



Unitless Physics III: Focused Particle Communication, Evolution of Fundamental Physics and the Universe US9-3

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ABSTRACT

Particle communication arising from rest energy enables conversion of random motion to organized motion. A major failing of the Standard Model of Physics is an inability to produce angular momentum conservation from random motion, an inability to explain nonlocality in QM and lack of explanation for the similar morphology of spiral galaxies and hurricanes, and for the causes of helicity conservation in water, and for tornados and jet streams in the atmosphere and galaxies. The solutions require selective particle to particle communication and subsequent particle action to a state of higher organization. This paper, based on US9-1 and US9-2, explores the possibility of new particle to particle forces via rest energy which enable higher organization.

An ability in Physics to deal with the above would provide physics which could be useful to biological science which presently describes numerous varieties of particle to particle communications in very complex organizations. Control of tornados via interference of particle to particle communication can be possible with future technology. The effects of focused particle to particle communication can replace the concepts of dark matter and nuclear force bosons.

Focused selective particle to particle communication enables evolution in Physics and the Universe

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which leads to quantum mechanics and biological evolution. The mathematics of QM is fundamental in this process, but this paper asserts that there are simpler predecessors of QM within particle communication and internal processing of fundamental particles. Selective particle communication enables evolution of Physics to states of higher organization. This possibility is not recognized in Standard Physics.

Keywords: Unitless physics; fundamental particle communication; rest energy; cosmology; evolution.

1. INTRODUCTION

Organized Motion is herein defined as that associated with angular momentum conservation, jet behavior and black hole rotation. Standard Physics relies on these concepts but does not provide the means of attaining them. US9, unitless solution 9, provides the opportunity to investigate and define laws of motion which can produce Organized Motion. This paper suggests selective particle to particle communication which results in appropriate momentum changes which are governed by internal particle information processing and lead to higher states of organization.

Only an unitless solution can lead to comprehension of the internal processing required to momentum changes that follow the Law of Gravity, the Laws of E&M and Quantum Mechanics. It is also required that solutions enable biological evolution which requires an inherent evolution of physics. Internal particle processing evolution requires the ability to recognize and produce Organized Motion. Quantum Mechanics is defined in terms of random probabilities and must be modified to enable production of Organized Motion. Obviously, Q.M. and the U.P. are governed by internal processing. In this paper, we only

address Q.M. and simple Organized Motion via focused selective particle communication.

Such particle communication will be limited in scope and interactions with the existing Laws of Physics will remain undefined, but should eventually enable Organized Motion and Evolution. This paper is a beginning to evolve the future Laws of Physics. One possible motive for particle internal processing is an increase in communication efficiency. This subject is not discussed in this paper, and is left for future development.

The amazing creativity associated with biological evolution requires a basic creativity in fundamental physics. The joining of the concepts of physics and biology will produce the next revolution in Physics.

One possibility is that in galactic scales baryons and molecules can over time form unified Organized States of identical velocity exactly comparable to organized photons. This situation can effectively produce massive particles that can communicate as a single molecule. This possibility is not discussed in detail in this paper, but should be considered in any communication theory.

This paper requires ignoring the limitations of the Standard Model.

US9 Constants From US9-2 [2], derived in US9-1 [1]

MKS constants

$\pi = 3.141592654$
 $@ = 137.035999074(44) = 1/\alpha$
 $R = 1836.15267245(75)$
 $c = 2.99792458 \text{ E}8 \text{ [M/S]}$
 $h = 6.62606957(29) \text{ E-}34 \text{ [KM}^2\text{/S]}$
 $m_e = 9.10938291(40) \text{ E-}31 \text{ [K]}$
 $G = 6.67384(80) \text{ E-}11 \text{ [M}^3\text{/KS}^2]$
 $e^2 = \hbar \alpha c$

US9 constants

$\pi = 3.141592654$
 $@ = 137.035999074(44)$
 $R = 1836.15267245(75)$
 $\underline{c} = \underline{m_e} @$
 $\underline{h} = \underline{m_e}^3$
 $\underline{m_e} = 3.6249118 \text{ E}6 \text{ electron mass}$
 $\underline{G} = 1 / R \underline{m_e}^4 = 1 / \underline{m_p} \underline{h}$
 $\underline{e} = \underline{m_e}^2$

US9 values are always underlined.

All physical constants are intimately related in US9, based on the value of the electron mass. A value of "1" has the same meaning for length, time and mass. The US9 values are assumed to be for

internal processing where units are digital. The ratio of the electronic force to the gravitational force in the Hydrogen atom is $\underline{m}_e^6$ [1].

US9 conversion constants:

$$\begin{aligned} K_M &= 1.4598347 \text{ E-17 [M]} \\ K_{Kg} &= 2.5129944 \text{ E-37 [Kg]} \text{ or } (0.141 \text{ ev} / c^2) \\ K_S &= 2.41888433 \text{ E-17 [S]} \\ K_V &= K_M / K_S = 0.60351572 \text{ [M / S]} \quad K_V^2 = 0.364231224 \\ K_J &= K_{Kg} K_V^2 = 9.153110262 \text{ E-38 [J]} \\ \text{or } K_{ev} &= 5.712922471 \text{ E-19 [ev]} \end{aligned}$$

These constants are to be multiplied times the unitless values to obtain measured values in MKS units. Note the similarity of K_M and K_S .

The K's are the equivalents of the US9 value of "1".

1 ev is equivalent to a US9 rest mass: $\underline{M}_{1ev} = 7.093775512$

US9 requires minimum and maximum values for all parameters. This is required to prevent information processing in Nature from the infinities in the Standard model.

as energy, $\underline{m}_e^3 / 2 = \underline{h} / 2 = \underline{\text{Spin}}^{1/2} = \underline{K}_{E_{H1}} = 2.381564 \text{ E19}$ or $\times K_{ev} = [13.60569298 \text{ ev}]$

$$\underline{\varepsilon}_0 = \underline{e}^2 / (2\alpha \underline{h} c) = [\underline{m}_e^4 @ / 2] / [2\pi \underline{m}_e^3 \underline{m}_e @] = 1 / 4\pi$$

$$\underline{\mu}_0 = 2\underline{h} / @ \underline{c} \underline{e}^2 = 2(2\pi \underline{m}_e^3) / @ \underline{m}_e @ \underline{m}_e^4 = 4\pi / \underline{m}_e^2 @^2 = 4\pi / \underline{c}^2$$

2. PARTICLE COMMUNICATION AND COMTINOS, THE ORGANIZATIONAL PRINCIPLE AND EVOLUTION OF PHYSICS IN UNITLESS PHYSICS

The evolution of Physics toward greater complexity is evident starting with the Hydrogen atom resulting in more complex atoms, molecules, and life. This paper assumes that a similar process, but simpler, precedes the Hydrogen atom in the evolution process of the Universe. Therefore, focused selective particle to particle communication involves simpler principles than those required in the Standard Model. Particle comm. is classical Physics that contains principles which enabled evolution to the complexities of the Standard Model.

This hypothesis is enabled by US9-1 and US9-2, Unitless Physics [1,2].

Repeating communication results from an electrostatic force when the comm. becomes focused. This is assumed to be independent of charge and originates from rest energy. One dimensional comtinos transfer momentum at velocity, $\underline{c}^2 = \underline{m}_e^2 @^2$, which is equivalent to

energy and enables motion in the direction toward organized motion. Subsequent Ap particle decisions result in momentum conservation and angular momentum conservation, the Organizational Principle, which maximizes particle to particle communication. The source of comm. energy is rest energy.

Particle to particle selective force communication is required to explain quantum nonlocality, formation of organized systems of motion, conservation of helicity, problems in turbulence calculations, jet streams, formation of tornados, formation of asteroids and asteroid belts, excess velocity in the outer regions of galaxies, the unique common appearance of hurricanes and spiral galaxies and the lattice structure of the Universe. All of these cases require selective particle to particle communication which enables additional attraction and motion towards angular momentum conservation and jets. All of this requires internal processing of fundamental particles which enables attraction to higher organization and evolution of Physics. This may lead to an explanation for the mysteries of quantum mechanics.

In the ground orbit of the Hydrogen atom, the electron QM wavefunction occupies the entire orbit. The standard view is that the electron has the probability of appearing anywhere due to an external force. QM does not use the language of force in this case, but in a classical sense such would be required. The US9 viewpoint is that the wavefunction is an internal motion regulator which enables the electron to minimize the effect of foreign particle collisions. In this case, particle

to invasive particle communication enables the electron motion via Rest Energy. This requires electron motion via energy obtained from focused selective particle to particle communication which is regulated by internal particle processing. The QM wavefunction is an internal particle processing function which in concert with focused particle to particle communication enables evolution to greater complexity.

2.1 Angular Momentum in Hydrogen Atom

$$\underline{m}_e = 1.075176754 R^2 = 1.408618645 @^3 = 3.6249118E6$$

$$R / @ = 13.39905342 = 1.066262792 4\pi$$

$$(R+1) \underline{m}_e = \underline{m}_H = 6.659516399E9$$

$$\underline{m}_e \underline{c}^2 = \underline{m}_e \underline{m}_e^2 @^2 = \underline{m}_e^3 @^2 = \underline{h} @^2 \quad \underline{m}_p \underline{c}^2 = R \underline{m}_e^3 @^2 = R \underline{H} @^2$$

$$\underline{v}_e = \underline{m}_e / n_B \quad \underline{r}_e = \underline{m}_e n_B^2 \quad \underline{m}_e \underline{v}_e \underline{r}_e = n_B \underline{m}_e^3 = n_B \underline{h}$$

$$\underline{m}_e \underline{v}_e \underline{r}_e = n_B \underline{h} = 2n_B [\Delta p \Delta x]_{UP} = (n_B \underline{m}_e \underline{c}^2) / @^2 = n_B 2[\Delta E \Delta t]_{UP}$$

$$\underline{m}_e \underline{v}_e^2 \underline{r}_B = [\underline{m}_e \underline{m}_e^2 / n_B^2] \underline{m}_e n_B^2 = \underline{m}_e^4 = \underline{e}^2 = (\underline{m}_e \underline{c}^2) \underline{m}_e / @^2 = \underline{E}_e 1.408645 @ \quad = 2 \underline{m}_e [\Delta E \Delta t]_{UP}$$

Angular energy conservation is a constant in the Hydrogen atom.

US9 indicates a unique relationship between rest energy, the U.P., angular momentum conservation and angular energy conservation. This is a statement where the Uncertainty Principle becomes the Organizational Principle, where chaos becomes certainty with rest energy as a source. Thus, particle selective decisions enabled by rest energy and the UP result in the OP, angular momentum conservation and angular energy conservation. US9 greatly simplifies the relationship between fundamental constants, enabling inquiry into internal particle processing.

Rest Energy:

$$\text{electron: } \underline{m}_e \underline{c}^2 = \underline{m}_e^3 @^2 = \underline{h} @^2$$

$$\text{proton: } R \underline{m}_e \underline{c}^2 = \underline{m}_e^3 R @^2 = 9.512193714 \underline{m}_e^4 = 9.512193714 \underline{m}_e \underline{h}$$

$$= 1.03757395 \pi^2 \underline{m}_e \underline{H}$$

$$\text{For electron rest energy } \underline{\Delta t}_{UP} = \underline{h} / 2 \underline{\Delta E}_{eUP} = \underline{m}_e^3 / 2 \underline{m}_e \underline{c}^2 = 1 / 2 @^2 = 2.662567725E - 5$$

$$\text{or } x K_S = 6.440443349E-22 \text{ sec electron}$$

$$/R = 3.507575077E-25 \text{ sec proton}$$

Can these be internal processing times?

Hypothesis I: All physical processes occur via internal particle processing within $\underline{\Delta t}_{int} = 1/2 @^2 = \alpha^2/2$.

This term may have fundamental significance in understanding the true significance of the Uncertainty Principle via internal processing. The number of significant digits in internal processing is likely to be limited.

This produces the S.R. gamma as a restriction on internal processing time as was developed in US9-2 [2]. This replaces $1 / @$ used in the description of gamma in US9-2.

Electrons in excited states return quickly to the ground state. This proves that fundamental particles are “egons”, capable of making decisions toward higher organization and communication. This is the only way to explain the creativity present in biology. This process is not included in quantum field theory which does not allow particle “ $\pm$ decisions” in momentum. There is an indication, in US9, that rest energy and particle to particle communication may be the source of the OP and QM.

The purpose of this paper is to explore this possibility.

$$\underline{m}_e \underline{v}_e \underline{r}_e = [\underline{m}_e \underline{m}_e / n_B] [\underline{c}^2 \underline{\Delta t}_{rcom}] = [\underline{m}_e^2 / n_B] [\underline{m}_e^2 @^2 n_B^2 / \underline{m}_e @^2] = \underline{m}_e^3 n_B$$

The particle to particle comm. provides the same angular momentum, a rationale for angular momentum conservation and a method to adjust the random U.P. into the O.P. which we will investigate later.

The maintenance of angular momentum conservation is consistent with radial particle to particle communication at velocity $\underline{c}^2$. The need for a theory of the development of angular momentum conservation from random motion is required. Standard Physics is incomplete.

A possible definition of the result of particle to particle comm. will be developed below.

Hypothesis II: Some physical processes require particle to particle comm. at $\underline{c}^2$.

3. HYDROGEN ATOM QUANTUM MECHANICS IN US9

$$\underline{h} = 2\pi \underline{m}_e^3$$

$$\underline{v}_e = \underline{m}_e / n_B$$

$$\underline{r}_n = n_B^2 \underline{m}_e$$

$$\underline{v}_{pn} = -\underline{m}_e / R n_B$$

$$\beta_{en} = \underline{v}_e / \underline{c} = \underline{m}_e / n_B \underline{m}_e @ = 1 / n_B @ = \alpha / n_B$$

β_{en} is related to the fine structure constant. Ground orbit radius and velocity in US9 is the electron mass which indicates a fundamental constant in particle internal processing.

$$\text{momentum conservation: } \underline{M}_p \underline{v}_p = R \underline{m}_e \underline{m}_e / (-R n_B) = -\underline{m}_e^2 / n_B = -\underline{p}_e$$

2.2 Angular Momentum Conservation Via Particle to Particle Comm at Velocity, $\underline{c}^2$

In Bohr H atom

$$\underline{\Delta t}_{rcom} = \underline{r}_e / \underline{c}^2 = (\underline{m}_e n_B^2) / \underline{m}_e^2 @^2 = n_B^2 / \underline{m}_e @^2$$

The velocity $\underline{c}^2$ is required to accommodate the similar morphology of hurricanes and spiral galaxies, the nonlocality of photon communication and conservation of momentum. In unitless US9, $\underline{c}^2$ can be regarded as a velocity.

$$\underline{\Delta t}_{rcom} = n_B^2 / \underline{m}_e @^2 = n_B^2 1.469036114E - 11$$

$$\text{or } x K_s = n_B^2 1.77671218E - 28 \text{ sec.}$$

$\underline{r}$ is converted to an internal time processing delay which provides a rationale for angular momentum conservation and angular energy conservation.

$$\underline{P}_H = 2\pi r_n / \underline{v}_e = 2\pi \underline{m}_e n_B^2 / [\underline{m}_e / n_B] = 2\pi n_B^3 \quad \text{H orbital period}$$

For electron deBroglie frequency:

$$\underline{h} \underline{v}_{DBe} = \underline{m}_e \underline{c}^2 \quad \underline{v}_{DBe} = \underline{m}_e \underline{m}_e^2 @^2 / 2\pi \underline{m}_e^3 = @^2 / 2\pi = 1 / \underline{P}_{DBe}$$

a constant independent of radius or velocity = 2988.749.

$$\underline{P}_{DBe} = 2\pi / @^2 = 0.000334588 \text{ or } \times K_S = 4.884431726\text{E-}21 \text{ sec.}$$

$$\underline{\lambda}_{DBe} = \underline{h} / \underline{m}_e \underline{v}_e = 2\pi \underline{m}_e^3 n_B / \underline{m}_e \underline{m}_e = 2\pi \underline{m}_e n_B = 2.277599256\text{E}7 n_B$$

or $\times K_M = 3.324918427\text{E-}10 n_B \text{ m.}$

Introduce particle to particle communication time:

$$\underline{\Delta t}_{rcom} = \underline{r}_e / \underline{c}^2 = \underline{m}_e n_B^2 / \underline{m}_e^2 @^2 = n_B^2 / \underline{m}_e @^2$$

$$\underline{P}_{DBe} / \underline{\lambda}_{DBe} = 2\pi / @^2 2\pi \underline{m}_e n_B = 1 / \underline{m}_e @^2 n_B = \underline{\Delta t}_{rcom} / n_B^3$$

$$\underline{P}_{DBe} n_B^3 / \underline{\Delta t}_{rcom} = \underline{\lambda}_{DBe}$$

There is an interesting interaction between the deBroglie definitions and the US9 definition of particle communication time.

Does rest energy, $R_M \underline{m}_e^3 @^2$, represent the total information content of a particle? A reasonable first guess in US9.

$$\underline{\Delta t}_{int} = 1 / 2 @^2 \quad R_M \underline{m}_e^3 @^2 1 / 2 @^2 = R_M \underline{H} / 2 = R_M (\text{UP})$$

Does this equation indicate something new?

US9 presents $\underline{\Delta t}_{rcom}$ from QM parameters in ground orbit

$$\underline{\lambda}_{DBe} \underline{\Delta t}_{rcom} = 2\pi \underline{m}_e n_B n_B^2 / \underline{m}_e @^2 = 2\pi n_B^3 / @^2 = \underline{P}_H / @^2$$

$$\underline{P}_H / \underline{\Delta t}_{rcom} = 2\pi n_B^3 \underline{m}_e @^2 / n_B^2 = 2\pi \underline{m}_e @^2 n_B = \underline{\lambda}_{DBe} @^2$$

$$\underline{\lambda}_{DBe} \underline{v}_{DBe} = [\underline{h} / \underline{M} \underline{v}_e] [(\underline{M} \underline{c}^2) / \underline{h}] = \underline{c}^2 / \underline{v}_e = \underline{m}_e^2 @^2 n_B / \underline{m}_e = \underline{m}_e @^2 n_B = n_B^3 / \underline{\Delta t}_{rcom}$$

In circular orbits:

$$\underline{v}_e^2 / \underline{r}_{nB} = \underline{m}_e^2 / n_B^2 \underline{m}_e n_B^2 = \underline{m}_e / n_B^4 = \text{radial acceleration}$$

US9 produces quantum mechanical variables in simple terms.

Hypothesis III: Particle to particle comm. at $\underline{c}^2$ determines some QM parameters.

3.1 Particle to Particle $\Delta\beta$ Focused Selective Force and Possible Effects in the Hydrogen Atom

Introducing $\Delta\beta$ focused electronic force, $\Delta\beta\text{FEF}$:

$\Delta\beta\text{FEF}$ is designed to implement attraction to organized motion. The selective process of focused particle interaction requires an unknown time, $\underline{\Delta t}_{sel}$. This is an interaction which only occurs when opportunity for increased

organization is detected. The selection requires a significant number of particles at the same velocity. This number is required to be significantly above that which occurs in random thermal motion. In the random case, $\Delta\beta$ FEF does not occur.

An obvious purpose is to implement an attractive force toward jet streams and in jet streams to attain common motion. Tornados are an obvious case where an attractive force across the diameter of the cone may be required. $\Delta\beta$ represents the velocity difference.

$\Delta\beta$ FEF:

$$\underline{\Delta p}_e = \underline{m}_{com} \underline{c}^2 = \pm \Delta\beta \underline{e}^2 / \underline{r} = \Delta\beta \underline{m}_e^4 / \underline{m}_e = \Delta\beta \underline{h} \text{ ground H orbit}$$

$$\underline{m}_{com} = \Delta\beta \underline{m}_e^3 / \underline{m}_e^2 @^2 = \underline{m}_e / @^2 = \Delta\beta 193.0314633 \text{ comtino}$$

$$\text{or } x K_{Kg} = \Delta\beta 4.851E-35 \text{ Kg}$$

Focused Particle to Particle Electronic Force, $\Delta\beta$ FEF is a one dimensional force proportional to the velocity/c difference between two elementary particles. In Hydrogen, the energy source is from rest energy in the proton which transfers energy at velocity $\underline{c}^2$ resulting in momentum in any direction determined by internal particle processing. At present, the rest energy is assumed to be replenished by cosmic flux. This can be a basis of evolution of Physics and biology. The selective process of focused particle interaction requires an unknown time, $\underline{\Delta t}_{sel}$. This is an interaction which only occurs when opportunity for increased organization is detected.

Conservation of momentum occurs when the proton detects the action taken by the electron. The internal processing time is assumed to be $\underline{\Delta t}_{UPe} = 1/2 @^2$.

$$\Delta\beta = 1/@ + 1/R@ = 0.007301327 \text{ ground H orbit}$$

$\Delta\beta$ is difference in proton and electron velocities.

From proton rest energy to electron in Hydrogen atom: **$\Delta\beta$ FEF**

$$\underline{\Delta p}_e = \pm 0.00730 \underline{e}^2 / \underline{r} = \pm 0.00730 \underline{m}_e^4 / n_B^2 \underline{m}_e = \pm 0.00730 \underline{m}_e^3 / n_B^2 = \pm 3.4777E17 / n_B^2$$

$$= \underline{m}_e \underline{\Delta v}_e / \underline{\Delta t}_{int} = \pm 0.00730 \underline{m}_e^3$$

$$\text{for } \underline{\Delta t}_{int} = \underline{\Delta t}_{UPe} = 1/2 @^2 \quad \underline{\Delta v}_e = \pm 0.00730 \underline{m}_e^2 / 2 @^2 = 0.7046 \underline{m}_e$$

$$1/2 @^2 = 2.662567725E-5 \text{ or } x K_s = 6.440443349E-22 \text{ sec} = \pm \underline{\Delta t}_{UPe}$$

This is more than sufficient to return a particle via a classical path to the ground state, however we have not included the unknown internal processing time and the details of the path.

The **$\Delta\beta$ FEF** enables conversion from U.P. and excited states to the O.P. ground state.

$$\text{In } H_1: \underline{U.P.} = \underline{m}_e^3 / 2 = \underline{\Delta p} \underline{\Delta x} = \underline{m}_e \underline{\Delta v}_e \underline{\Delta x}$$

$$\text{nominal } \underline{\Delta x} = \underline{m}_e / 2^{1/2} = \text{nominal } \underline{\Delta v} = \underline{m}_e / 2^{1/2} = \pm 0.7071 \underline{m}_e \text{ in the U.P. for } H_1$$

from above:

$$\underline{\Delta v}_e = \pm 0.7046 \underline{m}_e = 0.9965 \text{ nominal } \underline{\Delta v}$$

It is fascinating that the $\Delta\beta\text{FEF}$ produces close to the nominal values for the U.P. in the Hydrogen ground orbit. This indicates that $\underline{\Delta t}_{int} = \underline{\Delta t}_{U\text{Pe}} = 1/2 @^2$ is correct.

Hypothesis IV: The Uncertainty Principle is defined by $\Delta\beta$ Focused Particle Communication.

Obviously, the process evolves as r changes and may also interact with Q.M. The digital motion is in any direction determined by the objective of the electron internal processing. Angular momentum conservation and linear motion organization in jets is supported by $\Delta\beta\text{FEF}$ which is caused by the internal organization of the fundamental particles.

This pre-classical concept may explain Big Bang inflation. The $\Delta\beta$ Electronic Focused Force, $\Delta\beta\text{EFF}$, is a pre-classical concept adopted in this paper to aid in the understanding of many physical processes. Evolution preserves all fundamental principles as complexity evolves.

$\text{FEF}\Delta\beta$ is a $1/r$ force, not a field force, at comm. velocity $= \underline{c}^2$ which is both energy and momentum enabling momentum changes in any direction directed by particle to particle comm. Although the force constant is assumed to be $\underline{e}^2$, it may be a function of the communication. Below $\Delta\beta\text{FEF}$ will be applied to jet behavior, tornados, galaxies, and cosmology.

Repeating communication results from rest energy when the comm. becomes focused. One dimensional comtinos transfer momentum at velocity " $\underline{c}^2$ " which is also energy enabling motion in any direction. The electronic " $\pm$ force" is proportional to " $1/r$ " because of the comm. delay " $1/\underline{\Delta t}_r = r / \underline{c}^2$ ". This can originate in the Big Bang resulting in Cosmic Inflation which continues over great distances, eventually resulting in the Cosmic Red Shift.

Such a process requires particle to particle communication that is not recognized in standard Physics. Classical comtinos from rest energy become repetitive particle to particle communication that enables quantum behavior. Comtinos can then be one dimensional providers of energy from rest energy that can become motion steps in any direction, dependent on

other particle to particle communication. This replaces the concept of virtual particles in force communication. It is the purpose of rest energy to enable particle to particle communication. Rest energy may be maintained by cosmic flux.

Helicity conservation in water obviously requires particle to particle communication that is not permissible in Standard Physics. Images of microscopic helicity are remarkably similar to images of ionized matter in galaxies.

Physics Today Nov, Chandra [3,4] The first image is 3 mm diameter. The second photo is 200,000 ltyr diameter. This similarity requires communication at $\underline{c}^2$ and $\Delta\beta\text{FEF}$. Tornados, galactic jets, and black hole rotation also require a particle preference for increased velocity ordered states. This preference is due to internal processing presently beyond the dormant state of Physics.

Conservation of momentum requires that the baryon source communication with the object particle detects the particle motion and responds appropriately.

Hypothesis V: $\Delta\beta\text{FEF}$ can be the regulator of conservation of momentum.

There is strong evidence in tornados that an attractive force exists between opposite walls of the vortex where the maximum velocity difference occurs. $\Delta\beta\text{FEF}$ would produce such an attractive force. This effect is replicated in hurricanes, galaxies and the lattice structure of the Universe. The dark matter would be significantly reduced by this additional inward force.

The rings of Saturn would serve as a definer of the details of the proposed attractive force toward common velocity.

3.2 Neutron Decay as Focused Electronic Force, $\Delta\beta\text{FEF}$

Neutron decay can be interpreted as the result of $\Delta\beta$ Focused Particle Communication with another particle. The amount of energy transfer is a variable dependent on that required by the other particle to produce an O.P. state.

$$\text{neutron mass excess} = 0.00141 Rm_e = \underline{\Delta M} = 2.59m_e$$

$$\text{decay energy} = 2.59 m_e \underline{c}^2 = 2.59 m_e^3 @^2 = 2.59 @^2 \underline{h} =$$

mean lifetime = 885.7 sec or / $K_S = 3.6616E19$

$$= 0.76874 \underline{m}_e^3 = 0.76874 \underline{h}$$

energy / time = 63269

Maximum energy available for neutrino = $1.59 \underline{m}_e \underline{c}^2 = 1.59 \underline{m}_e^3 @^2$

= 29858 $\underline{m}_e^3$ comtino?

$$\underline{\Delta p}_e = \pm \Delta \beta \underline{e}^2 / \underline{r} = \pm \Delta \beta \underline{m}_e^4 / \underline{r} = \pm \Delta \beta \underline{m}_e^4 / \underline{r} = \pm 29858 \underline{m}_e^3 = E_{\Delta \beta FEF}$$

$\Delta \beta / \underline{r} = \pm 29858 / \underline{m}_e = / 121.41$ defines interacting particle

energy / time = $29858 / 0.76874 = 38840$

This value may define internal processing constants.

$\Delta \beta FEF$ seems reasonable in neutron decay.

In this case, the lifetime would represent the improbability of the occurrence of a single communication. This analysis does not include unknown internal processing time and velocity and distance of numerous baryon sources, but can enable neutron decay.

3.3 Force Bosons

W mass = $0.6253 R \underline{m}_e @ = 5.7033E11$ [1]

Z_0 mass = $0.708 R \underline{m}_e @$ H_0 mass = $0.978 R \underline{m}_e @$ [1]

Δ masses are $0.0827 R \underline{m}_e @$ and $0.270 R \underline{m}_e @$

Wenergy = $1148 \underline{m}_e^3 @^3 = 815 \underline{m}_e^4$

$$\underline{\Delta p}_e = \pm \Delta \beta \underline{e}^2 / \underline{r} = \pm \Delta \beta \underline{m}_e^4 / \underline{r} = \pm \Delta \beta \underline{m}_e^4 / \underline{r} = \pm \underline{Wenergy} = \pm 815 \underline{m}_e^4$$

$$\pm \Delta \beta \underline{m}_e^4 / \underline{r} = 815 \underline{m}_e^4 \quad \pm \Delta \beta / \underline{r} = 815$$

for $\underline{r} = 1E-4$ or $x K_M = 1.4598E-20 m$ $\pm \Delta \beta = \pm 0.815$

It is evident that $\Delta \beta FEF$ comtinos could replace the W, Z and H bosons under restrictive conditions. The need for gluons was questioned in US9-2 Hypothesis 1 [2].

$$\underline{\Delta t}_{UPW} = \underline{m}_e^3 / (2 \times 1148 \underline{m}_e^3 @^3) = 1 / 2296 @^3 = 1.6925E-10$$

or $x K_S = 4.0939E-27 sec = \underline{\Delta t}_{UPW}$

$c \underline{\Delta t}_{UPW} = 1.2273E-18 m$

Hypothesis VI: Bosons can be $\Delta \beta FEF$ comtinos.

4. JET STREAMS AND TORNADOS AS PARTICLE TO PARTICLE FOCUSED COMMUNICATION

The jet streams in the earth's atmosphere travel at velocities that are comparable to the molecular random velocities in the atmosphere. The organized motion versus the random motion is

similar to the UP versus the OP in atoms. These streams require particle to particle focused communication. The streams are stable despite continuous interaction with random thermal velocities.

The initial particle motion involves a $\Delta \beta FEF$ directly toward the stream due to the attraction

of organized velocity. When near the jet stream, $\Delta\beta_{FEF}$ adjusts to the dominant velocity.

Hypothesis VII: Jet streams, tornadoes and all organized motions arise from direct particle to particle focused communication, $\Delta\beta_{FEF}$.

Detection of organized $\Delta\beta$ by a particle's internal processing will require a significant time delay, Δt_{det} . This delay is unknown and must be determined via existing data in tornado conversion of random motion into organized motion. The following calculations will only involve the communication time, Δt_{com} .

$$100 \text{ km / hr} = 10^5 \text{ m / 3600 sec} = 27.8 \text{ m / s}$$

$$\text{at } T = 233 \text{ K} = -40 \text{ C } \quad N_2 \quad v_{thermal} = 419 \text{ m/s [4]} \quad \Delta\beta = 1.398E-6 = 5.068 / \underline{m_e}$$

$$\text{at } T = 263 \text{ K} = -10 \text{ C } \quad N_2 \quad v_{thermal} = 445 \text{ m/s} \quad \Delta\beta = 1.485E-6 = 5.382 / \underline{m_e}$$

$$\text{at } T = 293 \text{ K} = 20 \text{ C } \quad N_2 \quad v_{thermal} = 470 \text{ m/s} \quad \Delta\beta = 1.568E-6 = 5.684 / \underline{m_e}$$

Random atmospheric velocities exceed ordered motion and would certainly destroy ordered motion. How can it be possible that contact with thermal motion does not degrade the organized motion? This is why particle to particle communication is required that creates and supports organized motion.

$$1 / 2 @^2 = \mathbf{2.6626E-5} \text{ or } x K_s = 6.440443349E-22 \text{ sec} = \Delta t_{int}$$

$$\text{for } r = 1 \text{ km} = 1000 \text{ m or } / K_m = 6.8501E19 = \mathbf{1.4381 \underline{m_e}^3} = \underline{r}$$

$$\Delta t_{com} = 2 \times 1.4381 \underline{m_e}^3 / \underline{m_e}^2 @^2 = 2.8762 \underline{m_e} / @^2 = 555.2$$

$$\Delta t_{com} \times K_s = 1.343E-14 \text{ sec}$$

$$\text{Repeats in one } \mu\text{sec} = 1E-6 / 1.343E-14 = \mathbf{7.446E7} = N_{com} \text{ for } 1 \text{ km}$$

This is the maximum possible, excluding other interactions and other internal processing.

$$\Delta p = \pm \Delta\beta \underline{e}^2 / \underline{r} = \pm \Delta\beta \underline{m_e}^4 / 1.4381 \underline{m_e}^3 = \pm \Delta\beta \underline{m_e} / 1.4381$$

$$\Delta v = N_{com} \Delta p / \underline{M} = \pm N_{com} \Delta\beta \underline{m_e} / 1.4381 R_{N_2} \underline{m_e}$$

$$= \pm \mathbf{7.446E7} \Delta\beta / 1.4381 R_{N_2} \text{ in } 1 \mu\text{sec.}$$

$$\Delta\beta = 1.398E-6 \quad R_{N_2} = 14$$

$$\Delta v = \pm 5.178E7 \times \mathbf{1.398E-6} / 14 = 0.3693 \text{ or } x K_v = 0.2229 \text{ m/sec in } 1 \mu\text{sec}$$

$\Delta\beta$ is reduced as the random particle approaches the jet stream maximum velocity. $\Delta\beta_{FEF}$ in one second seems very suitable for supporting a jet stream. Δt_{det} remains undetermined.

4.1 Tornadoes

Jet streams over a tornado increase the vertical motion in the tornado indicating that $\Delta\beta_{FEF}$ increases the tornadoes strength.

Cumulous clouds form surfaces within a random velocity environment which requires a specific form of particle to particle communication and action. The surface defines an organized system. Tornadoes evolve within cumulous clouds.

Tornadoes are the best example of the conversion of random motion into ordered motion for which we have an enormous amount of data and which requires particle to particle communication resulting in accelerated velocities. The process of evolving organized motion requires new physics.

Tornados appear to involve particle to particle communication across the diameter of the tornado which insures opposite velocity vectors and includes an attractive force. From outside the tornado random motions are attracted and participate in the rotational velocity. Tornados also show enhanced response to the Coriolis Force which requires particle to particle communication over large distances. The importance of investigating these possibilities in an environment of random velocities is crucial for progress in Physics. $v^2 / r [m / s^2] = acc_r [m / s^2]$ or $\times K_S^2 / K_M = \underline{acc}_r$

$$K_S^2 / K_M = [6.31514085E-34 / 1.4598347E-17] [s^2/m]$$

$$= 4.00798899E-17 [s^2/m]$$

$$\text{For } v = 200 \text{ km / hr} = 2E5 \text{ m / 3600 s} = \mathbf{55.56 \text{ m / s}} \quad v^2 = 3086.9$$

$$v / K_v = 55.56 / 0.60351572 = \underline{v} = 92.0606 \quad \underline{v}^2 = \mathbf{8475}$$

$$r = 1 \text{ km} = 1000 \text{ m}$$

$$r / K_M = 1000 / 1.4598347E-17 = \mathbf{6.8501E19} = \underline{r} = 1.43815 \underline{m}_e^3$$

$$v^2 / r = 3.0869 [m / s^2]$$

$$\underline{v}^2 / \underline{r} = 1.2372E-16 = \underline{acc}_r \quad \underline{acc}_r / (K_S^2 / K_M) = \mathbf{3.0868} [m / s^2]$$

$$2 \underline{r} / \underline{c}^2 = 2.87630 \underline{m}_e^3 / \underline{m}_e^2 @^2 = 2.87630 \underline{m}_e / @^2 = 555.22 = \underline{\Delta t}_{rcom}$$

$$\underline{\Delta t}_{rcom} K_S = 1.3430E-14 \text{ sec}$$

$$\text{in } 1 \mu\text{sec there are } \mathbf{7.4460E7} \text{ repetitions} = N_{rcom}$$

$$\Delta\beta\text{FEF attractive force across vortex to obtain centrifugal acceleration: } \Delta\beta = 2 \times 55.56 / 2.99792458E8 = 3.7066E-7$$

$$\underline{\Delta p} = \pm \Delta\beta \underline{e}^2 / \underline{r}_{km} = \pm (3.7066E - 7) \underline{m}_e^4 / 1.4381 \underline{m}_e^3 = \pm 0.9343$$

$$\underline{\Delta v}_r = N_{rcom} \underline{\Delta p} / M_{N2} = 0.9343 N_{rcom} / R_{N2} \underline{m}_e$$

$$= \pm 0.9345 \times \mathbf{7.4460E7} / 14 \times 1836 \times 3.6249E6 = 7.468E-4 \text{ per } \mu\text{sec}$$

$$\text{In } 4134 \mu\text{sec } \Delta v_r = \mathbf{3.0869 \text{ m/s}} \text{ as estimated above.}$$

This simply demonstrates that $\Delta\beta\text{FEF}$ is sufficient to explain tornadic centripetal acceleration. Internal processing time is unknown, but can be estimated by calculating the required attractive force. From outside the tornado, the same attractive force applies. When near the vortex the particles are attracted to the rotational motion.

Focused particle to particle communication can only be defined via analysis of the existing data on conversion of random motion to organized motion. Tornado data exists which can provide the process to organized motion with new Physics. This paper provides examples of possible new Physics in particle to particle communication which enables evolution.

Analysis of tornado data can be approached with this new attitude, including significant radial attractive force.

5. GALACTIC JETS, SPIRAL GALAXIES AND COSMOLOGY

Galactic jets reach relativistic velocities and the cosmic expansion greatly exceeds the velocity of light at large distances. Particle to particle focused force, $\Delta\beta\text{FEF}$, provides a simple explanation for the conversion of random thermal velocities to the velocity of light. The excess velocities in the outer regions of galaxies can also be explained in this way. The attractive force of $\Delta\beta\text{FEF}$ towards organized motion can replace some of the need for dark matter.

Universe radius: $8.8E30 \text{ m} / K_M = 6.03E47 = \underline{R_U}$

$\underline{R_U} / \underline{c}^2 = 2.443E30 \text{ or } \times K_S = 5.9092E13 \text{ sec} = \Delta t_U = 1.8726E6 \text{ yr}$

$8.8E30 \text{ m} / 2.9979245E8 \text{ m/s} = 2.935E22 \text{ s} = 9.302E14 \text{ yr}$

$1 \text{ ltyr} = 9.4607E15 \text{ m or } / K_M = 6.4807E32 = 1.0355\underline{m_e}^5 = \underline{r_{ltyr}}$

$\underline{\Delta t_{rcom}} = \underline{r_{ltyr}} / \underline{c}^2 = 1.0355\underline{m_e}^5 / \underline{m_e}^2 @^2 = \underline{m_e}^3 / 18135 = 2.6265E15$

or $\times K_S = 0.063531 \text{ sec}$ for roundtrip comm. = **0.1271 sec**

for $\Delta\beta = \mathbf{1E-6}$ differential galactic motion estimate: 299.79 km /sec

$\underline{\Delta p_{\Delta\beta fef}} = \pm \Delta\beta \underline{e}^2 / \underline{r_{ltyr}} = \pm 10^{-6} \underline{m_e}^4 / 1.0355\underline{m_e}^5 = \mathbf{2.664E-13}$

for $N_{rcom} = 1$

$\underline{\Delta v_r} = \pm N_{rcom} 2.664E-13 / R\underline{m_e} = N_{rcom} 4.002E-23 \text{ for protons}$

In 1 yr = **3.1557E7** sec or $/ K_S = 1.3046E24 = \underline{1 \text{ yr}}$

$N_{rcom} = \mathbf{3.1557E7} / \mathbf{0.1271} = \mathbf{2.4828E8}$ repetitions of one source in 1 yr.

$\underline{\Delta v_r} = 2.4828E8 \times 4.002E-23 = 9.9364E-15 \text{ or } \times K_V = 5.997E-15 \text{ km} / \text{s}$

The possibility of simultaneous comm. with multiple sources can be as large as

$1 / 2 @^2 = \mathbf{2.6626E-5}$ or $\times K_S = 6.440443349E-22 \text{ sec} = \Delta t_{int}$

0.1271 sec / $6.4404E-22 \text{ sec} = 1.9735E20$ but this limit is undetermined.

For 10^8 years, about 10^9 baryon sources per year are required. In the low temperature environment it is possible that local $\Delta\beta FEF$ transforms baryons into large organized velocity groups, similar to photon behaviour, which results in much greater $\Delta\beta FEF$ force in a single comm. at large distances.

Within organized motion $\Delta\beta FEF$ can produce synchronized velocities of molecules which effectively produces a much larger molecule which can result in a much larger external $\Delta\beta FEF$ force in a single comm.

$\Delta\beta FEF$ can meet the need for an attractive force to condense a diffuse nebula into spiral arms, to produce excess velocities in the outer regions of galaxies, and to enable galactic jets, There is obviously more knowledge required and more sophisticated calculations.

The lattice structure of the Universe is a mystery which can be discussed as a possible example of

the $\Delta\beta FEF$ force [5]. Filaments of galaxies and gas dominate the Universe and are characteristic of galactic jets and spiral structure in galaxies. These are all forms of organized motion where intergalactic gas at random velocities is drawn into organized filaments, creating gigantic voids. [6].

The striking similarity of some spiral galaxies with hurricanes indicates a universal property of fundamental Physics which can only be explained by particle to particle communication at $\underline{c}^2$. The excess velocities in the outer regions of spiral galaxies require dark matter and $\Delta\beta FEF$ force [7,8].

$\Delta\beta$ will decrease as the particle velocity increases. It is also possible that a large number of source particles are involved. The determination of $\Delta\beta$ has not been addressed. This unknown significant delay time would provide a limit on the number of interacting particles.

The question is whether this is applicable to the Red Shift and Big Bang Inflation. The crossing time of the observable Universe at c^2 is 1.8726E6 yr.

The cosmic web can be looked at as a collection of jet streams, organized motion which attracts gaseous particles via $\Delta\beta FEF$. This organizing requirement applies to all filamentary structures, including micro filaments.

This would meet the requirements of galactic jets and cosmic expansion although requiring much more sophisticated calculations including $\Delta\beta$ less than one and unknown internal processing time per step.

Also, Big Bang inflation could be explained by a simpler dynamics that precedes Standard classical mechanics and enables evolution of Physics.

$\Delta\beta FEF$ is sufficient to reduce the dark matter requirement and to contribute to the lattice structure of the Universe, creating gigantic voids. $\Delta\beta FEF$ as a contributor to the evolution of complex order enables independent biological evolution throughout the Universe.

6. CONCLUSIONS AND POTENTIALS

A relationship between particle to particle communication at c^2 and Quantum Mechanics has been demonstrated which may lead to an understanding of the origins of QM. In order to introduce evolution of Physics the unitless system US9 is required. This enables potential analysis of internal particle processing which determines physical laws.

$\Delta\beta FEF$ has been shown to produce the value of the Uncertainty Principle in the Hydrogen ground state and to be intimately related to the Quantum Mechanics of the Hydrogen atom. The consequences of these connections are yet to be determined. This paper constitutes a beginning of the subject of evolution in Physics which will be continued by exploratory minds.

The introduction of $\Delta\beta$ into particle to particle communication may be a fundamental property. Particle identity is mass and velocity relative to a cosmic frame and location. It is reasonable to assume that every communication contains this identity. The process of attaining this information via fundamental particle communication has been addressed in this paper as particle

selection, Δt_{sel} , which is undetermined internal time.

Magnetic field effects are a function of particle velocity and may be best understood via $\Delta\beta FEF$. Tornadoes appear to involve particle to particle communication across the diameter of the tornado which insures opposite velocity vectors and includes an attractive force. Tornadoes also show enhanced response to the Coriolis Force which requires particle to particle communication over large distances. The importance of investigating these possibilities in an environment of random velocities is crucial for progress in Physics.

$\Delta\beta FEF$ is a one-dimensional force in which the slower particles accelerate towards the higher velocity particles. This is required to explain jet behavior. The $\Delta\beta FEF$ force is turned off when common velocity is attained, the O.P., including momentum conservation. Galactic jets can reach relativistic velocities which can be attained by $\Delta\beta FEF$ for fundamental particles and perhaps $\Delta\beta FEF$ can explain excess velocities in the outer regions of galaxies, replacing some of the need for dark matter.

Focused forces are assumed to originate from rest energy. This is energy transmitted from nucleon rest energy enabling transfer to momentum. The maintenance of rest energy could be via a cosmic flux which may be the cause of the cosmic Red Shift.

The difference between gravitational and electrostatic forces is assumed to be due to internal processing which requires a measurement of distance via velocity c^2 in order to enable momentum conservation. The strength of the focused force can be tuned via particle to particle communication of Δv which requires time that has not been considered in this analysis. In this case, the organizational principle moves Δv to zero in order to produce a larger organism. There is zero Δv among photons producing group activity. This is enabled by comm. at c^2 .

Particle to particle focused communication is required in many circumstances to evolve random velocities into ordered velocity states. This occurs on the microscopic scale and the cosmic scale. The topics in this paper provide a viewpoint in which momentum arises from rest energy. This opens a new arena for measurement and calculation while searching for the requirements that enable the transformation

of randomness into order in each of the many occurring events, complex molecule and biological formation, jet streams, helicity conservation, tornados, enhanced Coriolis force, turbulence in liquids and gases, Solar system evolution, galactic structure and cosmology. This will move Physics beyond the imposed limitations of the Standard Model which requires inherent randomness.

This is a challenge to physicists who are experts in their fields to perform measurements and develop theory to quantify particle movements required to attain organized motion from the state of random motion. Suitable information is available in the case of tornados. Such practical theory will contribute greatly to biological science, galactic structure and cosmic jets. Control of tornados will then be possible with new technology. Humming-birds may gain energy from wing velocity which draws in organized energy via particle to particle communication. Evolution in fundamental physics is required to enable biological evolution.

Black hole $\Delta\beta\text{FEF}$ radiation at c^2 may draw in particles in the vicinity of the surface of the black hole. Black hole growth would be increased by its rotation rate. Fundamental particles are egons.

Based on US9, an argument has been presented that evolution of Physics requires a simpler predecessor of classical physics, $\Delta\beta\text{FEF}$ and Δt_{com} , which enables evolution in Physics toward greater complexity and the Organizing Principle. It has been demonstrated that in the Hydrogen atom, particle to particle communication defines angular momentum conservation, the Uncertainty Principle, and some Quantum Mechanical parameters.

The discussion continued into probable causes of jet streams, tornados, hurricanes, asteroid belts and galactic spiral arms, galactic jets, cosmic expansion and Big Bang Inflation. In all cases an attractive force, $\pm\Delta\beta\text{FEF}$, appears necessary to enable the morphology and evolution of Physics. The “ $\pm$ ” implies decisions made by internal processing towards greater communication and complexity.

The extreme creativity present in biological evolution requires a predecessor in evolution of Physics. From biology we have learned that complexity increases while retaining fundamental logic. This concept must be carried over to fundamental physics. The search to understand

cosmology must look to simplicity of early physical concepts which are retained throughout. Particle to particle focused communication enables biological evolution.

Evolution of Physics requires increasing complexity with time. Earlier Physics must be simpler which excludes the many failed attempts to extend the Standard Model via more complex mathematics and dimensions [9]. This paper introduces one dimensional force which requires internal particle processing as a simpler addition to Classical Mechanics and the enabling predecessor of Quantum Mechanics. The evolution of Physics is a process which our only basis of understanding will come from biological science and much measurement of appropriate parameters in tornados and many other areas. Understanding of Biological evolution [10]. can be greatly enhanced by understanding of the evolution of Physics. Biology requires incredibly complex internal processing of component particles which produces a selection from numerous alternatives. This selection process must evolve from fundamental Physics. The current formulation of Physics ignores the creative element present in Cosmology.

The possibilities regarding the Universe and Cosmology are extensive. The introduction of focused particle to particle communication from rest energy in addition to gravity and E&M enables creative interactions which can solve many of the mysteries inherent in current understanding: Dark matter, dark energy, lattice structure of the Universe and inter-galactic voids. $\Delta\beta\text{FEF}$ can explain superconductivity, lightning, etc. Fundamental particles are egons, containing the essence of evolved minds, seeking increased states of order. This is only a crude beginning to the future Physics which will illuminate the cosmic process of biological evolution.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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