

## Quantum Physics 101 - 5

### Holographic Theory

Dutch Physicist Gerard t Hooft and the co-inventor of String Theory, Leonard Susskind proposed the Holographic Principle in 1993. This theory states that all of the fundamental information (physics) in one part of the universe can be equivalent to some information (physics) defined on the boundary of that part of the universe. For instance, all of the information in your PC could be depicted as its shadow cast on the desk.

M-Theory tells us we are living in a four dimensional brane floating in a fifth dimensional space-time. That higher dimension could be the real reality of the holographic image we perceive as our own brane existence. So what does that mean? We do not really exist? Are we all Ghosts?

Hardly...

The Holographic Theory has gotten a lot of support due to recent discoveries in the field of Black Holes. Maximum entropy or information content, of any region in space is defined by its surface area rather than its volume. The Holographic Bound is how much information can be contained in a specified region of space. Additionally, Black Hole Thermodynamics are allowing physicists to calculate the absolute limits of the holographic bound.

A Black Hole may be the result of a crashing of one the universes servers. The surpassing of entropy beyond the holographic bound, creating a sheer overload of information in one region of space can exceed the ability to be contained in the surface area.

So Black Holes are caused by too many people logging on?

Michael Talbot writes in his book, *The Holographic Universe*, "there is evidence to suggest that our world and everything in it from snowflakes, to maple trees, to falling stars and spinning electrons are also only ghostly images, projections from a level of reality so beyond our own it is literally beyond both space and time".

Ah...the paranormal fog seems to be lifting a bit.

Time will tell if the universe actually is just a tiny reflection of a greater masterpiece. But if it is, then everything is a ghost. The question would then be, where am I really?

Information theory

What if the universe is just a very large mega-computer? Remember the Hitchhikers Guide to the Galaxy? Grab your towel and DO NOT PANIC! This theory, developed about 40 years ago to maximize the amount of information that can be transmitted over information pathways, proposes that physical reality is simply pure information. In this view, reality is not the quantum, but the bit. In the book, *The Bit and the Pendulum, from Quantum Physics to M-Theory, The New Physics of Information*, Tom Siegrfried describes John A. Wheeler as the most distinguished evangelist for Information Theory. Wheeler coined the catchy term IT from Bit, referring to his belief that every physical quantity derives its ultimate significance from bits, binary yes or no indications. In other words, IT states that everything has its foundation in an immaterial source of Bit Soup, and the posing of yes-no conditions result in a response to suggest that the universe is participatory. In 1998, Wheeler said that the universe was similar to a computer, and based on yes-no logic, it was not unreasonable to imagine that information sits at the core of physics just as it resides in the core of a computer.

I will look at my computer in a much different way now.

My question is, what is the universe computing, and are we a part of the output? The fascinating book *Programming the Universe, A Quantum Computer Scientist Takes on the Cosmos*, author and MIT professor Seth Lloyd proposes that the universe is computing itself. And furthermore, as soon as the universe began, it started computing. The first patterns, he states, were simple, particles and basic laws of physics. But as time passed, the computations became more and more complex, such as intricate and complex patterns of stars and galaxies.

We all know of course that the answer is 42.

He further justifies his theory by offering it as the answer to how complex systems such as living creatures can arise from fundamentally simple physical laws. He further argues that the need for divine intervention or GOD is not required for IT. This of course appeals to the purely scientific crowd eager to remove any resemblance of Intelligent Design from the final theory of everything. Much like the movie, *The Matrix*, IT places Humanity in the middle of a system that is controlled by the supercomputer, programmed from seeds of complexity based on laws of quantum and particle physics.

I am reminded of something Einstein once said. The more I understand about the universe, the more I see the hand of God, or something like that. But what if God were a supercomputer?

Before you burn me at the stake, let me just say that if the universe really is one big computer, processing reality as a whole, it does offer an explanation for the evolution of systems. Each time it processes, it has access to more information from which to build upon, so the outcome is continually evolving, always

expanding. However, it seems that modern man appeared somewhat out of nowhere as a separate species from Neanderthals. Explanation?

I prefer to believe in the hand of GOD.

The scary thing is, the IT theory fits in rather well with all of the other quantum theories, but I refuse to believe I am a hologram.

The offshoot of this theoretical thinking, however, will reveal the development of super computers, or Quantum Computers, complete with high levels of artificial intelligence. This is already in development.

I am gradually working up toward the payoff with all of this, Zero Point Energy, but before we cross the threshold of normal into paranormal, we need to spend a little time exploring dimensions.