

The Ultimate Secrets of the Universe

Fundamentals Series

6: Unifying Quantum Theory and Relativity.

The apparent incompatibility between relativity and quantum theory is a major unsolved problem of modern physics. The fundamental reason for the apparent incompatibility is that both theories assume that events take place within *pre-existing spacetimes* that are incompatible. Quantum theory assumes a pre-existing fixed flat spacetime, and relativity a pre-existing spacetime that is dynamically affected by the presence of mass-energy.

The key to unifying relativity and quantum theory is to understand *there is no pre-existing spacetime*. The actual dimensional structure of the observable universe is the UEN described in the previous video on *Computing a Quantum Universe*. The UEN isn't a pre-existing structure but is *emergent* from the dimensional and other relationships created by particle interactions in aggregate which are *simultaneously relativistic and quantum*.

The UEN isn't a dimensional spacetime in the usual sense, but instead is the totality of implicit dimensional and other relationships among all particles resulting from their computational interaction history. It takes the general form of a relativistic spacetime at cosmological scales, a Newtonian spacetime at human scales, and innumerable *dimensional fragments* at the particle scale.

Dimensional fragments are the coherent particle processes resulting from conservation events with exact dimensional relationships among their constituent particles but each is dimensionally indeterminant with respect to all others and the aggregate UEN since each is computed by a separate instance of the elemental program with its own unique random conflation pattern. The UEN is the universal information background with respect to which all computations are made. And each computation modifies the information in it.

So particle interactions aren't computed with respect to a pre-existing dimensional spacetime but instead in a *virtual computational space* in the same sense as the dimensionality of virtual realities is computed in computer memory, and only appears dimensional to human observers in a VR headset. What is actually computed are *individual dimensional relationships among particles and thus particulate objects*. Our human minds and science then make sense of these relationships by arranging them all within a *mental graph* in our mind's simulation of reality it then reifies and pretends is a pre-existing 4 dimensional spacetime.

So as particle interactions are computed in accord with quantum equations, their dimensional relationships are scaled by the presence of mass-energy. This scaling is there but too small to be captured in the quantum equations and is only measurable at larger aggregate scales. In this manner dimensional relationships in aggregate result in an emergent spacetime that is simultaneously quantum at the particle scale and relativistic at the cosmological scale.

This insight that dimensional spacetime is not a pre-existing structure, but instead is emergent from the dimensional relationships created by particle interactions in aggregate is the key to unifying relativity and quantum theory because it removes the primary source of their apparent incompatibility and results in dimensional relationships being computed in a manner consistent with both relativity and quantum theory.

This is how the computational universe computes an observable universe that is both relativistic and quantum in a manner that unifies these two previously incompatible theories. I have high confidence in this model and if it's even partially correct its implications are enormously profound. Of course it now needs a firm mathematical foundation. Please see my Complete Theory of Everything for more details at <https://EdgarLOwen.info>

YouTube Fundamentals series:

1. Everything is Information
2. The Computational Universe
3. Computing a Relativistic Universe
4. Computing General Relativity
5. Computing a Quantum Universe
6. Unifying Quantum theory & Relativity
7. Time Travel & Space Travel

See also:

The Complete Theory of
Everything at EdgarLOwen.info