Article 5: (TBD)

A Second Introduction: A recap of where we have been and where we are going-

Article 1 addressed the secular versus religious social contracts and tensions that will be exposed un any thoughtful, considerate development of AI.

Article 2 was then devoted to giving a basic description of what are the AI algorithms exactly that people are using to make AI and explain how complex they are. The complexity inherent in AI programs reduces the ability to fine tune the algorithm outside of using generic rules of thumb; the most powerful in my opinion being expanding the training data the AI learns on.

Article 3 then looks at this training argument in further detail. It starts with comparing our trust in humans and their internal moral compasses and simply asking how can we extend this trust to AI? If good training data is all that is needed to train "good" AI then this "trained" argument implicitly rejects religious arguments of: the nature of prophets; revelation; or any relationship with a divine which exist outside of our physical reality. It is taken that the religious perspective, put simply, argues that there exists more dimensions than the 4-D realty that is easily seen. Therefore, the religious perspective argues for a physics where the extra-dimensional spaces are where people attain their intrinsic sense of goodness. Therefore, a thorough physical understanding of how people learn from extra-dimensional goodness is needed to then create safe AI on which we can trust on the same level as other humans.

Article 4 starts to answer the extra-dimensionality learning issue and proposes idea on how to solve and understand the issue from a physics-based perspective. First, it explains how magnetism can be viewed as the primary physical reason for at least a 3D reality, leaving the 4th dimension of time to be explained later. Second, Alpha Space is introduced as a concept to provide a fundamental ingredient towards the metaphysics being built. Some analysis and further description of Alpha Space is given. A short explanation is that Alpha Space constitutes the largest possible phase space and thus can also be used as a grab bag of esoteric ideals. Alpha Space will be key to understanding the unique relationship between magnetic monopoles and Entropy.

Article 5 will now explain what magnetic monopoles are in current physical theory. Furthermore, it will be posited that the unique physical of magnetic

monopoles make then the ideal physical candidate to bridge Alpha Space and reality.

Article 6 will explain what Entropy is, why it is the physical reason for the arrow of time.

Article 7 will then explain how the mysteries of superconductivity can be understood in light the metaphysics argued here. We will combine the facts and idea of Articles 5 and 6 to then explain how the we can then reach a better understanding of superconductivity. Finally, we shall reach an understanding on how we can understand magnetic monopole generation in reality and what that means in terms of a system's Entropy.

Article 8 will the utilize the final arguments of Article 7 and explain how they yield a general algorithm to create "creative machines" which can not only make safe AI but also power AGI as well as massive reduce the cost to develop current AI algorithms. To summarize one of the main points of this article is that: to create safe AI that is not simply beholden to its training will require the engineering addition of creativity engines into its hardware which will code for instinctive sense of goodness. Therefore, we will be able to build in the internal moral compass as required in Article 3 to then have trust in AI. A further analysis and description for the development of creativity engines is also given as well as explain what consciousness means in terms of the meta-physical arguments being pursued.

Preface 2: A Short Discussion on Philosophy of Science

Before just jumping in to explain magnetic monopoles, a disclaimer is needed about how the theory I am arguing currently lacks a precise mathematical formula. The reason is simply that many of the concepts I am tying together, especially with how religious arguments have particular views of reality, do not have clear and precise descriptions in mathematical notion. It will be interesting to see if anyone is able to invent a mathematical notion which does well describe the meaning of my argument. For our current purposes, we will precede without an explicit math formula and without needing one as well. To be clear, I am not rejecting a mathematical formation, it is simply given that the argument I will make can move forward, inspire interesting experiments, and thus be scientifical relevant without needing one. These experiments should produce results that either disprove or prove my theory. Since science is based on empiricism and

experimentation we can still move forward to satisfy the basic tents of scientific progress.

I should further note that my argument comes together conceptually very cleanly in Articles 7/8. It could very well be the case that finding the rigorous mathematics that well represent my conceptual argument will be a much harder challenge then doing the experiments and using their results to create safe AI. To explain with a historical example, Pierre de Fermat wrote his eponymous "Last Theorem" in the margins of Arithmetica by Diophantus of Alexandria in 1637. It was not until 1993, 356 years later, that Andrew Wiles was able to "prove" Fermat's last Theorem. Note that whether Fermat's theorem was true or not from God's perspective was not changed when Wiles wrote his proof. It was simply that Wiles provided a logical foundation to believe the theorem was correct!

To further explain where we will end up, there will be general logical formula on which the physics I am arguing for can be empirically tested and used to engineer new devices. It is simply that English proved in my mind a better language to use to communicate than esoteric, high fluentent mathematics. Furthermore, it is highly possible that many mathematical ideas, systems, and paradigms can be "made to fit" my logical arguments. Therefore, the only way to determine which one is the "true" one will be through using empirical data to exclude the theories which make contrary predictions. Therefore, I find it highly likely that even with a more detailed mathematical argument, experimental data will be required to determine whether any math argument is correct.

I should also note that I am effectively arguing for new physics which has yet to be understood by the physics community. Therefore, there is no current consensus on how to answer these problems mathematically. What this leads to is that only through experimentation will there be the information to develop a more comprehensive mathematical theory.

As a final note, I should explain the difference between how I am solving and approaching my physics-metaphysics connection in contrast with what a standard theoretical physicist is doing. One will sometimes find T-shirts with the paradigm exclaiming Math->Physics->Chemistry->Biology->Life. Effectively it advocates that reality is just advanced mathematics and Physics is just based on Math. As described in the opinions of not only my own, but of Roger Penrose and other physicists, physics is more than just fancy math. In fact, and it should come

as no surprise given what I argued for in Article 3, I believe a special physics intuition is needed to fundamentally understand physics; something profound that escapes precise mathematical description. Not that I am not being any less logical nor less demanding of precise logic in my metaphysics. It is simply that some logical steps which will seem very clear and coherent to me might seem like massive skips to others. As an example, I find Anselm's ontological proof of God a very coherent and neat proof. I know many other people find it to be nonsense. Whether they call it nonsense because they understand it and disagree with it or simply because they do not understand it, I am not sure. The greater point is that I will be making logical connections inspired by current physical theory that others might call illegitimate without underlying math to justify the jumps. I disagree; I am doing something which we simply do not yet have the math for!

My thinking will be different from that of a typical theorical physicist because they are much more bound by the math. Even if a theorical physicist came up with good physics argument, to be legitimate in the eyes of the physics community at large, the physicist would need to build a coherent math argument, and if it is a beautiful math argument like string theory, even better. They would mathematically reach their theory by modifying current accepted physics formula until they reach their goal. Note that even amongst physicists, theorists can be so esoteric and quite frankly confusing that even other physicists who just work on the experimental side of physics are confused and frustrated by them. When I was talking to a physics mentor of mine about physics, he exclaimed how one theoretical physicists' theory was so esoteric one would need a room of theoretical physicists to understand what they were talking about!

In addition, when working in the very mathematically abstract sphere of quantum field theory or deeper, there is this bias amongst physicists to let the math do the talking even when the math is only able to be understood within its tight math context. In other words, the mathematics defies conceptual understanding. It seems to me that to rationalize this issue, and I learned this from the same physics mentor as mentioned earlier, many tenured physicists would argue that when doing particle physics, one needs to simply follow the math and not relay on conceptual human understanding. The same mentor further rationalized this idea with evolutionary arguments; that the human brain was developed to hunt animals and not do theoretical physics. Thus, one needed

to simply put one's faith in the mathematics and not worry about the conceptual, philosophical issues.

While he did not explicitly use the word faith, his argument is at its core one of faith. As mentioned in a prior article, I believe using evolution to explain the difficulty of people understanding fundamental physics to be a scientifically unsound one. Darwinian evolution is simply unable on its own to explain all of the great physical diversity of life and how it evolved over the eons. Furthermore, I believe it to be an implicit rejection of a divine creator as well as rejecting the idea that an individual person can have a profound connection with the divine such they can receive inspiration from the divine. What my physics mentor was arguing towards was, at this core the idea that when doing mathematically legitimate transformations to formula, even when one encounters weird math that fails to have a good physical interpretation or runs against inherent gut instinct and life experience, since the technique used is considered a "legitimate mathematical transformation", then it must be right!

To be fair to my old physics mentor, this is not new a new argument or conflict in the history of physics. This happened in a famous argument between Einstein and Georges Lemaitre, where, in this case the physics conceptual understanding lagged behind the mathematics. Lemaitre in 1927 was able to use mathematics based on Einstein GR to show how galaxies could be moving faster away from us the farther away they are. Lemaitre reportedly contacted Eistein with his results but Einstein responded with the statement "Your calculations are correct, but your physics is abominable,". In the coming decades Lemaitre would be endorsed as correct over Einstein's initial objections.

To further explain the greater point I am driving at, Einstein's genius was in conceiving of physics that could be connected to the currently understand physics of his day and expand on them profoundly. When in 1905 Einstein published four papers which formed the basis of Special Relativity, Brownian Motion, and the photoelectric effect, he was arguing for such weird ideas as length would contract with greater speed and time would slow the faster one moved. He also argued that light had to be made of discrete quanta which fundamentally challenged the infinity continuum idea which underscored optical physics at the time. While still weird to many people today, his ideas proved to be profoundly correct.

This long preface has been to explain why I believe I have gathered enough evidence that experimental procedures I will argue for later have good reason to be successful. I did feel that I needed to explain how modern physics relies on a philosophy of science that is extremely math based. My physics arguments are built on the physics arguments of many other great scientists which I will show in the coming articles. The reason I came to different conclusions than these scientists was through simply taking what they would consider to be "absurd" conclusions and apply the logical strategy of playing Devil's Advocate to see if what they thought was "absurd" was actually not so absurd.

Section 2: What is a monopole?

Since the last article argued for the importance of magnetism in setting reality in 3 dimensions, we will need to use the idea of the magnetic monopole to then tie magnetism to Alpha Space. Furthermore, I will explain how the theoretically predicted qualities of the magnetic monopole align with many simple basic expectations one would have about a physical mechanism.

One would expect any physical mechanism which can connect to Alpha Space will need to work in the physical conditions of the brain. For example, since humans have a consistent in time connection to trying to be good this means that the brain needs to have an "open door" during that time to retrieve information from the "good" region of Alpha Space. This means it is necessary that the connection between Alpha Space and the brain needs to be temporally stable. Since I will propose monopoles as that connection, it is very important that monopole particles are eternally stable in standard physics unlike most fundamental particles. Furthermore, I believe monopoles have a unique quality in physics in orchestrating physical systems due to their size and fundamental relationship with Entropy which will later I argue provides a clear way to understand the profound macroscopic orchestration that occurs in biological organisms. Here, I am trying to give a strong preview of where we will end up after looking at the hardnosed physics which underscores the original concept of a magnetic monopoles. For readers not as interested in the proof but just the conclusion, they may move on to later articles.

Section 2: The Magnetic Monopole- The Big Foot of Fundamental Particles

The magnetic monopole is one of those Holy Grails of physics which if detected would provide the experimental evidence for a paradigm shift in our

understanding of the physical universe. If only someone had found more than one of them!

Historically the magnetic monopole (monopole for short) was first conceived of by Paul Dirac in 1931. For those unaware, Paul Dirac is one of the founding fathers of quantum mechanics and his mathematical notion for doing quantum mechanics is still used to this day. What Dirac did in his 1931 paper was consider, and mathematically prove, that since we find electrons quantized into specific units then we should also find the magnetic field quantized into specific units. This argument simplifies into: since we find electrons in nature we should find monopoles as well. A very basic explanation of what a monopole is through the analogy that as an electron is to the electric field the monopole is to the magnetic field. More specifically, as an electron is a discrete fundamental unit of the otherwise continuous electric field a magnetic monopole is also a discrete fundamental unit of the otherwise continuous magnetic field.

Before moving on, I should explain why it is called a monopole. Typically, every magnetic field has a north and a south end, in effect they are dipoles, literally meaning the field has two poles. Two north ends will repel each other (as well as two south ends) but a north and south end will instead attract each other. One can simply test this with two magnetic where trying to push them together creates a repulsive force when both magnetics are oriented in particular directions but then flip one magnetic and instead of repulsion there will be attraction. Magnetic monopoles are different since they would just be an isolated north or south end. If one tried to make a monopole just by cutting a magnet in half, in the hopes of just isolating one end, it turns out that is not what happens. Instead, the cut pieces will form a new south or north depending on what was lost; no isolation of the poles occurred to create a single pole or monopole.

What is shocking about magnetic monopoles is that they provide a very clean and coherent way to justify electron quantification. Even in Dirac's 1948 summary on magnetic monopoles he admits that no better reason for electron quantification had come along in the 17 years from his first paper so it must be correct by default. It seems that Dirac was oddly prescient when he wrote that as no one has come up with a better reason for electron quantification even coming to our modern year of 2024, 76 years latter from his 1948 paper!

Over time the importance of the magnetic monopole to fundamental theorical physics only grew. In 1974 't Hooft and Polyadov published papers stating how if

one wanted to find a physical theory of everything under a "Grand Unified Theory" or GUT of particle physics which can include gravity then one will have magnetic monopoles as part of that theory. As Preskill put it in his 1984 review of magnetic monopoles: "While Dirac had demonstrated the consistency of magnetic monopoles with quantum electrodynamics, 't Hooft and Polyadov demonstrated the necessity of monopoles in unified gauge theories. Furthermore, the properties of the monopoles are calculatable, unambiguous predictions in a given unified model". Therefore, finding a monopole would provide, from what I have read the best physical evidence, for how to conceptualize the biggest Holy Grail in Physics- a coherent theory of quantum gravity!

What is dramatically interesting for the purpose of this article series is this idea of monopole diversity where different theories of unifying physics each has their own monopole with different properties attached to it. In effective, the diversity in monopoles will then create a mapping between esoteric mathematical ideals and, since monopoles are integral to unifying physics including gravity, also the 4-D manifold of spacetime as argued by Einstein's General Relativity. I take this basic idea of monopoles mapping between esoteric math ideals and how they can intersect with reality as exactly the kind of physics-based mechanism we are looking for based on the arguments of Article 4. I would then take this idea and boost it to then include any ideal, not just mathematical ones. Preskill goes into detail about how in different theories monopoles with different qualities will be produced. Preskill shows what the different properties of different monopoles are if one uses a: SU(2) gauge group; SU(3) gauge group; as well as how monopoles appear in Kaluza-Klein manifolds. For reference SU standards for Special Unitary group. The point in writing SU(2) and SU(3) it to notate which unitary groups since each one can have different properties. Kaluza-Klien manifolds refer to a hypothesis of adding extra dimensions to spacetime and then finding a method to compact them down to the 4-D manifold evident in GR. The main point of these references is to show how using different mathematical ideals to form a GUT theory will necessarily include monopoles. In addition, Preskill notes how he only uses the simple examples in his review thereby stating how that list given is not an exhaustive one. I believe the list of possible mathematical theories to combine physics into one conceptual frame that will have monopoles as a necessary consequence to be infinitely long. Note that the review is already 70 pages long so to be longer and more thorough would likely

make the documents hundreds of pages long and no longer a review. Therefore, given the large mapping that already mathematical exists between monopoles, GUT theories, Kaluza Klien theories, and other fundamental physics theories then to extend this already large mapping to include additional non-mathematical ideals to also map to different monopoles seems to be a rather logical step rather than an illogical one. The review articles outright states that monopoles are a general consequence of physical theory. If they are truly a general consequence they should map to any esoteric ideal.

A basic standard in mathematics is that one has to prove something is NOT true just as rigorously if one wants to prove if some theorem is true. A famous example of this is the three-body problem in Newtonian mechanics. What the three-body problem is that in basic Newtonian mechanics one can reach exact analytical solutions to the interactions of just two bodies. However, add in a third body and things get very tricky where only numerical, approximate methods can be used. The question then physicists were looking for is if there is some exact solution to the three-body problem. When Henri Poincare published in 1890 his attempts to handle the problem, he effectively proved that there is NO clean analytical solution to a three-body problem in Newtonian mechanics.

Returning to my logical extension of mapping between esoteric ideals and monopoles we can also use the same standard and ask if there exists a proof that states I am wrong in positing my extension. I believe any proof would have to be oxymoronic and self-contradictory. This would happen because it would require using a very tight, reductionary and incomplete definition of mathematics to clearly separate the worlds of non-math ideals and math ideals. In other words, one would have to jail mathematics in an overarching, fundamental way and well describe how and why the jailor is able to do so. To jail math is antithetical to strength, beauty, and largesse of math. Math is used to bring precise meaning and analysis to situations; restricting math with a jailor would inherently limit the explanatory power of mathematics in a very basic way. Therefore, unless one wants to live in a reality where math is made fundamentally flawed and weaker than the reality I am arguing for, I believe my logical extension is valid.

It is important since I have used logical religious arguments in the past to also have a short mention of them here. As Preskill and other physicists argued for is at high enough energy, i.e. the "unification scale" where all the fundamental physics can be described in a compact unified way has a simply and interesting quandary when juxtaposed to religious arguments of divine revelation. From a

theist point of view all physics is unified under God. Furthermore, under the assumption that people can receive personal revelation then we can understand this as thinking about a "God" point which not only exists in the place that unifies physics by can also send information to people. This is interesting to me because the brain is not recognized as a highly effective, compact particle collider that can probe distances smaller and energies higher than what CERN can. However, if this idea is taken seriously it means that the brain can sometimes receive information from God and thus learn about length scales smaller than what CERN can. I believe the nature and complexities of magnetic monopoles can provide can solve this conundrum in such a way that both perspectives will come out being right.

As a short aside it will be helpful to explain why high energy and short distances are tied together in fundamental physics. This essentially comes from the formula known as the Planck relation, a fundamental equation in quantum mechanics. The formula is very simple with just that the energy of a photon, the quanta of light, is equivalent to the frequency of its wave, ν ,times the Planck constant h. Thus the equation is . Note that this means that if one wants to probe smaller distances with photons to see what is there one then needs photons of higher frequency. Shorter wavelengths means high frequency. This means that one then needs to use photons of higher of higher energy. Thus, the fundamental reference to small distance scales and high energy.

Monopoles, strangely enough, can provide a work around. As Preskill notes "the monopoles has interesting structure on many different size scales…" he then goes on to give many examples and add that at the end of the same paragraph that "In a grand unified theory in which new physics appears at energies below the unificiation scale M_x… the structure of the monopole might be even more complicated". The greater point here is the magnetic monopole is intrinsically tied to the physics of many distance scales and thus if one can measure monopoles then one can theoretically get information from those distances without having to go through the Planck relation to probe the same length scales. From the argument a few paragraphs ago, this would then simply require that the brain is a good monopole detector to then solve the quandary between standard particles physics and divine revelation.

One of the unique qualities about the monopole is how stable they are. As Preskill demonstrates in his article, there are time-independent monopoles solutions to the classical field equations. What this means is that once a

monopole is formed it will not naturally decay like many fundamental particles. For example, the decay rate of the famous Higgs Boson is currently estimated to be 1.6 x 10^-22 seconds. A single second is an eternity compared to that quantity. Eternity is even longer!

The temporal stability of monopoles then poses a very strange conundrum in astronomy. As Preskill wrote in an earlier paper, given the current thinking of a Big Bang which started at infinitely high energies, then monopoles should have been produced during the time which then survive to our current day. In fact, monopoles produced during the earlier universe "should exceed by many orders of magnitude the current observational limits". Preskill notes in this review that this issue either casts doubt on "the stand view of the evolution of the universe, or on cherished beliefs about particles physics at extremely short distances". Hopefully, it is becoming clear how paradigm defining monopoles are in current physical theory.

The astronomical observational issue becomes even more interesting due to this idea called the Parker limit. The Parker limit comes from the simple observation the entire Milkey Way has a small, standard, magnetic field across its breadth. Since monopoles are magnetic charges, if there are enough of them they would "short" the Milkey Way's magnetic field such that it should dissipate and reduce to 0 strength. Therefore, one can use the strength of the magnetic field we do observe to then set limits on monopole flux i.e. on how many monopoles are passing through the Milkey Way.

However, as Preskill points out, the Parker limit really only applies as long as the monopoles in question are light enough that is it reasonable to ignore gravitational effects. Preskill notes that the predicted mass of monopoles in commonly studied GUTs are on the order of the "kinetic energy of a charging rhinoceros" or about 10^16 GeV. Note this is extremely massive for fundamental particles. For refence, GeV stands for giga-electron-volt. 1GeV is equivalent to 1 billion electron volts or eV. 1 electron volt is (effectively, I am summarizing here) the energy carried by a single electron. Therefore, monopoles, and this is not a high-end possibility, have the energy equivalent of 1 x 10^25 electrons! Note that a single proton typically has the energy of just 10eV or 1 x 10^1 eV. This is truly a huge amount of energy for a fundamental particle.

Since a monopole can be such a massive fundamental particle that it is effectively a classical in nature then with gravitational effects included, note this

is standard gravity not quantum gravity, this means we can only use the Parker limit to put constraints on the flux of light monopoles not heavier ones. The funny thing then happens that these very heavy monopoles run into another issue. Since they are so heavy, one might then apply the constraint they not should not be so abundant as to outweigh the currently visible matter in a galaxy. This limit is arguing for a fundamental difference between the matter seen in the cosmos and monopoles, which I will argue against latter.

Continuing with the theme of astronomical observational limits on monopoles it is vital to consider their generation during the earliest moments of the universe i.e. during the earliest stages of the Big Bang. Preskill goes into detail and shows how using very simple arguments and assumptions about how monopoles could have been produced during the early universe where in standard Big Bang cosmology there were insanely high temperatures. When one then does a thorough but not needlessly complicated analysis as Preskill does, one comes to the conclusion that monopole density is equivalent to that of normal day-to-day matter called baryonic matter. To explain what baryonic means without going into more detailed particle physics is to simple state that protons and neutrons are classified as baryons and since they hold the vast majority of physical matter that we humans interact with as well stars and galaxies they are "typical" or baryonic matter. Please note that baryonic matter is fundamentally different from "Dark Matter" or "Dark Energy"; those two concepts come from different physical ideas and observations than the ones that undergird the physical understanding of baryons.

Preskill's larger point is that seemingly innocuous line of thought ran into a huge problem of predicting that in our universe today there is an equal density in the universe of baryonic matter to monopoles. This is saying that if 10,000 units of baryonic matter is observed than 10,000 units of monopoles are there as well. The issue is that monopoles each unit of monopole is 10^{16} more massive than each unit of baryon such that their mass would dominate the cosmos over the observed Baryonic matter observed. Therefore, it seems that something is wrong in theory as it is seriously conflicts with observation. Preskill notes how this is the" "monopole problem" " (he uses quotes in his own article) and shows a massive conflict between grand unified theories and standard big-bang cosmology.

Now this monopole problem is what I have read in other works by physicists as what fundamentally inspired the inflation paradigm in cosmology. The point of

inflation is to reduce the density of monopoles such that they do not create the monopole problem as described in previous paragraphs. Furthermore, it can be taken further as to so drastically reduce monopole density that it is then probable to never fine one!

What inflation is, more from a mathematical perspective, is to inflate spacetime literally for some period of time until monopole density reduces to "sensible amounts" and then let the universe, eventually, "reheat" into the standard cosmological model that fits observation. I person find this idea horrible, and Roger Penrose does as well but I will not go into details on his reasons. I will explain mine.

From a pure philosophy of science perspective, I find it extremely damning to rely on a theory that will make a key physical marker, the magnetic monopole, unobservable. Science is about experimentation and empiricism. It is a direct attack on the foundation of science to use a theory which states that the monopole cannot be found through experimentation. I find the inflation argument to be similar to a parent to asking if their child did their homework.

"Son," the Father goes, "did you do your homework to create a magnetic monopole?". The Son says "Yes Father but the neighbor's dog Inflationary Field came in and carried it away!".

Preskill in his review article writes how using this inflation theory is a convenient one for theorists because it fixes other cosmological problems and predicts a flat universe which is consistent with modern observation. Furthermore, he notes it as being the best solution currently thought of. In effect, the inflation argument wins by default and convenience. This argument then relies on extending Dirac's original argument to mean that ONLY ONE monopole is needed in the ENTIRE universe to then fulfill the symmetry between charge quantification in magnetic and electric fields. I personally do not see how such an argument works where a single monopole can effectively project itself across the entire universe. It seems to me that this argument is then requiring information distribution faster than light which then makes the argument fundamentally opposed to the tenets of GR. I do not find these arguments convincing.

Now besides using these astronomy observations are there other experimental evidence of monopoles? Can one build a monopole detector? The simple answer is yes, and Preskill writes how using a closed loop of superconducting wire "is an ideal monopole detector, because it gives an unambiguous signal whenever a

monopole passes through a loop, however slowly". In the 1970s and 1980s many experimenters where setting up these loops throughout the world and just waiting for a monopole to waltz through one. The issue is that even with many loops in operation for many years, only one event occurred. In the Cabrera laboratory on Valentines Day in 1982, while no one was in the lab, a monopole detection occurred that match one unit of magnetic charge as predicted by Dirac.

The issue with the Cabrera measurement is that they only every got event. In science, an experiment needs to be reproducible as well as give reliable measurements in each reproduction. They could never get a false positive to be detected by the coil i.e. they could not surreptitiously mimic a monopole. They even tried smacking the detector with a screwdriver to see if that produced a false positive. Therefore, there is a fundamental issue here of what produced the detected signal. If not attributed to a monopole, then to what physical process what does one attribute this to? No one has given a good answer since the measurement was made. Since only one event was observed, the convenience offered by the inflation argument, and that fact that a theorist could convince themselves that from astronomical observations monopole detection should be low anyway then it seems that the zeitgeist of theorists came to rest on searching for monopoles. It was easy to rationalize the Cabrera measurement as either some weird fluke or just an extremely a lucky measurement that was so rare to happen in the first place that the likelihood of it happening again is essentially 0. To reemphasize, as some physicists argue only one monopole is needed to fulfill Dirac's basic argument then Cabrera was just that lucky to see the ONLY MONOPOLE IN THE ENTIRE UNIVERSE. Never has Big Foot been so elusive!

I should clarify the deep connection between spacetime and monopoles. Given the previous arguments about the unification of fundamental forces is it possible to cook up a theory which does unify them all including gravity. This would then propose a theory of quantum gravity with a specific monopole attached to it. The interesting part is even without relying on a theory of quantum gravity to tie monopoles and spacetime there is already plenty of evidence of a deep relationship. For reference, gravity in GR is the curvature in spacetime induced by the relevant mass in that region of spacetime. From our discussion of the mass of monopoles and how they could very well constitute a huge proportion of the mass density of the universe then monopoles would deeply effect the

dynamics of the cosmos. Furthermore, monopoles created literally at the beginning of time could still be around with us today and thus are still shaping the spacetime curvature. Given how strong an effect monopoles would have on the universe within currently accepted theory, it would be an extremely strange outcome for a theory of quantum gravity to not have a deep connection to monopoles.

The greater point here is that in Article 4 I posited, using very basic but fundamental classical electrodynamics, that the 3D part of reality is fundamentally tied to the cross-product of magnetism. However, in that article I had to ignore the fourth dimension of time since we needed to first understanding monopoles before I could fully explain my argument. Now, hopefully, it is clear how looking at magnetism in more detail through its quantum particle, the magnetic monopole, there is a profound relationship between magnetism and all of spacetime, including that 4th dimension called time. The issue is before we can really settle on what that relationship is between magnetism, though monopoles specifically, and time we need to explain where the concept of the "arrow of time" comes. That concepts comes from Entropy which shall be the subject of the next article.