PicoPhysics Concepts
Speculation and Abstraction

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I. Introduction

This is a second in series of discussion papers on PicoPhysics concepts. The core logic of PicoPhysics will be discussed after basic concepts incorporated into unary law are addressed.

In the first discussion paper the emphasis was on concept of observation. The observation steps were named. Different conceptualizations on observer were presented. The role played by intuition in observation steps especially in recording of observation was presented. In the discussion to follow, we will present the important role Speculation and Abstraction plays in observation and build-up of observer's Intuition.

Next, we will discuss the PicoPhysics thought process to integrate and relate observations into unary law. Beginning with formulation of Unary Law & unification process, we attempt to understand some open topics in contemporary physics.

II. Discussion

1. Speculation

In five senses of vision, odour, taste, touch and hearing we have very potent tools of observations. These are un-encumbered senses with exclusive reigns. Absence of encumberance from senses such as Echolocation & Tetrachromacy for vision, makes the humans intuitively conclusive and deterministic.

The respective sensory organs communicate with short term memory of the brain. It is in the brain where first integration with human's knowledge takes place. This integration results is subject selection and identification (See my last communication on "Concept Observer"). While the senses provide brain with multifaceted raw experience of nature, the integration with contemporary human knowledge and current human disposition results in object identification and subject selection.

The Cross-fertilization of experience with nature and existing knowledge is important part of object identification. The cross-fertilization with silent brain builds context to identified objects as well.

It also results in possible differing perception of same experience by different people and even same person in different state of mind. Thus object identification takes place in short term memory of human brain. This identification also filters (attenuation and re-enforcement) the information contents from sensory organs for long term memory. These results in integration of experience (information received from sensory organs) with long term human memory.

The context describes the speculation part of object identification stage (about past and future state of the identified object).

The speculation part of object identification is clearly experienced in our daily life. When watching a cricket match, those supporting the batting side, look towards the boundary when a batsman swings his bat. Those supporting fielding side, look towards wicket for possible miss (Subject to many other factors). This indicates all of us speculate as we observe about past and future to understand and identify present object identity.

The co-overt process of object identification by humans is brought into light in scientific observations. However, the speculation aspect of object identification is missed. It satisfies the human urge to be conclusive and deterministic in observations.

Examples of co-overt object identification processes abound in astronomy. We collect all of information from various instruments together and then analyse it to identify patterns that is suggestive of a particular phenomenon of interest. Those patterns are amplified to identify observation objects. This process is akin to the process in human brain and includes reality as well as speculation aspects.

2. Abstraction

Speculation is abstraction in small measure. Speculation is applied to reality of an identified object. The result of speculation is limited to subject object. Abstraction in it-self is removal of the object and understanding the behaviour or patterns.

Application of Abstraction on object movements by early humans resulted in development of numbers and science of arithmetic's. The development of calendar by caveman by watching moon is an example of leverage abstraction has provided to us. By recognition of patterns marked on the stone by caveman, it was possible for him to predict no-moon day for extra night time precautions for survival. Development of counting symbols – numerals and arithmetic operations of addition, subs traction, multiplication and division collectively seeded the science of Arithmetic's.

In contemporary physics we find a powerful abstraction on reality in Schrödinger's equation. Science has developed advanced concepts like conservation, superimposition, and invariance by using abstractions. These concepts are developed by studying different objects and indicate behaviour patterns common to all objects. Laws of physics by very nature of universal applicability are abstractions of reality. They are independent of the object.

Speculation and abstractions are very potent tools used by humans. They distinguish humans as superior over other creatures. These are used in science as well to regimentise and further develop knowledge about nature.

3. In-conclusiveness of observed reality

The basic processes of observation include Cross-fertilization and integration with existing knowledge base. By nature, object identification is first and important part of any observation. Speculation is part of object identification. The element of speculation can only be reduced if the field of observation is increased to all aspects of nature. For this to happen, our knowledge base needs to encompass most of the processes of nature. It is then; science will become a complete logic.

Till such a state of perfect the knowledge base is achieved, speculation constitutes part of observed reality. By executing abstraction over observed reality, the scope of natural processes is increased, reducing the speculation content in observed identity.

Pico-physics begins with attempt to handle all encompassing reality, present all interactions, into Unary law. By enlarging scope of applicability to all of universe, it is expected that missing element in knowledge base is reduced. In PicoPhysics the contribution of speculative and abstraction element is attempted to be reduced to minimum possible by using large contemporary knowledge base.

When speculation is introduced as a possible hypothesis, and we set out to verify the hypothesis, it is very feasible that object selection, identification and observation of reality include the speculative element. Thus what we speculate in theory can be later-on verified experimentally.

The verification brings out the part truth in the hypothesis itself. The hypothesis it self being based on reality has an element of truth. This truth is re-enforced by hypothesis in speculative process within process of observation.

4. Formulation of Unary Law

Before 1975 the thought process in PicoPhysics was fragmented around Conservation & Energy, Inertia & Activity (Since dropped after formulation of Unary law), Formation of Matter, Inertia & Activity, and Properties of nucleus & extra-nuclear regions of material particles. The integration by Kambhar concept was weak.

By 1980 Unary law was fully established in PicoPhysics. Many universal laws of science were considered to be candidate as Unary Law. These laws included; Laws on Invariance, Superposition & Conservation, Entropy, Uncertainty Principle & Schrödinger's equation. One of the problems these universal laws was they were too abstract. It was very difficult to orient a thought processes that could integrate the laws in other application areas with them. While for Law of Entropy it was only partly true, it could provided us a common platform for change, while first law of thermodynamics answers creation in negative. The problem with a dispensation based on laws of thermodynamics will still be absence of direct relationship to human observations, abstractness and dependence on concepts other than contained in the law itself.

Instead, the attention shifted to determine the highest common factor in human observations. It was felt that all observations are result of set of elementary interactions between objects (geometrically confined and isolated matter). Matter was already considered as another form of energy thanks to famous equation $E = MC^2$. We have already discounted the inter-convertibility between energy and mass. Thus Energy that is geometrically confined is present in all observations. The next stage was elaboration of geometrical confinement as contained in space.

The above thought process gave us the statement 'Space contains Energy'. It was universally applicable, close to human perception and intuitively conclusive & deterministic. It was very attractive candidate to become Unary law statement.

But to be termed a law, the statement has to be more than just being a fact or truth. The energy is already identified with conservation. It's presence in the statement can be attributed to the concept of conservation.

The concept of conservation in contemporary physics is weakened by neutralization. If matter is considered as form of energy, negative energy will hypothesize negative matter. Contemporary physics already has electron and positron as particle /antiparticle pair. But none of them has energy in negative. It was seen that the energy in Unary law may not share neutralization of contemporary conservation concept. So a modified concept Konservation evolve out of conservation. The Konservation concept imbibes confidence of PicoPhysics to explain nature with Unary law. This concept drives itself more from first law of thermodynamics - energy can never be created or destroyed. To improve the concept further, the development of science of arithmetic's along with set theory was analysed. It gave more substantial (conclusive and deterministic) properties to Energy. The newly defined Energy with this conceptual leaning was termed Knergy and incorporated into Unary Law.

Space was harder to understand. It needs to be raised to a level where it can occupy significant position in Unary law. The first break came when we realized that intuitively we consider the Space to be more conserved than even energy. Energy can change forms and to an observer (capable to observing certain forms of energy only), it can prove to be not conserved. Space has no such luxury; it can not hide itself from observer. It exists. Further thoughts made us understand the space-conservation was secondary conservation – due to objects used to link different elements of Space were all composed of Knergy – Konserved substance. With this realization, Space was conceptualized with Anti-Konservation. It can be created and destroyed. Quantifying creation and consumption of Space and setting up the mathematical formulation shall be included with the concepts embedded into Unary law or intuitively derived from it.

Thus in Unary law Space represents a reality that is Anti-Konserved, while Knergy is Konserved.

Initially, 'Knergy exists' was considered as corollary to Unary law. This will confirm to human intuition that everything we observe exists in the space. We can go silent on the word 'Space' and 'contain' replacing them with Exists. "Exist" being conclusive, deterministic and assertive is better acceptable to human psychology. "Knergy Exists" is still considered corollary to Unary law in PicoPhysics.

However, this corollary misses the word 'Space'. It is important for statement of Unary law to be able to include Anti-Konservation. This highlights Knergy characteristics as Konserved reality. It also provides a direct and conclusive relationship to human observations. It makes Unary law less abstract, bringing it closer to reality.

Next difficult contemporary concept to understand was Time. In a way it was much more difficult than Space and Knergy. This concept is integrated into human physic. It is very difficult to have a thought processes devoid of time. Intuition and speculation was used to integrate time with concept of Space and Knergy. The word 'Contain' in Unary law is indicative of this processes as well as geometric containment. Thus word 'containment' in Unary law represents geometric confinement, dynamics that confine Knergy in Space as well as time.

Initially, Unary law was formulated to understand interaction between Knergy in different confinement states. It has been realized after immigrating to Canada (1996), that Unary law describes the Unary interaction. The Unary interaction is interaction between Space and energy. All other interactions can be described in terms of interaction between Space and Knergy.

In latest understanding; Unary law 'Space Contains Knergy' describes the Unary interaction between Space and Knergy.

The above statement summarises the position of Unary law in Picophysics to-date.

5. Unary Law Vs Universal laws

In contemporary physics we have multiple laws of universe. The prominent among them are those who changed human intuition. These are Newton's law of motion and Einstein's Relativity. Laws of thermodynamics and Schrödinger's equation have universal appeal as well.

The concept of inertia when enunciated as universal law in Newton's laws of motion was at variance with human intuition that without an external motive force (power), all objects would come to rest and that moving objects only continue to move so long as there is a power inducing them to do so. This intutive thinking is still valid and basis to judge the physical development of human body in competitive sports.

Newton observed astrological objects. In the process he explored the Inertia concept. He found it applicable to astronomical objects. The application to objects on earth was not

that straight forward as human intuition guides otherwise. He speculated and applied to all objects to arrive at universal inertial concepts.

Newton opted to formulate laws of motion, to directly state how it conflicts with the currently held belief and intution.

When taken with explaination that motive force (power) is required to balance force of resistance (drag) of the medium (air) the newton's inertia wins. Now-a-days Inertia is part of human intution.

Due to size of observed objects relative to size of earth, a preferrential farme of reference got embedded in human intution. This inflenced laws of motion, conclusions about relative motion and on addition of velocity. Addition was an abstract concept from mathematics. It included symbolic represntation of quantity by a number, and droping physical nature of object. Thus the concept of addition only part represented nature. Its application to all objects and situation was extrapolated in human intution. Lorentz experiments were in part result of this human intution of applicability of abstract concept of mathemetics to measurements on motion.

The important part of Einstein's relativity was invariance principle. This invariance concept evolved from human experience of traveling long distance in ships that move with little or no acceleration. So your experience (essentially mass, weight, human physical power etc) is invariant with respect to speed of ship (though change in speed matters while it is changing). The experience is extended to the laws of physics that result in human experience. So invariance of physical laws is established through human experience. The laws of physics are invariant with respect to observer. The observer is the human traveling on the ship.

Einstein in a way extended this human intuition to all laws of physics and replaced observer with frame of reference (to apply to result of Michelson's Interference Experiment). In a way, Einstein was the first to bring forward the missing element in science of mathematics – the nature in the form of object.

The fact remains that Einstein relativity was the first theory that enunciated motion as law of nature, rather than relative state of object with respect to observer in Newtonian mechanics. It used invariance principle (Galileo) to explain intricate behaviour of nature. It made law of invariance universally applicable, not just to motion.

Though it took some time, but now Einstein's relativity is part of Human intuition. The enunciation of relativity laws in terms of Lorentz Invariance was a choice made. Now Invariance law is a part of human intuition. When a cause and effect relationship is analysed, it is checked against the principle of invariance.

In PicoPhysics we adopt Newton's approach in formulating text for laws of nature.

Laws of thermodynamics have universal applicability. They find there origin in human perception about heat and temperature. The generalization in terms of enthalpy and entropy makes them universally applicable. In a way, current direction in astrophysics about expanding universe can be related to laws of thermodynamics. One can find influence of laws of thermodynamics (law of entropy) in Picophysics on conservation aspects of photon's energy. (Isolated photon either looses energy with time, or at best keeps its energy – result of affinity characteristics of occupied space).

Generalized Laws of thermodynamics are not directly comprehended as human experience. They imbibe some unique aspects of nature. They are abstract representation of nature to human brain.

Schrödinger's equation is one of the most important law in contemporary physics. It has many missing links to nature. Similar to Einstein relativity making motion as law of nature is generally hidden from human psych. Schrödinger's equation has many more such hidden trails. Knergy is present in the equation as the wave function describing its distribution over the Space co-ordinates. Overall it can be said to be a representation of Unary law in advanced mathematical representation. However, it is abstraction in the extreme. It is very difficult to comprehend. In our dispensation we will refer to this law when we reach a stage to be able to interpret it.

6. PicoPhysics - Unification Process

To a Pico-physicist, laws of contemporary physics with universal applicability are facts of nature to be understood and integrated into Unary law. He uses Intuition, Speculation, Abstraction and Concept observers as tools to understand contemporary physics. He uses concepts such as Observer, Knergy & Konservation, Space & Anti-Konservation, Time and dynamic universe as derived from Unary law to link laws of contemporary physics into Unary law. In general, most basic facts are first established in Pico-physics from Unary law. The basic facts in Pico-physics include 3-D space, heterogeneity of space, granularity of Knergy, speed of light as translation between length and time, Refraction of light (result of non-homogenous space) being the Unary interaction. These are then used along with Intuition, Speculation, Abstraction and Concept observers to explain and integrate the laws of contemporary physics into a single law – called Unary law of Pico-physics (Space contains Knergy).

Some recent example of approach of PicoPhysics in understanding the facts of nature are;

a. Accelerating Universe
b. Neutrino - Faster Than Light
c. Higgs Bosons

7. Understanding Accelerating Universe

In PicoPhysics Konservation (Can not be created nor destroyed) plays an important role. Knergy is invariant with respect to all variables, including observer, state of Space or object in which it is confined. This Konservation is reflected in Conservation of Contemporary Energy. Contemporary Energy reflects the rate of consumption of Space by Knergy. It's measure is subject to basic reflexes (response) of space.

In PicoPhysics energy is not conserved. Pico-Physics believes that when a body falls through a gravitational potential, the energy of the system increases. Similarly as photons travel through Space its energy decreases. Both these affects are observed. But in these observations, cross-correlation and integration with knowledge about conservation of energy (in absence of these changes) results in contemporary understanding.

Gravitational potential energy and expanding universe is postulated to describe the facts of observation. Gravitational Potential is now integral part of contemporary physics. It has been absorbed into human intuition. Accelerating Universe is rapidly approaching state of intuition. Pico-Physics submits that its interpretation of the facts of observation show better compatibility with observation in other areas than contemporary understanding.

If we look at gravitation, conversion between potential and kinetic energy is assumed. It works against simultaneous existing of energy with mass. In the two states before and after the fall through gravitational potential, the combined mass of objects is different. Especially in a frame of reference where momentum before and after is nil, the mass of both objects increases. Simultaneity of mass-energy indicates increase of energy of system without gaining it from an external object.

Similarly, we observe photons from distant astronomical objects appear to have the spectrum shifted to lower frequencies. The shift is proportional to the distance of the source from receiver. The contemporary explanation of exploding universe is non-sustainable. It places all observers at center of the theorized big explosion (big-bang, the vent that led to formation of universe in cosmological theory).

This reduction in energy of photon as it travels through Space is attributed to creation of Space along the way. (Anti-Konservation allows for creation and consumption of space) This reduces the confinement of photon in the direction of its motion. It increases its size (wavelength) in the direction of motion. This is similar to motion of photon source with respect to observer.

The path traveled by photon before it is observed increases with distance of cosmic objects. The wavelength is correspondingly increased as well (red shift). This increased wavelength is read as increase in recessionary speed of astronomical objects with distance by contemporary prevailing cosmological theory. The red shift can not be distinguished from the red shifted 'de-Broglie' waves emitted from receding objects. In PicoPhysics this is a proof of Anti-Konservation of space.

If PicoPhysics explanation for frequency shift (red shift) is correct, recently observed variation in proportionality of shift with distance is attributable to matter density in the path of travel of the photon.

8. Understanding Neutrino - Faster Than Light

Confinement of energy in Space is fundamental in all observations. Inverse square decrease of strength of interaction with distance from object – A property based on geometric characteristics of space, is extrapolated to believe infinite span of certain energy fields. This is questionable. In PicoPhysics it is not feasible as it contradicts confinement of Knergy in space. It also negates the Konservation (Will be discussed along with set theory). The observed fact is after certain distance, the affect is not measurable.

PicoPhysics understanding of electromagnetic phenomenon confines electromagnetic fields within defined boundaries. It is not only indicated in Unary law itself in the word 'Contain' as well as basic explanation of forces that are guided by increase/decrease in field energy in the system under study.

The confinement of energy in space, gives an intuitive concept of particle. These particles consist of Knergy present in a specific dynamic geometric state of confinement. By virtue of constant speed characteristic of occupied space, they can not travel faster than this characteristic speed to honour confinement.

The presence of Knergy in Space makes the Space loose homogeneity. The heterogeneity of Space introduces Space-Knergy dynamics. Space-Knergy dynamics makes it possible for Space to loose Knergy before it is fully consumed by Knergy and replaced with incoming Space. Such Space can get dispossessed of Knergy. When Knergy of another particle occupies this previously used space, it will appear to affect energy of particle.

However motion of such Space particles is not governed by characteristic speed of Knergy in space. Neutrinos appear to be such Space Particles – devoid of any Knergy contents. They can not be termed as energy exchange particles, as magnitude of energy change in destination is not same as source.

9. Understanding Higgs Bosons

Subatomic particle called the Higgs boson are hypothesized based on explaining interactions (attraction or repulsion) with exchange of particles. The theory is speculative with the statement on the concept that rest mass of exchange particle is zero for long range forces, and significant for shorter range forces. To match the concept with observation Higgs Bosons were hypothesized.

PicoPhysics have two issues with this approach. First, it separates energy from mass. Second it makes distinction between mass and rest mass. In PicoPhysics, Energy is clearly defined as rate of consumption of Space by contained Knergy of particle.

9.1. Inertial Mass

This also defines inertial mass. Since, if the object were to increase its speed, motion relative to observer, the volume of Space occupied decreases. This results in increased Knergy density in the particle. The consumption rate being proportional to square of the Knergy density, the net result is increase in rate of Space consumption by contained Knergy. This increase in consumption in Space has to be supplied by replacement of space, by Space external to particle (Affinity of Space to occupy Knergy). External Space has to adjust into a different relaxation state. The time constant for this relaxation of Space is very high – as can be judged from low value of Hubble constant. The mutual interaction between the need to change rate of Space consumption and slow relaxation rate of Space results to resistance of the Knergy particle to change in speed. Inertial mass is a measure of this resistance.

9.2. Gravitational Mass

The slow relaxation of space, also results in collapse of Space around mass particles onto particles themselves. This is seen as gravitation affect. Thus two affects of inertia and gravitation are related to each other. They have there origin to interaction of Knergy with space. The proportionality between inertial and gravitational masses with suitable definition of units, make them same.

Picophysics explain inertial and gravitational mass properties of matter as above.

10. Change drivers (Energy Conservation Vs Affinity)

PicoPhysics handle creation of particles from Knergy (Knergy confinement process);

a. The processes and control parameters that describe various states in which Knergy is confined in space.
b. The role played by nucleus and extra nuclear part of particles.
c. Particle stability and radioactivity.
d. Formation of lighter particles in radiation (process).

In PicoPhysics all changes are driven by interaction of Knergy with Space rather than by conservation of energy as in contemporary physics. Thus it does not need to address the confinement of particle in nucleus with energy exchange particles. Unary law 'Space contains Knergy' can be read as affinity of Space to posses Knergy. The Space affinity to possess Knergy is the motive force that results in dynamic universe. The result is Unary interaction between Space and Knergy.

The slow relaxation time of space also guides certain other changes in which energy is found conserved. Conservation of energy as change driver in contemporary physics is attributed to mis-match between relaxation time for Space and observation set-up.

To be continued (with Infinite Maths & Set theory) ……..