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This may be from the dvd on string theory by green?

Much has been learned about the universe in spite of the fact that we do not have a GUT. However, some parts of the universe will never be understood without understanding how gravity, EM, and QM are related; that is, without a "GUT"

In 1916, German astronomer Carl Swarchfield proposed what we now call black holes. He postulated these would arise in cases where the mass was so concentrated that gravity was strong enough to prevent even light from escaping.

Today, satellite telescopes are discovering regions with enormous gravitational pull. Most scientists believe these regions are under the influence of black holes.

So, what equations do you use for something that is both very massive (gravity usually rules) and very tiny (QM usually rules) Here is a case where physical reality provides us with something we have no equations to describe.

20th century physicists have now joined in a search to find a way to mathematically describe both the very large (massive) and very small.

The primary contender is "String" theory, or "Super String" theory, which asserts that all phenomena are made up of very tiny strings of energy, which vibrate in varying ways.

Problems: the strings, if they exist, would be so small there would be little chance of ever seeing them.
So how do you test this theory?

(this is a lot like just creating another type of "atom", or smallest particle.)

Einstein's theory says that space can stretch or warp, but it cannot tear, so a "worm hole " cannot be created.

At the level of the quantum, the fabric of space is chaotic, so it might rip.
But that might be catastrophic.
This is where strings come in. they have a "calming" effect; they make rips in space possible
(this is getting on pretty thin nice)

modeling of atom went from protons & neutrons in nucleus & electrons orbiting, to a nucleus made of quarks of various flavors.

The next iteration in particle physics was "String Theory"

By the mid 1990's, 5 different string theories evolved, involving 10 dimensions.

Edward Witten regarded as standing head & shoulders above other physicists in mastery of mathematics; considered a successor to Einstein.

At a world conference on string theory in 1995, Witten presented his work, which showed the 5 different versions of string theory were merely different perspectives on the same thing; his theory was called “M” theory, and requires 11 dimensions. Some string theory advocated.

speculate the simple strings can now be membranes (Branes) that can be “as big as the universe”
and that our perceivable universe could be merely one “slice” of a “bulk” of parallel universes

The weakness of gravity confounded scientists for decades. String theory suggests gravity is not really weak, but “seeps” off of our universe like the sound of billiard balls seeps off the billiard ball table.

In early string theory, the strings were all closed loops. Later string theory has all the forces except gravity be un-looped strands hooked to out universe, while gravity is closed loop form which can freely escape into parallel universes. These closed loop strings are called gravitons.

It is also speculated by some that the “big bang” was due to the collision of two “membranes” (slices of toast)

It is noted that if you can’t test it in the lab, it’s not science, but philosophy.

Fermi lab has a four mile circuit atom smasher: looking for evidence of a graviton escaping our universe membrane

CERN is working on a much larger one.

String theory predicts supersymmetry: every proton electron graviton associated with “accompanying “sparticle”

String theory is predicted by mathematics

Our picture of the universe has been revised several times to reveal new complexities

Scientists agree: string theory could be wrong

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