Things like quarks, leptons, muons, gluons, bosons, and others for a total of 28 different kinds, were identified. Some of these subatomic particles did odd things. They would pop up and suddenly disappear, then show back up again. Where did they go? This and other experimental work led researchers to the concept that the subatomic world must consist of more dimensions than just the three of space, and time, also known as "spacetime." Although people in Einstein's time first theorized it, finally there was evidence.

Today, there are many who think that our universe is highly multi-dimensional and for that matter, not the only one. Evidence has emerged showing that in order to support life, it appears that our universe is "finely tuned" to support life. (Gonzalez and Richards, 2008) To counter this idea because of its theological implications, and perhaps also to help deal with the universe's other dimensional nature, many researchers have supported the Multi-verse theory (M Theory). It could be possible that new universes are popping into existence throughout the black emptiness of space. Some of them could be interwoven with our own or intersecting it in various ways. Or they could be shadow, anti-matter or parallel to our own. (Greene, 2011) But whichever happens to be the case, things like this could not be said to rule out concepts from religion and faith. That is, that there seems to be an extra-dimensional nature to our own existence. And that there could be other-dimensional places, things and entities. The scientists do not claim this, but almost all religions do. But it would not be implausible at this point, just taking the scientists at their own word about these

other universes interacting with our own. And, all of these theories require mathematics and equations so precise that a mathematical structure to the universe could not be denied.

Another theory, which contributed to the idea that mathematics undergirded everything was String Theory. In this model, all the subatomic particles that make up protons, neutrons and electrons, which make up all of matter have an underlying level in which everything is made of vibrating strings and or membranes of energy. At this level, Einstein's equation,  $E = mc^2$  takes on complete reality. That is, all matter resolves into nothing but energy. But it does so according to tight regulations and mathematics. So matter does not even exist at all, being only energy. Where did this energy come from?

Theories like this find their best resolution in a mathematically constructed, even programmed for existence. In other words, all the equations do not just describe the things of the universe they could actually be said to generate it.

Ed Fredkin, the first computer professor at Princeton University, believed that the universe must certainly function as a super enormous computer of some sort, because of the mathematics. He recognized that all the quantum weirdness issues could only be possible if things were the result of computer algorithms. This is perhaps a strange way of reconciling the quantum world with our reality. But he is joined in this opinion by a growing body of other researchers.

One scientist, Max Tegmark of MIT, has theorized for years that our universe is made of mathematics. Indeed, he has written a book entitled, "Our Mathematical Universe, My Search for the Ultimate Nature of Reality." (Tegmark, 2014). Every year in June, as part of the World Science Festival, a panel of august scientists is assembled for the Isaac Asimov Annual Debate. In 2016 the topic was. "Is the Universe a Computer Simulation?" As one of the panelists, Dr. Tegmark likened our existence and our reality to a computer game. As he put it, "Imagine you were Mario in the Super Mario video game. If you started to poke around at your world you would discover that it is entirely made of mathematics. That's what we find when we look at our reality. So how do I know that I am not in some sort of video game?"

Another panelist in the same event went on to say something even more extraordinary. Dr. James Gates, a theoretical physicist from the University of Maryland, discussed the finding of what he termed, "error correcting codes" which he found embedded within the equations for the super-symmetry of subatomic particles. (Lewin, 2016) He also discussed their implications. He went on to discuss the fact that computer codes such as these would be unlikely to just form randomly, but are a type of very specific digital data. He then speculated about the idea that if we are in a simulation, then if the computer [of the universe] were not damaged, then things like resurrection, and eternal life were possible because the programming could be re-run. Furthermore, he added that, "This begins to break down the wall between science and religion..."

Other scientists looked to the cosmos and saw that a graininess permeates all the background of space. The best explanation proposed was that our universe might be "pixelated." Indeed, experiments have shown that scientists could not rule out the

possibility that we exist in a holographic world, created by, for lack of a better term, through programming. In other words, it feels real, but its facets only show up when we are looking at them. As Dr. Brian Green of Columbia University put it, we could exist in a flat, two dimensional world that has the appearance and feel of being three dimensional, but is nothing more than a type of virtual reality. (Greene, 2014) A virtual reality would be similar to a computer simulation or game even.

## **Implications**

Indeed, at this point one can see that if the universe is computer-like, happened to be the case, it poses a number of problems for both clerics and scientists alike. For one thing, in such a model there is no material. So the scientific idea that purely material processes were responsible for the creation of our universe, would be decimated. No material, no materialism, one could say. Rather, it would be the case that our world was and is the deliberate creation of some programmer(s).

On the faith side, this idea completely upends what people in any religion, think of as God. In the Judeo-Christian version of things, God is seen as this all powerful, super intelligent spiritual being, often thought of as perhaps wearing a flowing white robe. But in this scenario, one would have to acknowledge him as being a master-programmer as well. This is not what we are accustomed to thinking. He is old, predating the formation of the universe, but he programs?

If such a digital reality were the case, the issues multiply almost exponentially here. One must grapple with issues like, who is this (are these) programmer(s)? Is the programmer a post humanoid hacker, three hundred years into the future, running an ancestor simulation? This would be consistent with Dr. Bostrom's philosophical paper. (Bostrom, 2006) Or, would he be the God of the Bible, having created this thing we call reality out of pure energy and perhaps programmed it to come into existence in a certain way? Does the computer of the universe, in either scenario, have memory? Most major religions hold with the idea of an after-life and a judgment, after exiting this reality. Indeed, Christianity holds that God came into the world he created, as the Son of God, then allowed himself to be the atonement for all of us, and for our sins by dying on a cross. If one believes this, and accepts Jesus as a personal savior, they are said to be freed from consequences of those sins at the judgment. So an existence outside of this one is clearly identified.

Then there is the question of what are we after all, anyway? Are we spiritual beings inhabiting a created existence that seems real to us, but is actually a simulation meant to test us in some way? Or if the hacker dude scenario were the case, would we just shut off at the end of this life, our program having run and finished? So one can see that the complications, and sticky issues are many and complex. And more than that, people like the way their own reality seems to them, so this would represent a huge shift in thinking for many people, if they chose to believe it. Sometimes people cling to beliefs even when there is very substantial evidence to the contrary. So rocking people's reality boat could be cause for a lot of resentment and angst.

And finally, if this were true, then neo-Darwinian evolution, methodological naturalism and material explanations are out, because all the material is the result of programming and mathematics. This would overturn many commonly held constructs

in the science world. Imagine that the programmer made the simulation to have the appearance of history, but in fact that was an illusion? Or perhaps, set the programming in place and let it run, as things evolved, but according to a program?

## **Conclusion**

There is an old saying that goes like this, “Men are like waffles, but women are like spaghetti.” This means that for men, everything is “waffle-ated,” or that everything is in boxes and categories. For women, all things are part of one whole. This has implications for the ways in which science is done. Science tends to be male dominated and so it is set up in waffle form. Each group of scientists in each specialty and subspecialty pursue knowledge, discover things and give scant heed to what others are finding in different other fields. They are in their own “box”, drilling down to find out the truth in their area. However, questions about the true nature of reality demand that all fields look together to find it. That would be a very female approach, if the saying has any merit. If science findings really do support a digital, computer of the universe, simulation like reality, it would seem that everyone should be concerned about this. Because who is the programmer? What kind of relationship or knowledge should we have about who they are, what is their nature, etc. Where could we get such knowledge? This is where science and religion collide, and really do share common ground. How can we tell how it is really? Some have suggested that by looking at prophetic references in holy texts, that they should provide answers. Did the things predicted pan out? Indeed, Bible scholars have devoted much energy to identifying hundreds of things, which have happened as written and predicted. On an individual basis, everyone must make their own assumptions and decisions. Ultimately, searching out the nature of the reality we inhabit should be of the highest priority. Is it how we think it is? And how can we tell? These are essential but enormous questions, which people have been trying to answer for all millennia. But to say that science and the things of religion have nothing to do with each other can no longer be said to be true.

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