NATURES GRAND UNIFYING FORCE DISCOVERED! pdf

1: Full Force and Effect - Wikipedia

But what of his other grand hypothesis? Today, the unified field theory has been modified and expanded to include scientific research unknown to Einstein, with the potential to affect our fundamental understanding of the universe and what we now know of quantum physics. We have learned a lot, but are these advances sufficient to take what we know of the macroscopic realm of gravity and merge it with the strange microscopic kingdom of quantum subatomic particles to create a Grand Unified Theory of Everything? In the whole of the known universe, just two types of elementary particles are theorized to make up everything that exists â€" fermions and bosons. In simple terms, fermions are all the particles that make up matter for example, electrons , and bosons are all the particles that carry force for example, photons. These elementary particles are then further defined by four fundamental forces that affect them: Each of these forces, or fields, exerts a particular influence on matter or energy. The Standard Model of particle physics unites the first three of these forces in a single framework. It describes the interactions of the electromagnetic, strong and weak nuclear forces and all their carrier particles, as well as detailing how these forces act on all matter particles including the recent discovery of the Higgs boson and its associated Higgs Field. In essence, the Standard Model is the logical extension of another much earlier unifying theory by James Clerk Maxwell that brought the electric and magnetic field theories together. With the exception of gravity, each of the fundamental forces has its own corresponding boson type in the Standard Model; the strong nuclear force is carried by the gluon, the electromagnetic force is carried by the photon, and the W and Z bosons are accountable for the weak nuclear force. A Feynman diagram illustrating the interaction of electromagnetic particles Credit: Fermilab This means that the electromagnetic force influences particles with an electric charge, such as photons and electrons, the strong nuclear force provides the fundamental "glue" that holds atomic particles together â€" such as gluons and hadrons â€" and the weak nuclear force is defined by its ability to assist in the radioactive decay in elements â€" it is, for example, the force that initiates the nuclear fusion reaction that powers the Sun. So, in essence, the Standard Model can be seen as the "Handbook to the Universe" for modern physics as it shows how the whole universe hangs together in every possible way. Except, that is, for gravity. On a grand scale â€" that is, at the macroscopic level â€" gravity remains the only one of the four "fields" yet to have clearly defined particles or adequately explained forces associated with it. And, though it is particularly strong around very massive bodies like planets, stars, and galaxies, gravity is the weakest of all the known forces at the microscopic level, where all the other forces exert their greatest influence. So those in science that do believe all of the fields in the universe can be united in a Grand Unified Theory of Everything are looking for ways to expand the Standard Model to encompass gravity and show its interaction with other fields and particles to substantiate their theories. Some would say that the Standard Model is not so easily changed without substantial proof, and that proof has not been observed experimentally, so gravity cannot be included. Alternatively, the Standard Model itself is may no longer considered a definitive version of all the fields in the universe because it is, they say, incompatible with the most successful theory of gravity produced to date; that of general relativity. Regardless of which side of the theoretical divide physicists may sit, the idea that there could be a universal, Grand Unified Theory of Everything remains a captivating prospect, with the result that many proposals have been expounded over the years, and many researchers have spent a great deal of their time and energy pursuing this seductive scientific siren. Even the great Albert Einstein was not immune to its beckoning call. At first glance, such a theory was a logical progression of his work and would make basic, rational sense of the things that we perceive in the universe. Such a theory would encompass a verifiable set of principles, constants, and equations that would describe the field for all of space and time and how it would behave when its parameters were altered. In effect, it would show how the whole of reality behaves in a rational, predictable manner that could be measured, tested, and verified. However, dig deeper into the events of the time, and the motivation for Einstein to produce such a hypothesis as a purely logical progression of

known physics may not have been quite as rational as it seemed. At a conference for the leading physicists of the day in Brussels in , Einstein was involved in an infamous argument with the Danish physicist Niels Bohr about the newly-mooted field of quantum physics. Einstein himself had inadvertently set the wheels in motion for this new area of research when he published his paper which won him the Nobel prize in describing the law of the photoelectric effect , where light was first described as a stream of discrete particles. However, he had not â€" and would not â€" leap to the conclusions Bohr and others drew from it. Indeed, Einstein saw all the strange properties associated with quantum theory as proof of its flaws and dismissed it out of hand. For Einstein, God did not "play dice with the universe" â€" he was a strict believer in the deterministic, reliable, repeatable nature of things in his scientifically-stable world, and random effects played no part in it for him. To this end, Einstein sought to unify the forces at play in the universe from his perspective. And, indeed, from a macroscopic perspective, the forces of electromagnetism and gravity are alike in many ways and could be seen to exhibit properties that suggest they may have the same underlying forces at work. The measurable influence of both, for example, is inversely proportional to the square of the distance between two bodies, and both have a seemingly infinite distance over which that influence is capable of being seen or felt. Einstein felt that he was right in this; he was sure that the universe operated in a rational, persistent, measurable way and he saw it as a way to prove once and for all that he was correct about the elemental deterministic nature of reality, free from quantum spooky actions at a distance. During a particularly rancorous period in , he and a couple of other deterministic physicists published a paper purporting to finally prove the non-existence of quantum theory that was soundly rounded upon and howled down by many in the scientific community. Despite this, Einstein focused on little else for the rest of his life. Indeed, trying then rejecting one mathematical model after another, Einstein continued to believe that everything â€" including quantum physics â€" could be explained when the two forces of electromagnetism and gravity were proven to be two products of the same fundamental force. Einstein died on April 18, Next to his hospital bed were a dozen pages of paper covered in scores of notes and equations that had been crossed out, corrected, and re-written. To the very end, Einstein had continued to develop and explore the unification of these stubbornly disparate forces, never giving up his belief that his quest may be just one more line of mathematical code away. Much work leading on from his theories provided tantalizing glimpses at possible gravitational interactions, including the behavior of the smallest of all fermions yet discovered â€" leptons and quarks. This research led directly to the discovery of a gauge-invariant quantum field theory of the weak force, which included an electromagnetic interaction and produced the "electroweak" concept that now shows correlation between electromagnetic and weak nuclear fields , which was, in itself, a great breakthrough in particle physics research. Unfortunately, however, it did not progress to include an observable gravitational component. Nevertheless, buoyed by such revelations, theoretical physicists sought out a similar quantum field theory for the strong nuclear force, and eventually found one, dubbing it quantum chromodynamics. In this case, quarks are shown to interact through the exchange of gluons. This research has led to further postulations that the electroweak and strong nuclear forces could be united in a grand unified theory, which would then incorporate three of the four known forces in the universe. Again, however, an inclusion of the influence of gravity failed to be reconciled. Of loops, strings and gravitons So despite the successful conflation of the fields discussed above, physicists have been unable to formulate a complete particle-driven unified field theory for gravity since it seems to lack a force-carrier particle of its own. There is, however, one contender: A contentious theoretical particle known as a "graviton". The graviton moniker was apparently coined by the Russian physicists Dmitrii Blokhintsev and F. That is, the electromagnetic and strong and weak nuclear forces all act through a "force carrier", which is exchanged between the interacting particles. These exchange carriers are also known as field particles, or gauge bosons. Put simply, unlike the other forces, gravity can not be absorbed, transformed, or shielded against, and it only attracts and never repels. In effect, this theoretical particle appears to possess no discernible way to interact with any other particle. This fact by itself would prohibit its inclusion in the Standard Model, partly because no instrument of sufficient size or efficiency could possibly be built to detect the supposedly tiny energies associated with it, but mostly because the entire concept runs into enormous theoretical difficulties at energies close to the Planck scale , which are the smallest sizes and energies able to be probed with particle

accelerators. Despite this, quantum gravity and other yet-to-be-proven quantum mechanical models such as string theory are often associated with gravitons, both of which rely on its existence. And though much hope is pinned on one of these theories eventually providing a unified description of gravity and particle physics, quantum gravity may prove the best contender. This is because string theory alone is not a physical descriptor of reality, but instead a self-contained mathematical model that describes all of the fundamental forces and the various forms of matter as models, not observed phenomena. In string theory, the basic elements of the physical world are not particles, but infinitesimally-small, one-dimensional strings that vibrate at different frequencies, which supposedly give rise to all of the various particles and forces in the universe. The vibrating strings in this hypothesis need anywhere between 10 and 26 dimensions to perform their roles, depending upon the particular branch of the discipline applied. Of all the theories posited to incorporate a fundamental explanation for all the forces so far found in the universe, loop quantum gravity is currently one of the more popular research areas. Essentially, loop quantum gravity hypothesizes that space-time actually consists of an infinite amount of small chunks. At a macroscopic level, these pieces appear to be one smooth sheet of time and space, but when you zoom in to the sub-atomic level, it actually consists of groups of dots connected by lines or loops. As such, space can be viewed as an extremely fine fabric or network woven of finite loops that provide an explanation for gravity, in that it predicts space, like matter, has an atomic structure. The lack of observational evidence to these theories, though, does not preclude the notion that quantum gravitational effects may be somewhat more noticeable near black holes and, if this is so, then quantum gravitational fluctuations could theoretically leave their mark on the emission spectrum analyzed by LIGO and other gravitational wave experiments. Given that the electromagnetic force between an electron and a proton in a hydrogen atom is times greater than the gravitational force between the same two particles, however, it will take one heck of a sensitive detector to go anywhere near differentiating such a tiny field from the background noise. Barking up the wrong apple tree? In all of these theories the inclusion of gravity in interactions with the forces and particles detailed in the the Standard Model, or some yet-to-be-proven quantum mechanical model, requires gravity to have some sort of particle or equivalent force-carrier mechanism of its own for any of these hypotheses to work at all. And, despite Einstein trying to reconcile a Newtonian-style universe with that of his own General Theory of Relativity the central tenet of his hypothesis remains the idea that gravity is an effect of mass impinging on space-time, and no particle is identified or even required to make it work. So, what if there is no particle. What is producing this "force"? To help answer this, we have to look a little deeper into the mechanisms of mass creating curves in the fabric of space time around it. To make this a little more accessible, however, we will not use any of the mathematical formula behind it. Instead, we will use some hopefully not too tortured analogies to attempt to explain what is going on. Imagine, if you will, that space is an enormous bowl of colored jello "jelly" to those of you outside the US and that each massive object in the universe is like a marble dropped into that gelatinous goo. Being solid, the marble takes up space in the jello and the jello itself is distorted around the marble. In very simple terms, this is a simple 3-dimensional interpretation of what space would look like if we could see its distortions; a gelatinous, amorphous substance that contains lumps of matter that it molds itself around, but which distort it at the same time. Now take this analogy a little further, and we see that small particles do not distort the jello of space very much, but the more of these particles you bring together into larger masses, the greater the effect they have in producing distortions. Kick this analogy up a notch, and picture this collection of marbles being able to spin themselves and move forward through this gelatinous substance. All around the marbles, the glutinous space-time material would be contorted, with slow-moving vortices creating voids of jello in their wake as they pushed through it. These distortions and voids are the very simplified equivalent to mass creating curvatures in space. In the version of space imagined by Isaac Newton, with no forces acting between objects they tend to move along the straightest possible line at a constant velocity. If these objects deviate from their path and move towards each other, Newtonian theory would have it that some force has acted one or both of these objects. That is, Newton thought that a mass exerts force directly onto nearby objects. But Einstein realized that gravity is actually a product of the curvature of space where any objects close to a large mass have their ordinary straight line motion curved, giving the appearance of being attracted to the body in question. As a result, small masses near

to a massive sphere fall toward the distortion in space that the mass has created just as in our jello analogy. Using yet another analogy, imagine that you are travelling in a train on a straight track on a flat surface at night. Riding in the carriage, everything feels in equilibrium; you are moving forward horizontally, in a straight line, and with very little apparent motion. Now imagine that your train reaches a point on the line where it appears to dip into a steep, downward incline. Your train continues on its straight-line journey on its tracks, but that motion now curves downwards into the valley below. You can neither see the curve nor if the driver is not so reckless as to speed into the dip can you feel the change. But change you have. Your train is now traveling in a downward curve that appears to be in all respects to your senses a straight line, but is in fact distinctly bent. Now imagine that the train is a small mass, the train track is the apparent straight-line motion of objects through space, and the steep incline is the curvature in space-time created by a large mass. In this way, any object that appears to be traveling forward in time and space in a linear, straight-line motion as observed from your own point of view, is in fact, following the curvature of space-time created by a massive object and giving the illusion that the driver of this motion is the force of gravity. As such, gravity is not actually exerting a force, because it is not a force itself â€” it is merely an effect of the distortion of space-time being observed as something that has the apparent behavior of a force, but where objects are merely following the curve created by a mass. And this is all based on the fact that â€” and I am repeating this because it is worth doing so â€” gravity cannot be absorbed, transformed, or shielded against, and it only attracts and never repels, and so it displays no aspects at all comparable to other forces in the Standard Model.

NATURES GRAND UNIFYING FORCE DISCOVERED! pdf

2: A long way from everything: The search for a Grand Unified Theory

A Grand Unified Theory (GUT) is a model in particle physics in which, at high energy, the three gauge interactions of the Standard Model which define the electromagnetic, weak, and strong interactions, or forces, are merged into one single force.

The round robin interview was printed in some versions of the paperback release. Plot[edit] The novel begins on the Yuuzhan Vong prisoner-of-war camp planet of Selvaris. Four prisoners, a Jenet named Thorsh and three Bith, memorize a complex mathematical code smuggled in by a member of the Ryn Syndicate, and they make their escape. Two of the Bith are killed by the pursuing Yuuzhan Vong forces while one of them is captured, but Thorsh escapes Selvaris thanks to the Millennium Falcon. The Bith is killed as a result. The Millennium Falcon brings Thorsh back to the Galactic Alliance where he is debriefed and recites the mathematical code to a Givin member of the Alliance. So an Alliance fleet ambushes Selvaris and rescues many prisoners, although some manage to get away. However, the Millennium Falcon, badly damaged from the battle, is forced to make an erratic jump into hyperspace that transports it to Caluula. As it turns out, the inhabitants of the Caluula system have been fending off the Vong for quite some time now, but they are able to repair the Falcon. As Zonama Sekot travels through hyperspace back to known space it was previously in the Unknown Regions , it turns out that Harrar survived his confrontation with the treacherous Nom Anor in the previous novel. As for the sacrifice that had been partially foiled thanks to the Battle of Selvaris, the Yuuzhan Vong are able to compensate with captives from other contested worlds following Selvaris. But the sacrifice is spoiled thanks to a riot caused by the Shamed Ones, who save many of the Galactic Alliance captives much to their own detriment as Shimrra has many Shamed Ones and workers executed as capital punishment. As the Yuuzhan Vong arrive at Mon Calamari and battle the opposing Galactic Alliance forces, Han and Leia Organa Solo, along with a few allies, infiltrate the Vong-captured Caluula in order to eliminate the resident yammosk there. As Kyp Durron, part of the infiltration team, is able to discern, the illness that the Yuuzhan Vong on Caluula are suffering is Alpha Red, a biological virus set to target and eliminate the Yuuzhan Vong and anything sharing their DNA with them. It had been deployed on Caluula in secret just before the planet surrendered to the invaders. With the living world offering a distraction to the Yuuzhan Vong, the Jedi and the Galactic Alliance gather up all of their forces and resources for one last showdown against the Vong. Meanwhile, Nas Choka takes a portion of his fleet to destroy Zonama Sekot using the Alpha Red-infected Slayer ship, as Shimrra revealed previously that there is indeed a biological connection between the Vong and Zonama. After Mara gives him a severe beating, Nom Anor pleads for his life, which Mara grudgingly spares so that he would be properly convicted for his crimes in the end. There, Onimi easily overpowers Jaina and renders her unconscious with a toxin from his fang. Jaina notes, as she falls unconscious, that she was able to sense Onimi through the Force. This was done after Onimi, being a Shaper at the time, discovered that there was no eighth cortex in the Shaper Qahsa. With Shimrra now dead, he plans to kill everyone and every living thing in the galaxy so that he could become a new god and fashion a new universe in his image. As they do that, the coffer launches for space, and the Millennium Falcon, piloted by Mara Jade Skywalker with an ailing Luke aboard, and Jagged Fel in his commandeered X-wing follow the coffer. In the coffer, however, Jacen confronts Onimi and then hears the voice of his late grandfather, Anakin Skywalker, telling him to "stand firm," like he did on Duro. As a result, Jacen defeats Supreme Overlord Onimi. The coffer begins to die off due its now-lost connection with Onimi, and Nom Anor tries to trick the Solos into going into a garbage chute while he escapes alive. With his Vongsense, Jacen thwarts his plan, and when Nom Anor tries one more time to evade the Solos, his hand is cut off by Leia via her lightsaber. He offers them an ultimatum; those who wish to die may kill themselves or fight to the bitter end, while those like him will live to find out what the Galactic Alliance and their allies intend to do to them. Meanwhile, Zonama Sekot manages to repel the Alpha Red-infected Vong ship from its surface and brings down all ships, Yuuzhan Vong and non-Vong alike, to the ground. It works, and the Skywalkers and Solos collapse into one big embrace, glad that they survived and that the war is over. C-3PO and R2-D2 watch this scene and lament how

at times like these, they envy how humans must feel. Choka agrees to collect all remaining Vong throughout the galaxy so that they will be deposited on Zonama Sekot and be taken away into the Unknown Regions, where they will be safe and learn to acclimate their culture to peace and also reclaim their connection to the Force. To counter those who wish to see the Yuuzhan Vong totally exterminated, such as the Bothans among others, Galactic Alliance Chief of State Cal Omas saw to it that each and every remaining sample of Alpha Red has been destroyed. Jacen, for one, plans to go on a galactic sojourn so that he could broaden his view of the Force following his battle with Onimi. Several weeks later, after nearly every remaining Yuuzhan Vong is collected, Zonama Sekot travels back into the Unknown Regions. Afterwards, they all have a feast where they discuss their vacation plans. The novel, and the series, ends with everybody laughing, not only at what Han said, but also in joy and relief that once again, the galaxy is at peace.

NATURES GRAND UNIFYING FORCE DISCOVERED! pdf

3: The New Jedi Order: The Unifying Force | Wookieepedia | FANDOM powered by Wikia

A = A is the GUT (Grand Unifying Theory), the TOE (Theory of Everything) and the GUF (Grand Unifying FORCE) of the Universe. It is the "God Particle" that won't be found at CERN because the missing basic building block of the Universe is a force not a particle - so the Higgs Boson will not be found in the collision.

We want to hear from you. Take the Survey We all have questions. Where did we come from? Why are we here? Science is a unifying enterprise, one that brings us together to solve problems, fuel our sense of wonder, and understand our place in the world. Through scientific inquiry, we peer deeply into the infinitesimal workings of individual cells and outward into the unimaginable expanses of the cosmos. And I am optimistic that science can point us toward a path to a brighter and sustainable future, one in which we can together realize our common destiny as inhabitants of this small and fragile planet. There are so many forces that divide us: But science transcends these forces. Science is a path to knowledge that begins with a simple and humbling admission: Science looks beyond dogma and demands evidence. The resulting knowledge crosses all borders and makes its way around the world. Knowledge belongs to us all. Science reveals things so profound, they change the way we see the world and ourselves. The sequence of letters in our DNA has shown how closely we are related to each other and to every living thing on the planet todayâ€”the house plants in your window and the goldfish in your bowl are your relatives. It seems incredible, but even bacteria are your relatives. Indeed you are actually part bacteria, as you arose from an ancestral cell that combined with a bacterial cell and incorporated their genes into your own DNA. A literal fusion of two organisms into one. This may seem a humbling tale, but the rewards for this humility are tremendous. Some are very practical. Some hit close to home. My daughter has Type 1 diabetes and is alive today thanks to countless scientific breakthroughs. The insulin that she needs to live was discovered by biochemists nearly years ago. Originally insulin was extracted from animal tissue, but today it is made by genetically engineered bacteria. Science shows us how much we still have to learn. Which is what makes the whole process so beautiful. Because the more deeply we look, the more mysterious and breathtaking our world is shown to be. Science deepens the mystery of our existence and opens our eyes to the wonder and beauty of nature. Take, for example, the Hubble Space Telescope. When astronomers pointed it at an apparently empty segment of space, they revealed not utter blackness but galaxies upon galaxiesâ€”star formations whose light has been traveling for But more than holding up a mirror to the beauty of the universe, science holds the power to transform us. There are serious problems with our world today. Humans are disturbing the balance of the whole Earth biosphere. Like bacteria growing in a culture dish, eventually we are going to run out of nutrients and the things we need to sustain us. We need to make some changes before society reaches this breaking point. I am confident that we can come up with ways to promote sustainable livingâ€”and that science can help lead the way. As a society, we should focus on unlocking the potential of our people, both young and old, and work on educating everyone who has a desire to learn. And we should make sure we continue to invest in the kinds of exploration that inspire peopleâ€”perhaps even attempt to colonize space. Our greatest achievements often come from doing things that do not seem immediately practical. Mello is a professor of molecular medicine at the University of Massachusetts Medical School, and chairman of the national advisory committee of the Pew Scholars Program in the Biomedical Sciences. He received the Nobel Prize for physiology or medicine.

NATURES GRAND UNIFYING FORCE DISCOVERED! pdf

4: Star Wars Theology - The Living Force, the Unifying Force, and the Chosen One : MawInstallation

Physicists have failed to find disintegrating protons, throwing into limbo the beloved theory that the forces of nature were unified at the beginning of time.

Forces[edit] All four of the known fundamental forces are mediated by fields, which in the Standard Model of particle physics result from exchange of gauge bosons. Specifically the four fundamental interactions to be unified are: The exchange particle that mediates this force is the gluon. The photon is the exchange particle for this force. It is mediated by the W and Z bosons. The postulated exchange particle has been named the graviton. Modern unified field theory attempts to bring these four interactions together into a single framework. Classic theory[edit] The first successful classical unified field theory was developed by James Clerk Maxwell. Until then, electricity and magnetism had been thought of as unrelated phenomena. In , Maxwell published his famous paper on a dynamical theory of the electromagnetic field. This was the first example of a theory that was able to encompass previously separate field theories namely electricity and magnetism to provide a unifying theory of electromagnetism. In the years following the creation of the general theory, a large number of physicists and mathematicians enthusiastically participated in the attempt to unify the then-known fundamental interactions. In Kaluzaâ€"Klein theory , the gravitational curvature of the extra spatial direction behaves as an additional force similar to electromagnetism. These and other models of electromagnetism and gravity were pursued by Albert Einstein in his attempts at a classical unified field theory. This system is heuristically the super-classical [Varadarajan] limit of the not mathematically well-defined quantum electrodynamics. One can extend this system to include the weak and strong nuclear forces to get the Einsteinâ€"Yangâ€"Millsâ€"Dirac System. The French physicist Marie-Antoinette Tonnelat published a paper in the early s on the standard commutation relations for the quantized spin-2 field. In the s Mendel Sachs proposed a generally covariant field theory that did not require recourse to renormalisation or perturbation theory. In , Tonnelat published a book on the state of research on unified field theories. Modern progress[edit] In American physicist Sheldon Glashow proposed that the weak nuclear force , electricity and magnetism could arise from a partially unified electroweak theory. This unified theory modeled the electroweak interaction as a force mediated by four particles: As a result of the spontaneous symmetry breaking, the weak force becomes short-range and the W and Z bosons acquire masses of Their theory was first given experimental support by the discovery of weak neutral currents in Carlo Rubbia and Simon van der Meer received the Prize in In , Sheldon Glashow and Howard Georgi proposed unifying the strong and electroweak interactions into the Georgiâ€"Glashow model , the first Grand Unified Theory , which would have observable effects for energies much above GeV. Since then there have been several proposals for Grand Unified Theories, e. A major problem for experimental tests of such theories is the energy scale involved, which is well beyond the reach of current accelerators. Grand Unified Theories make predictions for the relative strengths of the strong, weak, and electromagnetic forces, and in LEP determined that supersymmetric theories have the correct ratio of couplings for a Georgiâ€"Glashow Grand Unified Theory. Many Grand Unified Theories but not Patiâ€"Salam predict that the proton can decay , and if this were to be seen, details of the decay products could give hints at more aspects of the Grand Unified Theory. It is at present unknown if the proton can decay, although experiments have determined a lower bound of years for its lifetime. Current status[edit] Theoretical physicists have not yet formulated a widely accepted, consistent theory that combines general relativity and quantum mechanics to form a theory of everything. Trying to combine the graviton with the strong and electroweak interactions leads to fundamental difficulties and the resulting theory is not renormalizable. The incompatibility of the two theories remains an outstanding problem in the field of physics.

5: Nobel Laureate Craig Mello Reflects on the Unifying Force of Science

Grand Unified Theory (GUT) is a model in particle physics in which, at high energy, the three gauge interactions of the Standard Model which define the electromagnetic, weak, and strong interactions, or forces, are merged into one single force.

For the New Jedi Order and the unrelenting Yuuzhan Vong , it will be the last, epic battleâ€”the ultimate fight that will decide the fate of the universe The Yuuzhan Vong, having overcome the strategies of the Jedi and their allies, have pushed deeper into the galaxy and conquered more worlds. The remaining defenders of the galaxy are struggling to form a united front. Luke , Mara and Jacen are missing in action. Clearly the stage is set for endgame. Yet as they speak, the Alliance capital world Mon Calamari is under attack. Also among the Yuuzhan Vong, there is a threat of revolt by the oppressed lower classes of their society. Ultimately, for both opposing forces, too much has been sacrificed and too much is at stake. And now, the final battle between the Yuuzhan Vong and the Galactic Alliance. Paperback Edit In the spectacular finale of the New Jedi Order series, Luke, Han, and Leia rally for their last stand against the enemy that threatens not only the galaxy but the Force itself. The marauding aliens have pushed deeper into the galaxy in their ruthless quest for domination. The remnants of the resistance are struggling to form a united front. For both sides, too much has been sacrificedâ€”and too much is at stakeâ€”to ever turn back. And now nothing can stand in the way of seizing victory Plot summary Edit The novel, set in the final year of the Yuuzhan Vong War , begins in the Yuuzhan Vong prisoner -of-war camp on the planet Selvaris where a Jenet named Thorsh and three Bith memorize a code mathematically encrypted on a smuggled computer chip, courtesy of the Ryn Network. The four prisoners escape but are soon chased down by Yuuzhan Vong security patrols. The chase kills two of the Bith while the last one is captured. Thorsh, however, is saved by the crew of the Millennium Falcon , and he is taken back to the Galactic Alliance in order to give out the mathematical code. The reason that the Galactic Alliance sees to saving the prisoners of this particular convoy is because the likes of Captain Judder Page and Major Pash Cracken are needed to lead and rally other planets against the Yuuzhan Vong. Commander Malik Carr , overseer of the prisoner-of-war camp, fails to divulge this information from the captured Bith as he uses a tkun to strangle him to death for the mathematical code in front of the other prisoners. Meanwhile, the Millennium Falcon is greatly damaged in the conflict by specialized Yuuzhan Vong ships , coercing it to make a random hyperspace jump that places it in the Caluula system. Nevertheless, despite the fighting, the crew aboard Caluula Orbital agree to fix the Falcon up. Later on, however, the Alliance finds out that Caluula had willingly surrendered in the fall of its space station, but asked the Vong to allow scientists on the planet because of a natural phenomenon called the Nocturne of the Winged-Stars , which occurs quite rarely on the world. The team members, however, are intercepted by specialized Vong patrols, with both spies killed, and Han, Leia, and the others are captured and are taken to be executed at the yammosk. Kyp theorizes that the Vong on Caluula died because of an earlier deployment of the Alpha Red pathogen on the world. The situation is compounded by the fact that if they wipe out the Yuuzhan Vong, then they will be committing genocide, an act not beneath the Vong themselves. The group, most of them emotionally weary of what will be done, proceed to return to the Galactic Alliance just as the forces of its military at Mon Calamari are fighting the invading armada. This battle sees Jaina Solo losing her astromech droid Cappie and nearly getting killed as the rest of the Yuuzhan Vong armada nearly overwhelms the GA defensive fleet. Elsewhere, the living planet of Zonama Sekot is still traveling via hyperspace for the Coruscant system since the events of the previous novel, The New Jedi Order: Since then, Harrar had lost faith in his religion after discovering the connections between his species and the living planet. Sekot comes to recognize Harrar by his species via the encounter that it had with the Vong a few decades earlier. The reason for this was because the ur-Vong were becoming a violent race who craved war and brutality, which was what led to their hatred for mechanical machines as they fought the opposing droids that invaded their galaxy. This was among one of the reasons that the Vong hold pain and death as such an essential part in their religion, because, when they were cut off from the Force, they realized that pain and death were the only other forms of living symbiosis that they could achieve. Thus, the ur-Vong

had cemented this new way of life into their religion by creating gods who look so positively upon their creations as those creations embrace what all living beings must suffer in life and more. And when the ur-Yuuzhan Vong had devastated their own galaxy as a whole in the Cremlevian War , they were forced to journey into the Intergalactic Void in search of another galaxy for them to conquer and live in, thus leading into the eventual invasion of this galaxy. Meanwhile, Jacen Solo experiences the return of the voice that told him to "stand firm" at Duro three years earlier , along with the vision of failing to catch the lightsaber tossed to him by his uncle Luke. From this, Jacen begins to wonder if he will make the right decisions in the near future against the Yuuzhan Vong. This promotion was influenced under the mistaken belief that Nom Anor had killed Zonama Sekot. So the High Prefect tries to use this as leverage in order to coerce Nom Anor into being a Quorealist. This is evident as the heretics break up the sacrifice of the Alliance captives, saving many of them, including Major Cracken, even at the cost of some of their own lives. And even with Shimrra demanding the deaths of many heretics and potential heretics alike, the Jedi heresy still stands strong. It also distorts the mainstream social hierarchy of the species and causes great joy in the Shamed Ones and workers for bringing their oppressive rulers down. Shimrra even seems to go insane, as Nom Anor sees from the demands that the Supreme Overlord makes to the highly placed officials at his command. But despite these suspicions, these orders from the Dread Lord are successfully carried out as he also demands for the deaths of all the rioting heretics, which the warriors begin enacting loyally. All of this marks the beginning of Recapture of Coruscant. She captures him and holds him for Mara to come over so that the latter can see it her way as to how he should be punished for all of the wrong that he had committed throughout the war. After a brief fight between the two of them, Mara defeats and nearly kills Nom Anor for giving her the coomb spore virus years earlier and for all of the other misdeeds for which he had given the Jedi and the late New Republic during the invasion. He also tells her that Shimrra had ordered the Alpha Red-infected Vong ship, transferred from Caluula, to Zonama Sekot, as it is set to kill the living planet. Jacen also convinces the Yuuzhan Vong biots, Sgauru and Tu-Scart , who are nicknamed the Biter and Beater respectively by the Vong, into helping him, his uncle, and his sister enter the Citadel. During this time, Luke seemingly surrenders himself to the Force, letting it engulf him so that he is an unstoppable force of nature which no Yuuzhan Vong can counter, and which neither Jacen nor Jaina can comprehend visually or through the Force as their uncle. However, after apparently forcing his Citadel to stay put in its regular placement because of the mental connection that he has with it, Shimrra knocks Jacen unconscious when the latter tries to attack him, knocks away his lightsaber, and begins to suffocate Luke with his special amphistaff , the Scepter of Power. Then the Supreme Overlord prepares to kill Luke by utilizing the lightsaber of the late Anakin Solo the lightsaber was collected by the Yuuzhan Vong after Anakin died at the Mission to Myrkr two years earlier , and which was brought to Shimrra after the late Ganner Rhysode used it against the galactic invaders prior to his own death around the same year. But Jacen misses the lightsaber, reflecting the vision that returned to him on Zonama Sekot of failing to catch the weapon. Despite this, Jacen is sent by the faltering Luke to retrieve Jaina. Onimi believes that the Jedi are the avatars of the Vong gods, with Jaina being Yun-Harla, the Trickster goddess, which she used as a persona in the latter half of the invasion as psychological warfare against the Vong. The eighth cortex was meant to find a way to save the Yuuzhan Vong from the decades of violence against each other as they crossed the Intergalactic Void in order to arrive in the galaxy. Onimi, in his goal of trying to find a way to save his people via the yammosk fusion to his brain , became a Shamed One for this. But as the war went on, Onimi later evaluated that the gods wanted to destroy him and his rule with Shimrra acting as his puppet, and thus, destroy the Yuuzhan Vong as a whole. It is also revealed by the real Supreme Overlord that he was responsible for the swaying and tipping of the Citadel. He has now gone so insane that he plans to wipe out every single living being and thing in the galaxy.

6: The Unifying Of The Forces Of Nature | Bertrand Wong - www.enganchecubano.com

They called such a theory, modestly, a Grand Unified Theory (GUT). At around the same time, Weinberg and Georgi along with Helen Quinn noticed something interestingâ€"following the work of Frank Wilczek, David Gross, and David Politzer.

It shows how a unified field theory and theory of everything may be obtained. Having only a beautiful theory and beautiful equations to model nature are insufficient for affirming the characteristic of the universe. The affirmation has to be ultimately carried out by physical experiment. However, in lieu of physical experimentation, computer simulation is proposed, simulation with powerful software having been effectively utilized in areas such as aeronautical, electronic, mechanical and marine designs, wherein it now becomes unnecessary to produce costly prototypes. A few possible ways of unification are also presented. Einstein had attempted to unify the four forces of nature, i. As in the past, he was unable to derive the electromagnetic field equations, even for the weak- field approximation. He was to live to the end of his life without any success with the unified field theory. Einstein had thought that David Bohm would be the first scientist to solve the unification problem. But ironically the latter regarded the concern with the unified field theory problem as merely an unnecessary fuss, dismissing it as an "illusion of parts" and simply relegating the problem to the logical constraints of topology; he resorted to the metaphysical way of interpreting the universe, calling it the "looking-glass" universe. There is also the belief that there is an anti- gravitational force for every gravitational force, just as there is an anti-particle for every particle. Nobel Laureate Richard Feynman had suggested that anti-particles are like ordinary particles moving backwards in time, which implies that anti-particles should have anti-gravity. Gravitation has always been thought of as a pulling or attracting force, just like the force of attraction between two magnets. Gravitation and magnetism may be different manifestations of the same thing. And, gravity may be a pushing force instead, a force that presses down on all objects in the direction of the centre of the earth. In fact, a push is equivalent to a pull, the former originates at the back of an object while the latter originates at the front. So far, gravitational forces are seen as forces of attraction only, while magnetic and electric forces are forces of attraction and repulsion. There may be a gravitational force of repulsion. All this will affect our approach towards the unified field theory. David Bohm, the British scientist whom Einstein had once hailed as being the person who would one day solve the unified field theory problem, had postulated that our universe is a vast fluid nothingness or no-thingness in which everything is. He had spawned a surprising relationship between maps and terrains. In other words, different things are really one thing. The observer is the observed, the part is the whole â€" all this seems more metaphysics than physics, but nevertheless this has evidently been the state of physics. Bohm believed that unification could be expressed by using the logical relations of topology, as is stated above. Can any of these four forces exist without the others? They are all evidently essential parts of our universe, making up the whole. Before Newton discovered gravity, nobody had known it existed or had thought that there was such an attractive force. Einstein in his General Theory of Relativity interpreted it as a curvature of the space-time continuum, a geometrical form. Can gravity be the fifth dimension, in addition to the four dimensions of General Relativity comprising of the three physical dimensions and the time dimension, as Theodor Kaluza had suggested, which impressed Einstein greatly? It depends on how we look upon the physical world, on our mental inventiveness, and is thus subjective. Quantum particles in the micro-world, unlike the objects in the macro-world, are comparatively unpredictable where their actions or movements are concerned and can only be predicted if at all in a probabilistic fashion. We will never be able to know for certain where a quantum particle will turn up next. We can have a quantum field equation involving infinite dimensions. According to modern quantum mechanics, all possible physical states of a system correspond to space vectors in a Hilbert space. An infinite-dimensional Hilbert space will also fit in with the theory of the existence of an infinite number of 3 parallel universes which are connected with each other through worm-holes. Under local supersymmetric transformations these two particles transform one into the other. When quantum calculations were carried out using supergravity theory, it was discovered that the infinities which plagued the earlier gravity theory with

only the graviton were now being cancelled by equal and opposite infinities produced by the gravitino. This is evidently the result of the deeper consequence of the presence of supersymmetry. As simple supergravity theory includes only the graviton and the gravitino, this hardly corresponds to the real world with its many particles. Most of those who have worked on supergravity feel that some crucial idea is still missing. Without this crucial idea the theories simply do not describe the real world. How do we make supergravity theory realistic? If we can solve this problem, we can have supergravity theory as a completely unified field theory. Supergravity theory shares the same features with its progenitor, the Theory of General Relativity, namely, conceptual power and mathematical complexity. Perhaps, by postulating the existence of a single master supersymmetry we can have a unified field theory that accounts for the whole universe. The left-hand side refers to a set of terms which characterise the geometry of space, while the right-hand side refers to a set of terms which describe the distribution of energy and momentum, i. Reading from left to right is space-time telling mass how to move, while reading from right to left is mass telling space-time how to curve. In General Relativity, there is neither absolute time nor space and gravitation is not a force, or, pull between 4 one object and another but a property of space and time. A suggestion is to change the left-hand side of the equation, the geometry of space, which is here a four-dimensional space-time continuum, into an infinite-dimensional space, a Hilbert space, which is as follows: One geometrical form of this nature can be an infinite number of Moebius Strips which are intricately intertwined and linked with each other with each Strip being cut lengthwise into several narrower strips that are connected together at narrow points, which represent parallel universes. It is thought that since we are only able to move around in the three large, observable spatial dimensions comprising of length, breadth and height, and one of time, all other dimensions must be very small and thus invisible to us, being curled up in a multidimensional space which may be construed as representing the invisible micro-world of the quantum particles. This is in keeping with the concept of the unified field theory which Einstein had attempted to formulate by combining General Relativity and quantum theory. However, without a good understanding of gravity, this unified field equation will not come by easily. This unified field equation will of course link both the macro-world and the micro-world through gravity, which will be the common denominator for both. Once the experimental confirmation of the existence of the graviton, the hypothetical quantum of gravity, is achieved, we should be surer of obtaining a unified field equation that accounts for the whole universe, which may be supported by the existence of a single master supersymmetry. Superstring Theory now appears to pave the way towards achieving this difficult goal. It is difficult to tell but it will be very useful to know these laws. This then will really be the theory of everything. To many, including scientists, even Einstein, the laws of nature had been created by a Supreme Being, a God whom Einstein believed does not play with dice. Alternatively, can all of 5 nature be a computer simulation carried out by a very advanced race of beings? This is probably a mammoth if not impossible task. These programming experts and scientists have to sort of play God. What will be the parameters involved, the coordinate system to be utilized e. With such a simulation, we may be able to understand better how the forces of nature, e. In this manner, which can be considered a kind of reverse engineering, success with the unified field theory and the theory of everything may be achieved. We like to think that gravity affects our position and movement in space. But gravity may not be what we think it is. It may not even exist, which means that our search for gravitational waves and gravitons may be a futile exercise. The search for gravitational waves is still ongoing. The existence of gravitational waves so far is inconclusive - there is only indirect evidence of their existence. In the gravitational effect known as frame dragging, objects occupying the space near to a rotating object get swept around with it; rotating objects drag space around with them rather like a spoon in treacle syrup. In , scientists analyzing data from two Earth-orbiting satellites apparently found evidence of frame dragging - they claimed to have detected the minute frame dragging effect of our planet. There is the possibility of extracting useful energy from the rotation of our planet. There is speculation that this could serve as a power source for an advanced civilization. Is all the space occupied by us and around us really one immensely large, flexible sheet of curved space-time as is posited by the General Theory of Relativity? That is, is gravity just one flexible sheet of curved space-time or more, perhaps infinitely more? What is the force, if it exists, which causes this? Will this force be an attractive or pulling force, or, a pushing force? Can gravity

be a kind of 6 fluid, whether air, gas or liquid? We can descend, glide or fly up through the air like how a bird or an aeroplane does. We can dive into and descend in, surface in, float in, and swim in, a pool of liquid. Can gravity be electrical, electronic, quantum or nuclear? Or, is gravity none of these but something else, as Richard Feynman had speculated? If this were the case, the weak nuclear force, strong nuclear force and electromagnetism would be sufficient to account for the phenomena of both our macro-world, the universe, and the micro-world of the quantum particles. The gravitational wave and the quantum of gravity, the graviton, may be non-existent and may never be found, though evidence of their existence is still being sought after; a good reason why they are not directly found the gravitational wave is only indirectly deduced can be that they are non-existent, and, when physical experiments fail to detect them directly though it is thought that they are very weak and instruments are not sensitive enough to detect them after a long period of time we should be prepared to make a turnaround instead of continuing banging the head against the wall. There is another possibility. All space wherein both the macro- world of the universe and the micro-world of the quantum particles occupy may be a sea of invisible, yet undetected, material or fabric, much as all space is occupied by fluid such as air, liquid or gas. This is the substance where all matter in the macro- world and quantum particles in the micro-world are theoretically submerged in this submerging effect being manifested possibly as the gravitational effect evident in the universe , much as objects exist and perambulate in fluids such as air, liquid or gas. This is theoretically the most basic constituent of space such that a vacuum in space is theoretically non-existent. The ether, which has been contemplated heretofore, is apparently comparable to this material or fabric, which may be regarded as the fabric of the cosmos. This will theoretically become the link between all the forces of nature in both the macro-world and the micro-world, without which nothing can exist, similar to the case of the very basic life-giving oxygen without whose existence in the air or in liquid no animals, insects or marine life can exist. This will probably be the spark-of-life, the life-giving, the activity-causing, the mobility-causing, the motion-causing, the behavior-causing, the action-causing, agent which causes 7 activity, motion, change in all particles and matter, e. The cells which make up our bodies, the bodies of animals and the bodies of plants are apparently living ones using up oxygen to generate energy while quantum particles also generate energy. This possible agent, which we may, e. The forces in both the macro-world and the micro-world may thus be unified in this manner. However, detecting and confirming the existence of this theoretical life-giving, action-causing agent common to both the macro-world and the micro-world is likely to be a hurdle. We can now only define it abstractly as an agent which causes activity, motion, change in particles and matter including possibly consciousness. This theoretical agent may also be regarded as the controller of nature, the director which guides all activities in nature, like how the DNA regulates bodily functions and the computer software regulates computer functions. Figuring out what will constitute this important agent, e.

7: Unification of forces | symmetry magazine

The Living Force and Unifying Force are two different roles or aspects of the Force. The Living Force is the more concrete of the two - it is the Force as simply life and emotion. As a philosophy, Jedi who follow the Living Force tend to be more concerned with the concrete and the physical.

The round robin interview was printed in some versions of the paperback release. Plot The novel begins on the Yuuzhan Vong prisoner-of-war camp planet of Selvaris. Four prisoners, a Jenet named Thorsh and three Bith, memorize a complex mathematical code smuggled in by a member of the Ryn Syndicate, and they make their escape. Two of the Bith are killed by the pursuing Yuuzhan Vong forces while one of them is captured, but Thorsh escapes Selvaris thanks to the Millennium Falcon. The Bith is killed as a result. The Millennium Falcon brings Thorsh back to the Galactic Alliance where he is debriefed and recites the mathematical code to a Givin member of the Alliance. So an Alliance fleet ambushes Selvaris and rescues many prisoners, although some manage to get away. However, the Millennium Falcon, badly damaged from the battle, is forced to make an erratic jump into hyperspace that transports it to Caluula. As it turns out, the inhabitants of the Caluula system have been fending off the Vong for quite some time now, but they are able to repair the Falcon. As Zonama Sekot travels through hyperspace back to known space it was previously in the Unknown Regions , it turns out that Harrar survived his confrontation with the treacherous Nom Anor in the previous novel. As for the sacrifice that had been partially foiled thanks to the Battle of Selvaris, the Yuuzhan Vong are able to compensate with captives from other contested worlds following Selvaris. But the sacrifice is spoiled thanks to a riot caused by the Shamed Ones, who save many of the Galactic Alliance captives much to their own detriment as Shimrra has many Shamed Ones and workers executed as capital punishment. As the Yuuzhan Vong arrive at Mon Calamari and battle the opposing Galactic Alliance forces, Han and Leia Organa Solo, along with a few allies, infiltrate the Vong-captured Caluula in order to eliminate the resident yammosk there. As Kyp Durron, part of the infiltration team, is able to discern, the illness that the Yuuzhan Vong on Caluula are suffering is Alpha Red, a biological virus set to target and eliminate the Yuuzhan Vong and anything sharing their DNA with them. It had been deployed on Caluula in secret just before the planet surrendered to the invaders. With the living world offering a distraction to the Yuuzhan Vong, the Jedi and the Galactic Alliance gather up all of their forces and resources for one last showdown against the Vong. Meanwhile, Nas Choka takes a portion of his fleet to destroy Zonama Sekot using the Alpha Red-infected Slayer ship, as Shimrra revealed previously that there is indeed a biological connection between the Vong and Zonama. After Mara gives him a severe beating, Nom Anor pleads for his life, which Mara grudgingly spares so that he would be properly convicted for his crimes in the end. There, Onimi easily overpowers Jaina and renders her unconscious with a toxin from his fang. Jaina notes, as she falls unconscious, that she was able to sense Onimi through the Force. This was done after Onimi, being a Shaper at the time, discovered that there was no eighth cortex in the Shaper Qahsa. With Shimrra now dead, he plans to kill everyone and every living thing in the galaxy so that he could become a new god and fashion a new universe in his image. As they do that, the coffer launches for space, and the Millennium Falcon, piloted by Mara Jade Skywalker with an ailing Luke aboard, and Jagged Fel in his commandeered X-wing follow the coffer. In the coffer, however, Jacen confronts Onimi and then hears the voice of his late grandfather, Anakin Skywalker, telling him to "stand firm," like he did on Duro. As a result, Jacen defeats Supreme Overlord Onimi. The coffer begins to die off due its now-lost connection with Onimi, and Nom Anor tries to trick the Solos into going into a garbage chute while he escapes alive. With his Vongsense, Jacen thwarts his plan, and when Nom Anor tries one more time to evade the Solos, his hand is cut off by Leia via her lightsaber. He offers them an ultimatum; those who wish to die may kill themselves or fight to the bitter end, while those like him will live to find out what the Galactic Alliance and their allies intend to do to them. Meanwhile, Zonama Sekot manages to repel the Alpha Red-infected Vong ship from its surface and brings down all ships, Yuuzhan Vong and non-Vong alike, to the ground. It works, and the Skywalkers and Solos collapse into one big embrace, glad that they survived and that the war is over. C-3PO and R2-D2 watch this scene and lament how at times like these, they envy how humans must

feel. Choka agrees to collect all remaining Vong throughout the galaxy so that they will be deposited on Zonama Sekot and be taken away into the Unknown Regions, where they will be safe and learn to acclimate their culture to peace and also reclaim their connection to the Force. To counter those who wish to see the Yuuzhan Vong totally exterminated, such as the Bothans among others, Galactic Alliance Chief of State Cal Omas saw to it that each and every remaining sample of Alpha Red has been destroyed. Jacen, for one, plans to go on a galactic sojourn so that he could broaden his view of the Force following his battle with Onimi. Several weeks later, after nearly every remaining Yuuzhan Vong is collected, Zonama Sekot travels back into the Unknown Regions. Afterwards, they all have a feast where they discuss their vacation plans. The novel, and the series, ends with everybody laughing, not only at what Han said, but also in joy and relief that once again, the galaxy is at peace.

8: The Particle Adventure | Unsolved Mysteries | Forces and the Grand Unified Theory

The "Theory of Everything" and Grand Unified Theory are closely related to unified field theory, but differ by not requiring the basis of nature to be fields, and often by attempting to explain physical constants of nature.

I considered copying-and-pasting it here for your benefit, but now that I think about it, this is a topic that I talk about so much it really deserves a much more fundamental write-up. So this is it - the basics of my theory about the nature of the Light Side and the Dark Side, and what I believe is the central theme of the Star Wars Saga. All of it has been explicitly stated somewhere in canon. What is the Force? It surrounds us, penetrates us, and binds the galaxy together. What are the Living Force and Unifying Force? The Living Force is the more concrete of the two - it is the Force as simply life and emotion. As a philosophy, Jedi who follow the Living Force tend to be more concerned with the concrete and the physical. They believe in treating the situation that is right in front of them. The Unifying Force is more abstract. It is the fact that, through the Force, all minds are one. It is the Force as the soul of the galaxy. As a philosophy, Jedi who follow the Unifying Force are concerned with prophecy and the cultivation of virtue. They are more concerned with the "big picture" than with the details in front of them. Why did Anakin Skywalker fall to the Dark Side? Understanding the story of Anakin Skywalker, the Chosen One, is critical to understanding the nature of the Force. A superficial reading of the prequel trilogy suggests an obvious explanation: Otherwise, they might form attachments, get emotional, and fall to the Dark Side. Anakin breaks the celibacy policy, forms an attachment, gets emotional, and falls to the Dark Side. One could be forgiven for concluding that the Orthodox Jedi philosophy has been vindicated. But this superficial reading misses one tiny, itsy-bitsy, but unspeakably crucial detail: It ends above Endor, with his return to the Light. And what brought him back to the Light? His love for his son. As long as we look at the story through the eyes of the Orthodox Jedi, the climax of the Star Wars saga will forever remain a baffling and inexplicable paradox. All of which leads me to believe that Anakin did not fall to the Dark Side because of his attachments. It was the exact opposite: Anakin Skywalker fell to the Dark Side because of his detachment. Anakin did not fail the Jedi Code, the Jedi Code failed him. Keep your concentration here and now, where it belongs. But Master Yoda says I should be mindful of the future. But not at the expense of the moment. Be mindful of the Living Force, young Padawan. Yoda is a follower of the Unifying Force. He is more interested in abstract prophecy and the cultivation of virtue. Yoda is a much more "by the book" Jedi. Yoda is the Grand Master of the Jedi Order. Things are made even more clear in Attack of the Clones, when Obi-Wan discovers that the planet Kamino is not listed in the Jedi Archives. The Force is out of balance. The Orthodox Jedi View of Light and Dark This section is mostly a recap of stuff you probably already know, so feel free to skip it. The Orthodox Jedi philosophy holds that the Dark Side is born of emotion, while the Light Side is born of reason and tranquility. To the Orthodox Jedi, all emotions are suspect, because any one of them can potentially lead down the dark path of Fear, Anger, and Hatred. A Jedi must purge themselves of emotion, achieving a sense of spiritual tranquility and contentment. The Orthodox Jedi attitude toward emotion is all-or-nothing deal: You must remain aloof and detached. To be good, it is vital above all else that you not care about anything. The Orthodox Jedi philosophy is wrong. Love, joy, compassion, hope, courage - all of these things are part of the Light. The Light Side of the Unifying Force is passive. The Light Side of the Living Force is positive. The Dark Side is born from fear - and in particular despair - anger, hatred, greed, and envy. It is vicious, ruthless, and hungry. The Dark Side of the Unifying Force is aggressive. The Dark Side of the Living Force is negative. The Sith would tell you that the Dark Side is stronger. Anger is a potent weapon, a source of strength. With enough anger, you can topple an empire. The Dark Side is certainly quicker, easier, and much more destructive. But that is where its power ends. The Dark Side cannot create, only destroy. The Light Side, by contrast, is patient. The Light Side cannot fight, but it does not need to. The Light Side waits, slowly building itself up a thousand tiny advantages by healing, mending, and creating. And when the time comes for the final battle, the Light Side will always win, seemingly from out of nowhere. By the time of the Clone Wars, the Force had fallen out of balance. They had abandoned love as a form of the Light - they might have respected it in principle, but they still forbid all

expression of it in practice. And by abandoning the Living Force, the Jedi had blinded themselves to the reality of the situation. The Chosen One is supposed to be the Jedi messiah, the hero who will bring balance to the Force and destroy the Sith once and for all. As the living embodiment of the Light Side of the Force, Anakin feels love more strongly than anyone who has ever lived. In order for the Force to be brought back into balance and the Sith destroyed, the Jedi Order must be humbled and shown how it has brought the imbalance into being through its own arrogance. As Anakin grows up, his emotions are suppressed and shackled. His capacity for love is declared to be a thing of evil. He tries to ask Yoda in a really oblique way, but Yoda gives the incredibly unhelpful suggestion of simply accepting it. He was so concerned about preventing the prophecy in his visions that, ultimately, he forgot what it was that had made him care about preventing them in the first place. Yoda tells Luke that he must defeat Vader. Obi-Wan tells him to bury his feelings deep down. Luke is placed in a seemingly impossible position: And funny thing, in Return of the Jedi, he carries a green lightsaber. Made out of parts Obi-Wan had lying around. When the moment comes, Luke refuses to kill Vader, and in doing so, defeats the Emperor. The climax of Return of the Jedi is a fascinating paradox from the perspective of both the Sith and the Orthodox Jedi - the Sith see a weak and cowardly boy, writhing in agony, somehow defeat a true master of the Dark Side, and have no explanation for this. They have no explanation for this. The only way the paradox can be resolved is to realize that love is a thing of the light, and that the Unifying and Living Force together are more powerful than the Dark Side could ever hope to be.

NATURES GRAND UNIFYING FORCE DISCOVERED! pdf

9: Lawrence Kraussâ€™ Brief History of the GUT

Forces and the Grand Unified Theory. Physicists hope that a Grand Unified Theory will unify the strong, weak, and electromagnetic interactions. There have been several proposed Unified Theories, but we need data to pick which, if any, of these theories describes nature.

Pocket Particle physicists had two nightmares before the Higgs particle was discovered in Krauss Particle physicists had two nightmares before the Higgs particle was discovered in For if it did, it would likely be the last large accelerator ever built to probe the fundamental makeup of the cosmos. Each time we peel back one layer of reality, other layers beckon. So each important new development in science generally leaves us with more questions than answers. But it also usually leaves us with at least the outline of a road map to help us begin to seek answers to those questions. The successful discovery of the Higgs particle, and with it the validation of the existence of an invisible background Higgs field throughout space in the quantum world, every particle like the Higgs is associated with a field , was a profound validation of the bold scientific developments of the 20th century. The Higgs is like a toilet. It hides all the messy details we would rather not speak of. The Higgs field interacts with most elementary particles as they travel through space, producing a resistive force that slows their motion and makes them appear massive. Thus, the masses of elementary particles that we measure, and that make the world of our experience possible is something of an illusionâ€”an accident of our particular experience. As elegant as this idea might be, it is essentially an ad hoc addition to the Standard Model of physicsâ€”which explains three of the four known forces of nature, and how these forces interact with matter. It is added to the theory to do what is required to accurately model the world of our experience. But it is not required by the theory. The universe could have happily existed with massless particles and a long-range weak force which, along with the strong force, gravity, and electromagnetism, make up the four known forces. We would just not be here to ask about them. Moreover, the detailed physics of the Higgs is undetermined within the Standard Model alone. The Higgs could have been 20 times heavier, or times lighter. Why, then, does the Higgs exist at all? And why does it have the mass it does? Ultimately to understand the underlying physics behind the Higgs is to understand how we came to exist. Some hints do exist, however, coming from a combination of theory and experiment. Shortly after the fundamental structure of the Standard Model became firmly established, in , and well before the details were experimentally verified over the next decade, two different groups of physicists at Harvard, where both Sheldown Glashow and Steven Weinberg were working, noticed something interesting. Glashow, along with Howard Georgi, did what Glashow did best: They looked for patterns among the existing particles and forces and sought out new possibilities using the mathematics of group theory. The honeycombs in which they store their amber nectar are marvels of precision engineering, an array of prism-shaped cells with a perfectly hexagonal cross-section. The wax walls are made with a very precise thickness, the This accident of nature causes these two forces to appear as two separate and distinct forces at scales we can measureâ€”with the weak force being short-range and electromagnetism remaining long-range. Georgi and Glashow tried to extend this idea to include the strong force, and discovered that all of the known particles and the three non-gravitational forces could naturally fit within a single fundamental symmetry structure. They then speculated that this symmetry could spontaneously break at some ultrahigh energy scale and short distance scale far beyond the range of current experiments, leaving two separate and distinct unbroken symmetries left overâ€”resulting in separate strong and electroweak forces. Subsequently, at a lower energy and larger distance scale, the electroweak symmetry would break, separating the electroweak force into the short-range weak and the long-range electromagnetic force. While the strong interaction got weaker at smaller distance scales, the electromagnetic and weak interactions got stronger. Every time we open a new window on the universe, we are surprised. When they did the calculations, they found with the accuracy with which the interactions were then measured that such a unification looked possible, but only if the scale of unification was about 15 orders of magnitude in scale smaller than the size of the proton. This was good news if the unified theory was the one proposed by Howard Georgi and Glashowâ€”because if all the particles we observe in nature got unified this way, then new

particles called gauge bosons would exist that produce transitions between quarks which make up protons and neutrons , and electrons and neutrinos. That would mean protons could decay into other lighter particles, which we could potentially observe. If protons decayed with an average lifetime smaller than about a billion billion years, then enough protons would decay in our bodies during our childhood to produce enough radiation to kill us. Remember that in quantum mechanics, processes are probabilistic. If an average proton lives a billion billion years, and if one has a billion billion protons, then on average one will decay each year. There are a lot more than a billion billion protons in our bodies. However, with the incredibly small proposed distance scale and therefore the incredibly large mass scale associated with spontaneous symmetry breaking in Grand Unification, the new gauge bosons would get large masses. That would make the interactions they mediate be so short-range that they would be unbelievably weak on the scale of protons and neutrons today. As a result, while protons could decay, they might live, in this scenario, perhaps a million billion billion billion years before decaying. Still time to hold onto your growth stocks. With the results of Glashow and Georgi, and Georgi, Quinn, and Weinberg, the smell of grand synthesis was in the air. After the success of the electroweak theory, particle physicists were feeling ambitious and ready for further unification. How would one know if these ideas were correct, however? There was no way to build an accelerator to probe an energy scale a million billion times greater than the rest mass energy of protons. Even if it was possible, considering the earlier debacle over the Superconducting Super Collider, no government would ever foot the bill. Happily, there was another way, using the kind of probability arguments I just presented that give limits to the proton lifetime. If the new Grand Unified Theory predicted a proton lifetime of, say, a thousand billion billion billion years, then if one could put a thousand billion billion billion protons in a single detector, on average one of them would decay each year. Where could one find so many protons? So all that was required was to get a tank of water, put it in the dark, make sure there were no radioactivity backgrounds, surround it with sensitive phototubes that can detect flashes of light in the detector, and then wait for a year to see a burst of light when a proton decayed. As daunting as this may seem, at least two large experiments were commissioned and built to do just this, one deep underground next to Lake Erie in a salt mine, and one in a mine near Kamioka, Japan. The mines were necessary to screen out incoming cosmic rays that would otherwise produce a background that would swamp any proton decay signal. Grand Unification seemed so compelling that the physics community was confident a signal would soon appear and Grand Unification would mean the culmination of a decade of amazing change and discovery in particle physicsâ€”not to mention another Nobel Prize for Glashow and maybe some others. Unfortunately, nature was not so kind in this instance. No signals were seen in the first year, the second, or the third. The simplest elegant model proposed by Glashow and Georgi was soon ruled out. But once the Grand Unification bug had caught on, it was not easy to let it go. Other proposals were made for unified theories that might cause proton decay to be suppressed beyond the limits of the ongoing experiments. On that day a group of astronomers observed, in photographic plates obtained during the night, the closest exploding star a supernova seen in almost years. The star, about , light-years away, was in the Large Magellanic Cloudâ€”a small satellite galaxy of the Milky Way observable in the southern hemisphere. If our ideas about exploding stars are correct, most of the energy released should be in the form of neutrinos, despite that the visible light released is so great that supernovas are the brightest cosmic fireworks in the sky when they explode at a rate of about one explosion per years per galaxy. Rough estimates then suggested that the huge IMB Irvine- Michigan-Brookhaven and Kamiokande water detectors should see about 20 neutrino events. When the IMB and Kamiokande experimentalists went back and reviewed their data for that day, lo and behold IMB displayed eight candidate events in a second interval, and Kamiokande displayed 11 such events. In the world of neutrino physics, this was a flood of data. The field of neutrino astrophysics had suddenly reached maturity. These 19 events produced perhaps 1, papers by physicists, such as me, who realized that they provided an unprecedented window into the core of an exploding star, and a laboratory not just for astrophysics but also for the physics of neutrinos themselves. Spurred on by the realization that large proton-decay detectors might serve a dual purpose as new astrophysical neutrino detectors, several groups began to build a new generation of such dual-purpose detectors. The largest one in the world was again built in the Kamioka mine and was called Super-Kamiokande, and with good reason. This mammoth 50,ton tank of

water, surrounded by 11, phototubes, was operated in a working mine, yet the experiment was maintained with the purity of a laboratory clean room. This was absolutely necessary because in a detector of this size one had to worry not only about external cosmic rays, but also about internal radioactive contaminants in the water that could swamp any signals being searched for. Meanwhile, interest in a related astrophysical neutrino signature also reached a new high during this period. The sun produces neutrinos due to the nuclear reactions in its core that power it, and over 20 years, using a huge underground detector, physicist Ray Davis had detected solar neutrinos, but had consistently found an event rate about a factor of three below what was predicted using the best models of the sun. Super-Kamiokande has now been operating almost continuously, through various upgrades, for more than 20 years. No proton-decay signals have been seen, and no new supernovas observed. However, the precision observations of neutrinos at this huge detector, combined with complementary observations at SNO, definitely established that the solar neutrino deficit observed by Ray Davis is real, and moreover that it is not due to astrophysical effects in the sun but rather due to the properties of neutrinos. The implication was that at least one of the three known types of neutrinos is not massless. Soon after this, observations of higher-energy neutrinos that regularly bombard Earth as high-energy cosmic-ray protons hit the atmosphere and produce a downward shower of particles, including neutrinos, demonstrated that yet a second neutrino has mass. This mass is somewhat larger, but still far smaller than the mass of the electron. For these results team leaders at SNO and Kamiokande were awarded the Nobel Prize in Physicsâ€”a week before I wrote the first draft of these words. To date these tantalizing hints of new physics are not explained by current theories. The absence of proton decay, while disappointing, turned out to be not totally unexpected. Since Grand Unification was first proposed, the physics landscape had shifted slightly. More precise measurements of the actual strengths of the three non-gravitational interactionsâ€”combined with more sophisticated calculations of the change in the strength of these interactions with distanceâ€”demonstrated that if the particles of the Standard Model are the only ones existing in nature, the strength of the three forces will not unify at a single scale. In order for Grand Unification to take place, some new physics at energy scales beyond those that have been observed thus far must exist. The presence of new particles would not only change the energy scale at which the three known interactions might unify, it would also tend to drive up the Grand Unification scale and thus suppress the rate of proton decayâ€”leading to predicted lifetimes in excess of a million billion billion billion years. Part of the inner tracker barrel of the CERN supercollider, where physicists continue the search for physical evidence that might lead to a Grand Unified Theory of physics. This fundamental symmetry is different from any previous known symmetry, in that it connects the two different types of particles in nature, fermions particles with half-integer spins and bosons particles with integer spins. The upshot of this is that if this symmetry exists in nature, then for every known particle in the Standard Model at least one corresponding new elementary particle must exist. For every known boson there must exist a new fermion. For every known fermion there must exist a new boson. What could be so attractive about a symmetry that suddenly doubles all the particles in nature without any evidence of any of the new particles? In large part the seduction lay in the very fact of Grand Unification. Because if a Grand Unified theory exists at a mass scale of 15 to 16 orders of magnitude higher energy than the rest mass of the proton, this is also about 13 orders of magnitude higher than the scale of electroweak symmetry breaking. The big question is why and how such a huge difference in scales can exist for the fundamental laws of nature. In particular, if the Standard Model Higgs is the true last remnant of the Standard Model, then the question arises, Why is the energy scale of Higgs symmetry breaking 13 orders of magnitude smaller than the scale of symmetry breaking associated with whatever new field must be introduced to break the GUT symmetry into its separate component forces? Following three years of LHC runs, there are no signs of supersymmetry whatsoever.

NATURES GRAND UNIFYING FORCE DISCOVERED! pdf

The science of learning disabilities A guide to research in music education Questions of identity: the / Gustave Le Bon, the man and his works Wild creatures of Africa Revisiting the WARN Act: Coverage, compliance, and enforcement The War Lord (Casca, No. 3) Lifes Little Book of Wisdom For Family The New Taxonomy of Educational Objectives Lucy Maud Montgomery: A Writers Life (Snapshots: Images of People and Places in History) Recurrent pregnancy loss MATLAB 5 for engineers There Must Be 50 Ways to Tell Your Mother (Lesbian Gay Studies) 12th public exam time table 2018 The Rules of Tyconius: Number 1 (Texts and Studies: Contributions to Biblical and Patristic L) South African sugar art Trees of Utah and the intermountain West Level of processing theory The story of god How to Take Twenty Pounds Off Your Man Language on a leash 11. The Death of Sarah 228 Katie Kit at the beach. Journeys of transformation Roderic Lacey Staying off the diet rollercoaster Door opening alarm project Options made easy your guide to profitable trading Les Relations Entre L Orient Et L Occident Au Moyen Age Tudes (Collected Studies Ser, No. 69) Blood and Honor/Inside the Scarfo Mob-The Mafias Most Violent Family Tower design and analysis Biswajit Basu Teri Kings Astrological Horoscopes for 1995 Network control and engineering for QoS, security and mobility, IV Oliver and Albert, friends forever 77 Chapter 31: On Sparrow Hills 4:33 Heavenly Weekends: Travel Without A Car Augustine, Christian theologian. 20 million careless capitalists Jessicas Lucky Millions #105 The thrones, chairs, stools, and footstools from the tomb of Tutankhamun Turning tears into nothing Miles Richardson