The Time Train

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Abstract

Whereas massless forms of energy (such as light) have intrinsic motion within their entropic conservation domain (space), massive forms of energy (such as ourselves) have no intrinsic motion within our entropic conservation domain (history). Rather, we experience an eternal "now", which is only tangentially connected to history. In our case, it is the time dimension itself which moves, carrying us with it, like passengers on a train. This arrangement allows the "passengers" to achieve an intrinsic motion in history which is the metric equivalent of light's intrinsic motion in space, a velocity which would otherwise be impossible for them (excepting only in the black hole, where a moving spatial dimension also carries massive objects at "velocity c").

Introduction

Our relationship to the time dimension is apparently very much like that of a passenger on an ordinary train. The train and the time dimension move and we as passengers just sit quietly and go along for the ride. As massive objects/observers, we can't move at the metric equivalent of velocity c, but the time dimension can. Just as the ordinary train carries us from point to point in space, the time dimension carries us from day to day in time. We move or age only because the train moves from place to place or time to time, but the effect on us, the end result, is to accomplish the actual displacement of our physical beings in either space or time. While entropy requires the intrinsic motion of time, causality requires the one-way direction of time's intrinsic motion. We age because we are carried in the historic dimension by the "time train", the moving time dimension, even though we ourselves experience only an "eternal now", as we sit quietly watching the hours slip by, just as on the ordinary train we move in space even though we remain in our seats quietly watching the scenery slip by. We can actually get to our destination slightly faster in either case by running up the length of the train. However, in the case of the time train, we get there sooner because our individual motion in running up the aisle causes our personal clock to run slow; nor does it matter in which direction we run. (See: "The Paradox of the Traveling Twin".)

Historic Spacetime

Matter ages because of the motion of the time dimension, but the energy content of matter is typically not diluted by aging, especially in the case of elementary particles, as it is in the case of light, where

light's energy is diluted but light does not age. This is because it is the time dimension itself which moves and expands into history, not matter. Time moves and interacts with space, becoming historic spacetime, the conservation domain of information and matter's "causal matrix". Matter itself cannot enter the historic domain, but remains forever in the "eternal now", the "Universal Present Moment" of bound energy. Matter remains the stationary passenger on the moving "time train"; it is the time train and not the passenger which interacts with space, becoming historic spacetime. (See: "A Spacetime Map of the Universe.")

The Aging of Matter

Biological aging is genetically controlled and is a necessary part of the evolutionary process which requires death. It is also an entropic artifact of large and complex systems (such as biological organisms). Atoms themselves do not age (the rest mass energy and charge of elementary particles is invariant through time), although they may be modified by fusion, fission, powerful gravitational fields, or actually destroyed by matter-antimatter annihilation reactions or "proton decay".

At the level of elementary particles, charge conservation prevents decay except in whole quantum charge units. The quantization of charge is the final deterrent to the "aging" of matter in the temporal realm. The decay, aging, or entropic disintegration of a large, complex body can take place by degrees and small, incremental steps, but for an elementary particle, decay is an all-or-nothing transformation. Proton decay can proceed, for example, only if the proton's spin, color, electric, and "number" charges can all be simultaneously neutralized, cancelled, or annihilated. While such an event is not impossible, it is extremely unlikely except in unusually favorable environmental circumstances - such as the interior of a black hole, the energy-dense metric of the early micro-moments of the "Big Bang", or via the mediation of a (very massive) weak force "X" IVB. (See: "The Half-Life of Proton Decay and the 'Heat Death' of the Universe".)

Entropy and Dimensionality

Whereas light participates fully (because of light's intrinsic motion as gauged by "velocity c") in the expansion and cooling of its conservation domain (space), matter does not participate in the expansion and dilution of historic spacetime. Only information, matter's "causal matrix", expands and is diluted in the ever-divaricating web of causal history. There is no separation and hardly any distinction between free energy (light), its entropy drive (the intrinsic motion of light as gauged by "velocity c"), and its conservation domain (space). But bound energy (matter) is separate and distinct from its entropy drive (the intrinsic motion of time) and its conservation domain (historic spacetime - the information archive of matter's "causal matrix"). This separation protects the energy content of matter (and the quantized charges of matter) from the vitiating influence of matter's own entropy drive, but in sentient beings like ourselves, this separation becomes the cause of an "existential angst" and fear of death. On the positive side, we are all immortal in history, and this separation does allow us some personal freedom with respect to our "karmic" fate: we can often change (or at least moderate) our "destiny", or the consequences of our actions, through an act of free will. If matter, like light, were part and parcel of its conservation domain, our actions would be completely controlled by the universe in a sort of "cosmic destiny"; we would have no personal freedom of action. (See: "Is There Life After Death?")

It is not just the fact that the time dimension is one-dimensional rather than 3-dimensional that protects matter's energy content (and charges) from the entropic enervation of time; it is rather the fact that matter does not participate at all in time's intrinsic motion and expansion in space, but rather sits quietly on the "time train", watching the hours slip by. In this regard, recall Einstein's result that when we do begin to tamper with time and move at high speed very close to "velocity c", then the energy

content of matter does in fact begin to change - increasing toward infinity as velocity c is approached and our "clock" slows down. (See: "The Higgs Boson vs the Spacetime Metric".) The message here is clear: let the train do the work. The time train has a mighty engine in gravity, which transforms the expansive, spatial entropy drive of light and free energy (the intrinsic motion of light) to the expansive, historical entropy drive of matter and bound energy (the intrinsic motion of time). (See: "Entropy, Gravitation, and Thermodynamics".)

Charge Conservation

The tangential position of matter's "present moment" with respect to the expanding historical domain of "bulk" spacetime, is required to prevent the inflation or attrition of elementary particle mass or charge (and the symmetry/energy debts those charges/masses represent), by the temporal entropy drive of matter. The preservation of the full value of symmetry/energy debts through history and regardless of the expansion of the Cosmos provides a conservation rationale for both the quantization of elementary particle charge/mass and the tangential position of matter with respect to matter's conservation domain - the causal information matrix of historical spacetime. (Note in this regard that light, which does fully participate in the expansion of its conservation domain, carries no charges of any kind.)

The Weakness of Gravity

The tangential contact between matter and historic spacetime (the fleeting "present moment") is also the reason for the weakness of gravity: gravity need supply matter with only enough temporal entropy to maintain or service this tiny tangential point of contact (see: "The Conversion of Space to Time"). This notion accords with the observation of P. A. M. Dirac that the ratio of the strength of the electromagnetic force to the gravitational force is the same as the ratio of the radius of the Cosmos to the radius of an electron - the electron's radius representing in this case the physical size of the "tangential" point of contact between matter and historic spacetime. (As to the actual physical size of this contact point between the temporal and spatial dimensions, I am inclined to believe that it corresponds to the size of a black hole containing the mass of a given particle or body. In the case of planet Earth, this is about the size of a ping-pong ball. See: "The Half-Life of Proton Decay and the 'Heat Death' of the Cosmos".)

It is interesting to note that in the case of the black hole, matter also is carried to velocity c, in this case by a moving spatial dimension rather than the moving time dimension. This is a large hint that gravity is following a symmetry-conserving agenda as required by "Noether's Theorem" (since "velocity c" is the fundamental "non-local" symmetric energy state of light), which in fact we see fulfilled by the complete gravitational conversion of mass to light via Hawking's "quantum radiance" of black holes. (See: "Currents of Symmetry and Entropy".)

Special Relativity

Of course, Special Relativity also tells us that matter cannot move with the metric equivalent of "velocity c", and that therefore the time dimension must move instead, while matter remains stationary and rides the "time train". There are multiple reasons for matter's isolation in the "universal present moment", illustrating the seamless interweaving of all natural law, and raising again Einstein's question: did God have any choice in the creation of the laws of the Universe? At least from the point of view of the "Anthropic Principle" (natural law must allow biology, evolution, and human existence), the answer seems to be "no".

Links

Gravitation

Entropy