

Discrete Matter and Action as Fundamental

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What Is “Fundamental”? Do all things necessarily emerge from a few fundamental things?

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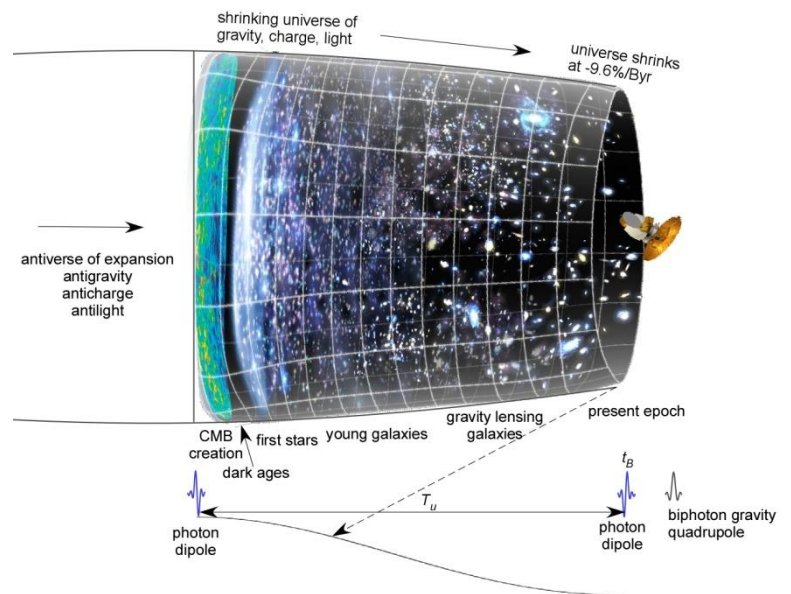
Abstract

Although continuous space and time seem to be fundamental to our universe along with matter and action, there does seem to be a way for space and time to emerge from the fundamental action of matter. Such an approach does, however, seem to turn the universe inside out since quantum decoherence now drives the emergence of space and time.

Discrete Action of Discrete Aether

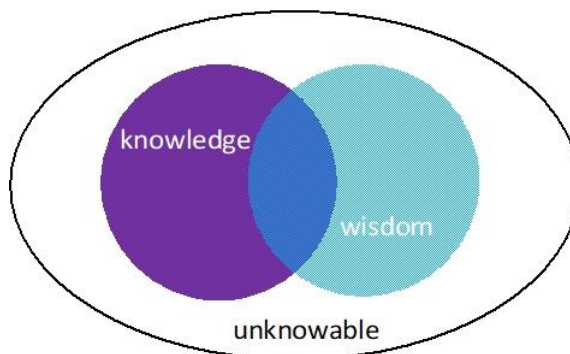
Discrete matter and action are both fundamental and are the two dimensions from which all other dimensions of the shrinking universe then emerge. Although typical source observers use the continuous time and space of an expanding universe to keep track of source actions, enlightened source observers keep track of sources instead with the discrete action of discrete aether. Both time and space

then emerge as collections of source actions of a shrinking universe and the term aether refers to the actual fundamental particle of all matter and light. This discrete aether is what actually makes up the universe, not really space and time. For example, atomic clock actions define time with discrete action and observers then simply believe that an infinitely divisible time has meaning in between the actions of a collection. Thus it is the belief that continuous time exists outside of the discrete actions of discrete atomic action that then define time and observers who believe in continuous time then interpolate between those discrete events to infer a continuous time.



It is the collection of discrete wavelengths of light that define space from the discrete actions of that light. Observers have to first of all simply believe in the existences of both matter and action and most observers then further believe in the infinitely divisible space between discrete events to keep track of matter sources even though it is from discrete events that the notions of continuous space and time emerge. Ultimately then it is the discrete diameters of atomic charge radii and their spin periods that actually define discrete space and time displacements by the discrete wavelengths of light.

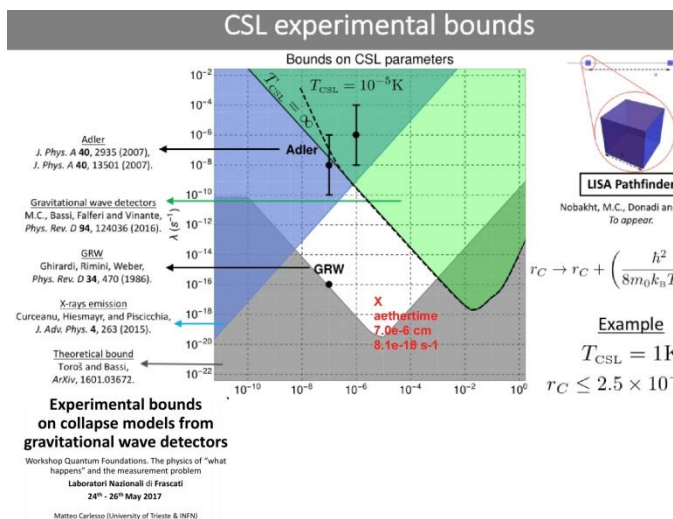
Although knowledge about the way the world works is necessary for wisdom, there are things about the way the world works that are not knowable and yet are still a part of wisdom. People cannot know anything more about matter and action other than to believe that they are the way that they are. In other words, people cannot know why matter and action are the way that they are, people can only believe that they are the way that they are. Likewise people cannot know why the universe is the way that it is, why they are right here, why they are right here right now, or why it is them and not someone else who are right here right now.



The universe is made up of discrete particles and collections of discrete actions and observers infer continuous space and time from those discrete actions. The universe does not exist first of all as continuous flow of time and a mostly empty continuous space filled with just a small amount of matter on determinate paths. Rather the universe exists first of all as a collection discrete aether with a small amount of aether condensed at the CMB creation into the matter and light of sources we now observe. The universe is then a pulse of discrete aether and action as shown above and it is from the action of decoherence that emerges one of the two dimensions of a continuous time.

Although action normally integrates energy over continuous time and space for an unbound source, quantum action is inherent in the matter-scaled Planck constant without regard to continuous space and time. The matter-scaled Planck constant integrates the energy of a timeless aether photon and it is from the decay of that aether photon that time and space emerge from the discrete action of aether. Therefore all constants of the universe emerge from just the two simple ones of aether particle mass, m_{ae} , and the matter-scaled Planck constant, $h_{ae} = h/c^2$. The velocity of an electron spin, c/α , is constant, and it is from that radius and spin period that both space and time emerge as c and α that both actually vary slowly in cosmic time.

It is a fundamental aether decoherence that drives both charge and gravity forces in the shrinking universe. Thus this notion is subject to measurement and falsification although the decoherence rate of $8.1e-18$ s⁻¹ is still beyond current precision as the plot shows. As measurement precision increases more and more, science will eventually measure the fundamental decay and shrinkage that the figure shows...or science will show that it is some other decay or that decay does



not exist at all. The fundamental decay time and distance of aether appear to center within the current experimental bounds of continuous spontaneous localization, CSL, as the figure shows. The difference between CSL and aether decay is that aether decay and distance are constants derived from the fundamental properties of a shrinking universe and not some arbitrary CSL parameters (see ref.).

It is the collections of discrete actions of discrete matter that define sources in an observer's universe and so space and time merely emerge from the collections of discrete action of matter from electron spin. Source matter oscillates with the action of exchange just as discrete source action oscillates and decays by exchange of discrete matter. The oscillations of matter and action mean that there are corresponding amplitudes and phases for the matter exchanges of matter actions. There is a further phase relationship between the oscillations of matter and action that then defines a quantum uncertainty principle in the traditional manner except with action and matter instead of displacement and momentum. This means that there is a limit to the precision of measuring both matter and action and so the conjugate variables of matter and action conform to the notions of quantum field theory.

While quantum field theory couples matter sources to each other with an infinity of vacuum oscillators, quantum aether action couples the same matter sources together with a very large but finite number of aether action oscillators. Thus the spacetime quantum fields that couple sources to each other in an expanding universe emerge from the simpler notions of the discrete aether exchange of a shrinking universe.

General relativity unites continuous space and time into gravity action that results in determinate and infinitely divisible spacetime geodesics with no inherent uncertainty. As a result, quantum uncertainty and oscillation and phase have no meaning for the determinate geodesic paths of relativity. However, the oscillations of matter action represent gravity as a series of discrete events for a very weak gravity force.

General relativity therefore unites discrete matter and action into quantum gravity action that also results in determinate geodesic paths but now it is discrete matter and action along those determinate paths that makes them discrete. The emergence of continuous space and time from a sequence of discrete matter actions means that sources do follow determinate geodesics. However, within those paths the uncertainty of discrete matter and action necessarily limits knowledge of mass and action along those otherwise determinate geodesics. Thus while a source path follows the determinate geodesic of general relativity, there are still inherent uncertainties about the matter and action along that now discrete geodesic path.

Each atom of matter at the CMB creation entangles with its emitted photon and we see today these two coupled photons that make up the biphoton resonance of quantum gravity exchange. The photons of the ancient light created not only matter, but also the biphoton quantum gravity from the determinate geodesic paths of the cosmic microwave background.

In summary, for matter and action to be the fundamental things from which all else emerges, the universe must be made up of a very large but finite number of particles of matter called aether. Instead of aether existing in continuous space and time, though, continuous space and time both emerge from the discrete actions of discrete aether. Since both gravity and charge derive from the decoherence of quantum aether, they become in effect scaled versions of each other and the discrete action of aether provides a fundamental framework for a rational universe.

References

<https://arxiv.org/abs/1606.04581>

Experimental bounds on collapse models from gravitational wave detectors

M. Carlesso, A. Bassi, P. Falferi, A. Vinante

Here are a series of blogs with more descriptive words for the nontechnical.

<http://mattertimemeaning.blogspot.com/2017/02/quantavangelism.html>

<http://mattertimemeaning.blogspot.com/2017/01/quantum-phase-noise-versus-classical.html>

<http://mattertimemeaning.blogspot.com/2016/06/why-quantum.html>

<http://mattertimemeaning.blogspot.com/2016/05/quantum-gravity.html>

Here are a series of technical papers only for those who understand the math.

https://www.academia.edu/7706507/Universal_Quantum_Action_with_Discrete_Quantum_Aether

https://www.academia.edu/7706668/GALAXY_ROTATION_WITHOUT_DARK_MATTER_IN_THE_MATTER-TIME_UNIVERSE

https://www.academia.edu/7708163/Decay_of_the_International_Prototype_Kilogram

https://www.academia.edu/9084109/Variation_of_the_Fine_Structure_Constant_over_Time_in_the_Matter_Time_Universe