Quantum Physics 106

If you are trying now to think about all of these fantastic theories and hypotheses, I am certain some interesting questions are emerging; such as if we are but one of many worlds floating on a brane or sea of branes, many of which we may even exist in as copies of ourselves, then why can't we see them? Or how about if we are a Holographic image of a higher dimensional reality why is that reality beyond our reach? Are we just a reflection of our greater selves?

Let us supply a little logic.

If we *could* perceive every universe we exist in, we would most likely go crazy. Think about it. I have a hard enough time dealing with my everyday schedule in this world, so I can't imagine juggling around my schedule in a hundred worlds. Clearly, my brain could never handle the information overload (I barely keep up now!) and most of the folks I know would melt down as well. However, I do believe *psychics* and *mediums* may possibly perceive aspects of these parallel worlds.

Dimensions may be the key to paranormal phenomena. For M-Theory and parallel universes to exist, we *must* accept the presence of at least 11 dimensions if not the full Monty of 26. If, for example, we just buy into the Holographic Theory, a higher dimensional reality above our own is required. In order to attempt to comprehend higher dimensions, we must first understand the four dimensional time-space we live in. Let us examine these dimensions we know and love.

Visualize a line on a piece of paper. This is the best example of one dimension. It has length, but no height or width. Now, visualize the piece of paper the line is on. It has height and width, but no depth. It is an example of two dimensions. Now fold the piece of paper into a cube. Now you have an example of three dimensions, with height, width, and depth. By counting the time it takes you to fold the paper into a cube, you have added the fourth dimension, a dimension that some refer to as time, the time we live in and by.

There is a raging battle over whether the fourth dimension is time or a fourth actual spatial dimension. Some call the fourth spatial dimension the fifth dimension, allotting the fourth to time. This can get pretty confusing. A fourth spatial dimension may look similar to a hypercube, or a cube within a cube. It is difficult to fully understand a hypercube, but we can grasp aspects of it. Look it up online and find an animation. By rotating the image of a hypercube you will get a feel for the fourth spatial dimension. It is also possible that we don't need to see the fourth spatial dimension. Our branes..er brains (sorry, my Freudian slip is showing) are designed to comprehend objects in three dimensions, plus time, so we have never developed the ability to see beyond, although as I indicated earlier, I believe psychics and mediums may see into this realm. I also believe that as a species, we may yet mutate into the ability to perceive these higher dimensions. Today, however, we have imagination. Imagination is our only tool to perceive higher dimensions.

It also helps to have a personal computer.

An example of this attempt at perception is the Calabi-Yau manifold. It reminds me of something I saw in a MAD magazine years ago. Or a Koosh ball.
Look it up on the net and you will see what I mean. Find an animation of the manifold for a very special mind-numbing experience. And those of you who forgot the 1960's? Prepare yourself for a flashback.
A Calabi-Yau manifold is an imaginary depiction of six unseen dimensions of string theory. Originally these dimensions were believed to be curly-cues, tiny and undetectable in size. There is some thought today, however, that these dimensions may be not only very large, but near infinite in size. Another theory holds that we may just be living in a 3 dimensional plus Time subspace of a grander universe. This is known as Braneworld theory.

No, not Wayne's World theory!

The Randall-Sundrum braneworld model, named after the scientists who created it, states that the visible universe is a membrane embedded within a larger universe, like a strand of seaweed floating in the ocean. Unlike the universe described by General Relativity, which has three dimensions of space and one of time, the braneworld universe contains an extra fourth dimension of space for a total of five dimensions. The interesting thing about the braneworld theory is that it predicts the existence of tiny black holes scattered all throughout the universe, supposedly left over from the Big Bang. Thousands of them should exist in our solar system alone. General Relativity, in contrast, predicts that such primordial black holes evaporated long ago.
Many researchers have predicted that braneworld black holes are about the size of an atomic nucleus but have masses similar to that of a tiny asteroid. The best part of this theory is that it is testable! The mini-black holes should warp the fabric of space-time differently from other types of black holes, such as stellar-mass or the supermassive variety, primarily due to their close association with the fifth dimension. Radiation, in the form of gamma-rays, should be distorted differently when they blast past braneworld black holes compared to conventional black holes. The Gamma-ray Large Space Telescope (GLAST) which was launched in 2007 should be sensitive enough to detect the gamma ray distortions. Want to know what it found? I'm not telling you, but you can find out by going to:

http://fermi.gsfc.nasa.gov/ssc/

download some analysis software supplied free, and head for the data. Let's call it homework…anyway, back to the ranch.

The notion of four dimensions of course was fathered by Albert Einstein. In 1919, the concept of a fifth dimension was put forward by Theodor Kaluza. One of Theodor's peers, Oskar Klein, determined that the fifth dimension was so small that it would be impossible to observe. He envisioned it as a bubble within a more solid construct. Now we have String and M-Theory that proposes 11 or 26 dimensions. Michio Kaku believes (according to his book *Hyperspace*) that if we were to be flung out into hyperspace, we would see a collection of spheres, blobs and polyhedra which would appear, constantly

change shape and color, and then mysteriously disappear. He further suggests that higher dimensional beings would have god-like powers in our three dimensional plus time eyes. He further states they could move through walls, see through solid objects, and appear and disappear in a moment.

Is this starting to sound a lot like paranormal phenomena?

I have talked a lot about Lisa Randall and some of her crazy ideas. She believes that gravity has the potential to leak between dimensions, resulting in our perception of gravity in our own realm as being weak in comparison to the other three forces. If this is true, (and I believe it is) and gravity can leak from one membrane, through the higher dimensions that contain many branes in space, only to spew into an adjacent brane to cause Newton to suffer a mild fruit concussion, can other forms of energy do this as well? Lisa and her colleague Raman Sundrum believe other universes exist in an extra spatial dimension that can only interact with ours via gravity. Many of my physicist friends think this is utter hogwash. While I once shared their opinion, I am not so sure. While I may differ from Lisa in the mechanics of the concept Aspects of it are becoming more sound as we learn more about the universe in which we live.

Time

Time opens up a whole plethora of bags of worms we will have to come to grips with. So much so, that it will be a recurring theme throughout the rest of this work. But for now, let’s just say that Einstein’s special theory of relativity demonstrates that time behaves in similar ways to our three dimensions of space. Length shrinks as speed increases, time expands as speed increases. Since we can measure time on a graph it has become our fourth dimension. Time is a whole realm itself. Or many realms, depending on who you believe.