

# Quantum Phase Compactification via Spacetime Expansion

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Non-relativistic string theory was introduced by d'Alembert, in 1747, with the first appearance of the wave equation and the d'Alembertian operator, which eventually became the foundations of "relativistic" field theories; for example, the theories of electromagnetism, special relativity, and quantum mechanics.

The description of any entity inside the real universe can only be with reference to other things in the universe. Space is then relational, and the universe, self-referential. For example, if an object/event has a momentum, that momentum can only be explained with respect to another object/event within the universe. Space then becomes an aspect of the relationships between things in reality.

If the universe is a causally closed system, the "information" or entangled quantum states cannot leak out of the closed system. So the "event" density of entangled quantum states, continually increases, as the entropy must always increase. While to us, it is interpreted as entropy or lost information, it is actually recombined information, to the universe.

The present moment is created and recreated constantly – analogous to continually opposing/juxtaposing reflective mirror images... originating deep in quantum phase space. The Heisenberg uncertainty relation provides both a resolution boundary and the invariant relational fabric for a translation between quantum[Planck scale] space and experiential reality. It is the quantum T-dual compactification that provides the Heisenberg resolution boundaries for experiential[perceptual] reality. Unstable or chaotic states at a given level are always "compactified" (stabilized and bounded by eigenstates) into 6 higher dimensions condensing to the next level of "event density".

Since relativity explains that there is no preferred frame of reference, the ether becomes superfluous; consequently, the metric of space-time must be defined by related events, such that there is no space-time if there are no events. Time is thus a sequence of events,

with each "event", having its own measure of location, and its own measure of time, with reference to other events. Space becomes an event density–probability distribution.

The organic analogues of quantum attractors are translated via quantized fractal modes onto the classical domain via compactification, while events on the classically canonical domain, of three spatial dimensions plus time, influence the collapse/condensation of these attractors on the quantum–level via feedback excitation modes.

T–Duality is a symmetry that obscures the ability to differentiate between large and small distance scales; resulting from the compactification of the extra space dimensions in a ten dimensional superstring/brane theory. For example, in ten spacetime dimensions, with nine space and one time, take one of those nine space dimensions and make it a circle of radius  $R$ , so that traveling in that direction for a distance  $L=2*\pi*R$  goes around the circle and returns back to the starting point. A particle traveling around this circle will have a quantized momentum around the circle, which will contribute to the total energy of the particle. But a string is very different, because in addition to traveling around the circle, the string can wrap around the circle. The number of times the string winds around the circle is called the winding number, and it is also quantized.

The momentum modes and the winding modes can be interchanged when the radius,  $R$ , of a circle is also exchanged with the quantity  $L_{st}^2/R$ , where  $L_{st}$  is the string length. If  $R$  is very much smaller than the string length, then the quantity  $L_{st}^2/R$  is going to be very large. Consequently, exchanging momentum and winding modes of the string, exchanges a large distance scale of radius  $R$  with a small distance scale of radius  $1/R$ .

Theoretical physicist Richard Feynman derived the "sum over histories" interpretation of quantum mechanics, where a system does not have a single history, but it has every possible history, and each history has its own probability amplitude. A probability distribution of histories. For example, an electron travels from point A to point B by every possible route at once. Each possible route or "path" corresponds to a history.

The amplitude for each history defines the probability of that particular path being followed. The number involves the "action" associated with the history–path, which seems to determine that the path taken, will be the history closest to the "classical" trajectory, in accordance with the natural law: conservation of energy.

Stephen Hawking explains that when we apply the Feynman sum over histories to particles moving in a background of spacetime, we must also include histories[waveforms] in which the particle travels backwards in time. This generates the space–time/event–density fractal

resonance.

The increase in mass of a body moving at relativistic speeds can also be interpreted as a type of rotational perspective effect, and when time is explained as a dimension, "ct", by combining one of the c's with time to convert it to a length,  $E = m_0 c^2$  becomes  $m_0 c$ , a momentum, specifically, a momentum of an object's motion down its time axis.

A being's conscious awareness is what is really moving along its world– line, which is the fourth dimensional extension of its 3 dimensional self.

$m_0 c$  is a momentum along its time axis.

If we stopped moving through time the rest energy of objects would be zero?

Interesting...

$$(mc^2)^2 = (m_0 c^2)^2 + m^2 v^2 c^2$$

becomes

$$(mc^2)^2 - m^2 v^2 c^2 = (m_0 c^2)^2$$

An equation of the form:

$$c^2 t^2 - dx^2 = K$$

A quantum field unites gravity and electromagnetism.

Gravity becomes a refractive/compression effect, as light cones are rotated near a massive object:

Topological metric spaces are defined as being diffeomorphism invariant. Intersecting cotangent bundles[manifolds] are the set of all possible configurations of a system, i.e. they describe the phase space of the system. Waves are ripples in a basic medium. Einstein explains that the ether is unnecessary as a medium, so the ripples are vibrations of space itself which are actually the overlapping of event densities/conic sections. As the ripples overlap/intersect with each other, it becomes a domino effect with the ripples continually increasing in density. Very similar to taking a penny and doubling it as a sequence.

$$2, 4, 8, 16, 32, 64, 128, 256, \dots 2^n$$

Since the ripples are increasing in density they are defined by density gradients. A compression force corresponding to the Shannon entropy of the system.

Resonating standing waves/waveforms. The past collapses/condenses/compactifies in 6 dimensions to the present moment, while the future is an expanding uncertainty, in four space–time dimensions.