johnreed take 1.2

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Today the mathematical descriptions of the universe on the blackboard and in the published papers, are abstract and devoid of any conceptual connection to physical reality. The American physicist, Steven Weinberg, wrote, "... it is always hard to realize that these numbers and equations we play with at our desks have something to do with the real world." With the phrase, "...something to do with the real world", Weinberg reveals that the mathematician has an unformed idea as to what his abstractions represent conceptually. Consider the words of the late Hungarian mathematician and physicist, Eugene P. Wigner, "...the enormous usefulness of mathematics in the natural sciences is something bordering on the mysterious... there is no rational explanation for it." It is in the contemplation of the mathematics and the operation of the stable systems in the universe, that I found the rational explanation for it. Galileo may have been the first to formally assert that, "...the laws of nature are written in the language of mathematics." Today we may elaborate. Stability in the field requires economy in cyclic motion. The invariant aspects of the stable systems within the physical universe, toward which we necessarily direct our investigative efforts, derive from least action functions*. It is illuminating to note that the action stable systems must follow to maintain perpetuity in the field, is precisely an action that mathematics represents well. The mathematics fits the stable universe because mathematics easily represents the economic properties of stable systems. Consider the continuing words from Eugene Wigner, "... it is just this uncanny usefulness of mathematical concepts that raises the question of the uniqueness of our physical theories."

The uniqueness of our physical theories is defined by the properties they retain after reduction to their most basic state. In this form they are consistent with, or reduced to, the orders of form attendant to an instant or complete cycle of stable system action, be it as in the inverse square property of an economic sphere, the circumference line segment ratio to its radially enclosed area in the Euclidean circle, or the planet's trajectoral time interval ratio, and its swept out area of the orbital conic.

Wigner approaches the idea that we can experimentally isolate a quantity with a local numerical magnitude and if that quantity operates within least action parameters, without influence, or effect, it can be proportionally applied to other stable systems, by virtue of the invariant, economic, time−area, or frequency−wavelength aspects, common to each stable system. In fact, mathematical models of stable physical systems are conceptual creations of the observers. The laws that result from mathematical abstractions derive from a physical system's potential for stability and not from its experimentally isolated operational quantities. This is not to say that there are no underlying reasons for the order we observe in the universe, beyond a principle of least action. Rather, it is to say that our classical laws are derived solely from the principle of least action and beyond this we know nothing.

Aside from the kinematic quantities common to stable systems, our operational quantities are limited by our sense perceptions. The quantity of mass is clouded by our sense of weight and force. Mass is not acted on by the Earth attractor** and operates within the least action environment without influence or effect***. Therefore the proportionality of the quantity mass, can be universally extended beyond its local value to obtain a superficial fit with the non−local observed system. Devising an operationally effective mathematical scheme based on the quantitative notion of mass, OR high energy particle collision data and principles of symmetry, does not raise the operational quantities to the level of a physical reality.

The fact that we can alter the energy of a proton into transient energy states we call bosons and fermions causes us to conclude that a physical proton object is composed of physical quark objects, whereas, this does not reasonably follow. The quarks have a physical justification that is dependent on the trails of transitory atomic fragments created by high energy collisions in the laboratory. I introduce the question here. Of what significance is an unstable energy state? Murray Gell−Mann put the theory together from the particle data available, but he did not believe that it truly mirrored, real world quantities. Consider Steven Weinberg's words again "... it is always hard to realize …"

Before the publication of The Physics Preview for the 21st Century, the "... something to do with the real world" aspect of the mathematics, had not been clearly articulated. As a result we assume a too literal interpretation for the operational quantities within our theoretical constructs, and the mathematicians and physicists are taught, and accept the physical reality of the theories they learn. What this means for the rest of humanity is: as long as the physicist has something that works as a mathematical model for a physical system's action, humanity is stuck with the operational quantities used within that model. We are given these quantities as real, and we are told that they are fundamental aspects of the universe. The most recent additions are the logical result of an unquestioned, never

verified, one hundred year old seminal assumption***** Colored quarks have no real existence in the universe, yet, today the academic humanist must reason from a theoretical reality, composed of colored quarks, joined together with gluons, within a time dilating, curved space universe. Why? Because mathematics has something to do with the real world.

* A simple example of an economic or least action function, in terms of its form, is a Euclidean circle. The circumference is the shortest line length to contain the greatest area. ** The Earth attractor is the phenomena that we presently assume and call gravity, our feel force. *** The Earth attractor does not act on mass during free fall acceleration, during orbit, or in escape velocity from the Earth. **** See Takes 2, 3 and 4 for discussions on mass. ***** The assumption was that the electron manifests as a particle inside the atom.

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