While I have been a writer for *FATE* Magazine for over three decades, I have to admit that some of the most interesting theories have come to life for me in that publication… and I did not write them! This month, along with my tutorial on Apparitions, Orbs and Photography, *FATE*'s own Phyllis Galde has offered up a one-on-one interview with famed theoretical physicist, Michio Kaku that covers the basics of string theory and a brief explanation on the debate of whether there are ten, eleven or thirteen parallel universes. While I can't reprint the story verbatim, after all *FATE* can only exist if you BUY it, I would like to share the essence of what Kaku said and what he shared with me earlier this week.

Michio Kaku is a professor of Theoretical Physics at the City of New York's Graduate Center, yes the same City University that I once taught for, although albeit at a much lower academic level; the City University system is comprised of a dozen colleges, with the Graduate Center at the pinnacle of the University's academic structure and Professor Kaku is literally at the top of the top, so to speak. His list of books and white papers are noteworthy, but his latest, *Physics of the Impossible - A Scientific Exploration into the World of Phasers, Force Fields, Teleportation* and *Time Travel* is a stellar example of his ability to write on very complex theories to a non-science oriented audience.

In the interview Phyllis asked Kaku how he was introduced to theoretical physics and the idea of multiple dimensions beyond the three we live in. He explained that as a child he would go to the Japanese Tea Garden in San Francisco and would sit by the fish pond, where he thought about life as one of the fish. A fish lives in a world of forward, backward and left or right, but the concept of up would be lost to them. If there was a scientific minded fish in the shallow pond, he would naturally reject the concept of up, if you can't do it, it is not there. But what if a child were to pick up that fish and lift him from the water for a moment; what would he see? He would see a world without fins to move living things, breathing without water, and "up"; a whole new world. Once back in the pond, he would relate his experiences of a universe far beyond his comprehension. He would become the aquatic version of the theoretical physicist in his pond!

Of course, when Kaku entered the real world of physics, he quickly learned that his peers would brand any scientist a crackpot, if he suggested a world beyond the known dimensions' up/down, left/right, forward and backward. While we all live in a three dimensional world, we also have a fourth dimension, which is time. Einstein broke the ice on that fourth dimension, and today the "crackpots" hold some of the most noteworthy seats in the most prestigious colleges in the world and embrace what was once unthinkable, multiple other dimensions that we do not see, but exist around us. This is a brave new world and Professor Kaku is at the forefront.

While most Ghost Hunters are only baffled by String Theory, or what is sometimes called the Standard Model, with its 36 Quarks, eight Gluons and three W Bosons, not to mention the electrons, neutrons and protons, the fact is that according to Kaku, this most elegant theory, is also, “the ugliest,” in several ways.

Confused? Join the group! Here is something that may help:

A quark is an elementary particle and a fundamental constituent of matter. Quarks combine to form composite particles called hadrons, the best-known of which are protons and neutrons. They are the only particles in the Standard Model to experience the strong interaction in addition to the three other fundamental interactions, also known as fundamental forces. Due to a phenomenon known as color confinement, quarks are never in isolation; they can only be found within hadrons. For this reason, much of what is known about quarks has been drawn from observations of the hadrons themselves. Got that? Well now things get a little more complex.

Gluons are elementary expressions of quark interaction, and are indirectly involved with the binding of protons and neutrons together in atomic nuclei. In technical terms, they are vector gauge bosons that mediate strong color charge interactions of quarks in quantum chromo dynamics (QCD). Unlike the electric charge neutral photon of quantum electrodynamics (QED), gluons themselves carry color charge and therefore participate in the strong interaction in addition to mediating it. The gluon has the ability to do this as it carries the color charge and so interacts with itself, making QCD significantly harder to analyze. If you get that, the rest is “simple.”

The gluon is a vector boson; like the photon, it has a spin of 1. While massive spin-1 particles have three polarization states, massless gauge bosons like the gluon have only two polarization states because gauge invariance requires the polarization to be transverse. In quantum field theory, unbroken gauge invariance requires that gauge bosons have zero mass.

The W and Z bosons are the elementary particles that mediate the weak force. Their discovery has been heralded as a major success for the Standard Model of particle physics. The W particle is named after the weak nuclear force. The Z particle was semi-humorously given its name because it was said to be the last particle to need discovery. Another explanation is that the Z particle derives its name from having zero electric charge. Two kinds of W bosons exist with +1 and −1 elementary units of electric charge; the W^+ is the antiparticle of the W^-. The Z boson (or Z) is electrically neutral and is its own antiparticle. All three particles are very short-lived, literally microns of a second.

Bosons are heavyweights among the elementary particles, almost 100 times as massive as the proton—heavier than entire atoms of iron. The masses of these bosons are significant because they act as force carriers; their masses thus limit the range of the weak interaction. The electromagnetic force, by contrast, has an infinite range because its force carrier is massless. The W boson can change the generation of the particle, for example changing a strange quark to an up quark. If you really understand this, you are in a league with a very small group of physical scientists, who think in terms of the very abstract and virtually unseen.

Not much help right? Well that is because you are not a theoretical physicist Unfortunately (or maybe fortunately) there are only a handful of folks who truly grasp the significance of all of this, but the end result is that Michio Kaku can. Kaku now says that at the turn of the last century, Victorian England was filled with folks who, like ourselves we unable to grasp the physics, but did stumble onto the theory of multiple universes. Like the fish in the pond, they looked at their world like a society on a tabletop, with higher beings looking down on us, and like the fish in Kaku's childhood visits to the tea garden; some began to theorize what would happen when those looking down on that tabletop decided to interact with our world. The greater question is, "What would we think of them?"

Some would be able to walk through walls, appear or disappear at will, etc. Sound familiar? The Victorians considered that ghosts were the inhabitants of this other dimension, even the Church got involved suggesting that maybe, just maybe, this is where God lives! Then they expanded on the theory, saying that the new dimension was too small a space for God, but that he could exist in the infinity of hyper-space. Obviously, that is a bit flawed, after all, if we can't say what these dimensions are, we can't possibly say how large they can be, or what may or may not dwell in them. Theologically speaking, God could exist in the fourth dimension, which is time; after all, he (or she) is GOD!

With the advancements of modern theoretical physics, the string theory is being reexamined, using the Hadron Collider and looking at Dark Matter. The collider is soon to open, after delays due to structural failure during testing. In September, 2008, the operations were halted due to a serious fault between two superconducting bending magnets. Due to the time required to repair the resulting damage and to add additional safety features, the LHC is now scheduled to be operational again this September.

The Large Hadron Collider (LHC) is the world's largest and highest-energy particle accelerator, intended to collide opposing particle beams. The Large Hadron Collider was built by the European Organization for Nuclear Research (CERN) with the intention of testing various predictions of high-energy physics, including the existence of the hypothesized Higgs boson and of the large family of new particles predicted by super symmetry. It lies in a tunnel 27 kilometers (17 mi) in circumference, as much as 175 meters (570 ft) beneath the Franco-Swiss border near Geneva, Switzerland. It is funded by and built in collaboration with over 10,000 scientists and engineers from over 100 countries as well as hundreds of universities and laboratories.

It is anticipated that the collider will demonstrate the existence of the elusive Higgs boson, the last unobserved particle among those predicted by the Standard Model. Experimentally verifying the existence of the Higgs boson would shed light on the mechanism of electroweak symmetry breaking, through which the particles of the Standard Model are thought to acquire their mass. In addition to the Higgs boson, new particles predicted by possible extensions of the Standard Model might be produced at the LHC. More generally, physicists hope that the LHC will enhance their ability to answer key questions about the nature of string theory and extra dimensional universes.

OK, that wasn't much help either, right? Don't worry, that is right out of the textbook that could be entitled, *Theoretical Physics for Dummies*, and I still don't totally grasp it! The good professor was a little more help. He actually laughed when I suggested he was the Carl Sagan for the next generation, so he does have a sense of humor.

On a topic a little closer to home (ours that is) the question of psychic ability and how these parallel world might be explained. Kaku notes that he is physicist, but does note that clairvoyance does exist. He reminds us that Nobel winner Richard Feynman experimented with OOBE using a depravation chamber and reported that he did indeed leave his body. There is something ironic there; when OOBE was studied at Duke more than thirty years ago, the original efforts were the brunt of jokes, but when a Nobel Lauriat gives it a spin, the world nods it collective head in agreement that this is true science!

Kaku also notes that there is a case at Brown University where a paralyzed man had an implant into his brain and can now move the cursor of his computer, send e-mail and do cross-word puzzles telepathically. "Look ma, no hands!" Likewise, in Japan colleagues have experimented with reading the MRI of a subject and tell what picture he is looking at by his brain impulses. No great surprise to the parapsychologist there, either!

Kaku concludes that if there are other civilizations in the universe, they would not be traveling like Captain Kirk, but rather it is rational that they would simply put out probes (most likely unseen) and populate from there… what we call today a virus! Frankly, humanity would be too dim witted to see it for what it is. Sagan asked that question, "Are we bright enough to see other civilizations all around us," and the answer is probably "no!" We constantly close our eyes to the obvious. Time travel for example is physically possible, we only lack a method of generating enough power, equal to the energy we see in a black hole, but does not mean that at some time in our future, it will be possible, even common.

So what would we do when we encounter time travelers? Kaku leaves that question to us. Are we so sure they are not already here? He notes that "cloaking" or making someone or something invisible to the eye is not just plausible, but ready to test. If invisibility is at our doorstep and time travel possible, who knows what we are dealing with every time we see a ghost or hear an unseen being? Is that what the UFO phenomenon is all about?

Kaku and his fellow theorists believe that in time, all will be revealed, but it will be necessary to have all those case studies at hand that we are working on each day to recognize what is real. Kaku notes that Paranormal Investigators were the brunt of jokes a generation ago, but not so among the theorists today. We are watching the universal back door, which is probably where we are most likely to encounter all of these scenarios; we just have to be alert enough to see them!

It all requires an open mind. Leaving the door open to what might otherwise be considered impossible and a lot of hard work.. This is the world of theoretical physics and for many of us, the world of paranormal investigating!