Why String Theory is Very Real and Not What You Thought It Was

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Jeffrey,

The interesting thing about string theory is how beautifully it captures the dangers of overgeneralization combined with unverifiable guesses.

Strings and their string-like vibrations are entirely real and constitute a huge subset of particle physics data dating back decades. The strings are a stretchy combination of the strong force and electric forces, their ends orbit more-or-less in circles around each other, and their lowest-energy states are about 10^{-15} meters long. They stay stretched out due to the mutually orbiting quarks attached to their ends, which makes them a lot like quantized bolas. The strong force makes them string-like because its pull stays constant with increasing distance, as opposed to fading like the electric force.

A nice argument can be made for the interiors of protons and neutrons having four Euclidean dimensions rather than three, but I haven't had time to search the literature for that one yet.

Unless that book was better than most on the history of string theory, you're probably wondering what heck I'm talking about, yes?

Well... strings. They're just another way of describing how the strong force holds the quarks of protons and neutrons and many other particles together. Using something called Regge trajectories, they're also a great way to organize the excited states of baryons and mesons in collider data.

What that book you mentioned is talking about is an entirely hypothetical concept that was originally called superstrings. There's been so much sloppy abbreviating of "superstrings" to "strings" that the original real strings have been mostly forgotten.

Superstrings were an extrapolation of the mathematics describing only the vibration component of real strings. The extrapolation was enormous, going all the way down to an equally hypothetical and unverifiable Planck foam scale 20 orders of magnitude smaller than real strings.

Using some terminology I just developed here, the folks who made this astonishing leap were big O mystics, meaning that because space and space curvature at that scale were considered freebies, they saw no need to keep anything but the pretty string vibration

math. Any consideration of the need for new forces and new counterweights were discarded.

Thus to this day, superstrings use strings made out of nothing with end masses made out of nothing. All that leaves is a set of classical vibration equations -- classical, not quantum, since the assumed strings are infinitely sharply defined -- plopped down into a mystical space with infinite computational capacity.

Removing all of the annoying force and particle constraints of real strings made it possible to postulate just about anything. That's why string theory has so many different forms of the vacuum that it's hard to even write the number down. When you remove all constraints, you get, well... everything.

Thus no matter how accommodating supersymmetry is, superstring theory is, if anything, even more liberating. Somewhat bizarrely, people have even turned this extreme deficit into a funding tool by proposing the need for more money to search such a magically large space of spaces for the one vacuum that matches our reality. Sort of. Maybe.

There's nothing abstract about the careers that were lost to string theory. I've met some of the folks who had to leave physics because there was nothing they could do anymore with this nonsense.

Yarn theory hurts people, no matter how exciting and interesting it sounds on a PBS special.