SECTION 6

The Outward Flow Propagated by all Matter

Section 5 demonstrated that the fundamental particles of atoms and therefore of matter in general are *Spherical-Centers-of-Oscillation* in the form of equation *5-6*. The present Section 6 develops the details of the structure and behavior of those fundamental wave-in nature-particles.

THE FLOW FROM THE SPHERICAL-CENTERS-OF-OSCILLATION

The Particle "Core"

Consider a small individual particle such as a proton. Where a_{grav} is the gravitational acceleration, G is the Newtonian constant of gravitation, and d is the separation distance of the source and the acted-on Newton's law of gravitation expressed in terms of the masses, m_{source} and $m_{acted\text{-}on}$, and with both sides of the equation divided by $m_{acted\text{-}on}$ is, of course,

(6-1) $$a_{grav} = G \cdot \left[\frac{m_{source}}{d^2} \right]$$

However, mass and energy are equivalent, so that [using c = light speed and h = Planck's constant] a mass, m, is proportional to an oscillation frequency, f, that is characteristic of that mass. That is

(6-2) $$m \cdot c^2 = h \cdot f \quad \text{or} \quad f = [\, c^2 / h \,] \cdot m$$

so that the m_{source} of *(6-1* has a corresponding equivalent frequency, f_{source}.

That being the case, the gravitational acceleration, a_{grav}, can be expressed in terms of that frequency as the change, Δv, in the velocity, v, of the attracted mass per time period, T_{source}, of the oscillation at the corresponding frequency, f_{source}, as follows.

(6-3) $$a_{grav} = \Delta v \,/\, T_{source} = \Delta v \cdot f_{source}$$

It can then be reasoned using equation *6-3* = equation *6-1* as follows .

(6-4) $$a_{grav} = \Delta v \cdot f_{source} = G \cdot \left[\frac{m_{source}}{d^2} \right]$$

Equation *6-5)*, below, is obtained by using that frequency is proportional to mass. With f_p and m_p as the proton frequency and mass then $f_{source} = [m_{source} / m_p] \cdot f_p$.

(6-5) $$\Delta v \cdot \left[\frac{m_{source}}{m_p} \right] \cdot f_p = G \cdot \left[\frac{m_{source}}{d^2} \right]$$

Rearranging and canceling m_{source} on both sides of the equation,

(6-6) $$\Delta v = \frac{G \cdot m_p}{d^2 \cdot f_p} \quad \text{per cycle of } f_{source}.$$

Then substituting, per equation 6-2), $m_p = [h \cdot f_p] / c^2$,

(6-7) $$\Delta v = \left[\frac{G}{d^2 \cdot f_p} \right] \cdot \left[\frac{h \cdot f_p}{c^2} \right]$$

$$= \frac{G \cdot h}{d^2 \cdot c^2} \quad \text{per cycle of } f_{source}.$$

The Planck Length, l_P, is defined as

(6-8) $$l_P \equiv \left[\frac{h \cdot G}{2\pi \cdot c^3} \right]^{\frac{1}{2}} \qquad \text{so that} \qquad G = \left[\frac{2\pi \cdot c^3 \cdot l_p^{\,2}}{h} \right]$$

Substituting G as a function of the Planck Length from equation 6-8 into G as it is in equation 6-7), the following is obtained.

(6-9) $$\Delta v = \left[\frac{2\pi \cdot c^3 \cdot l_p^{\,2}}{h} \right] \cdot \left[\frac{h}{d^2 \cdot c^2} \right]$$

$$= c \cdot \frac{2\pi \cdot l_p^{\,2}}{d^2} \quad \text{per cycle of } f_{source}.$$

This means that at distance $d = \sqrt{2\pi} \cdot l_P$ from the center of the source, attracting mass, the acceleration, Δv, per cycle of that attracting mass's equivalent frequency, f_{source}, is equal to the full speed of light, c, the most that it is possible to be. In other words, at that [quite close] distance from the source mass the maximum possible gravitational acceleration occurs. That is the significance, the physical meaning, of l_P or, rather, of $\sqrt{2\pi} \cdot l_P$.

The physical significance of $\sqrt{2\pi} \cdot l_P$ is that it sets a limit on the minimum separation distance of particles and therefore that a "core" of that radius is at the center of fundamental particles. That is, equation 6-9 clearly implies that it is not possible for a particle to be approached closer than that distance.

That physical significance of $\sqrt{2\pi} \cdot l_P$, is so fundamental to particle structure, that it more truly represents a fundamental constant than does l_P. For that reason that length should replace l_P as a fundamental constant of nature as follows.

(6-10) The fundamental distance constant, δ

$$\delta^2 \equiv 2\pi \cdot l_p^{\,2}$$

$$\delta = 4.051{,}34 \times 10^{-35} \text{ meters}$$

The Particle Core's Propagated Outward Flow

Each gravitationally attract**ing** *Spherical-Center-of-Oscillation* must tell each gravitationally attract**ed** particle its "message": the direction from the attract**ed** particle back to the attract**ing** one and the magnitude of the attract**ing** particle's gravitational attraction. That task is assigned by contemporary physics' theory to a *gravitational field*, a vector field that is an assignment of a direction of action and its magnitude to each point in a region of space.

However, that designation of the field, while facilitating the description of the action fails to explain the cause, the mechanism of the field and thus fails to explain or account for the action at issue. It also fails to account for the time delay due to the limitation of the speed of light that must exist between a change at the attract**ing** particle and its effect at the attract**ed** particle.

Something flowing is required, something flowing at the speed of light, continuously, carrying the direction and magnitude information, spherically outward, from every gravitating *Spherical-Center-of-Oscillation* to every other *Spherical-Center-of-Oscillation*.

Furthermore, the necessity for gravitation that an oscillation and its frequency are closely involved in the effect [equation 6-9] and therefore in what is communicated by the flow, means that the flow itself is oscillatory corresponding to and generated by its oscillatory source, the *Spherical-Center-of-Oscillation.*

For such a flow to persist there must be a supply of that outward flowing substance in every particle. And, for that flow to have persisted the billions of years since the "Big Bang" that "supply" must be an extremely concentrated reservoir of that which flows outward [concentrated relative to the outward flow].

Having now just determined:

- That δ sets a limit on the minimum separation distance in gravitational interactions and therefore that a "core" of that radius is at the center of fundamental particles, and
- That an extremely concentrated reservoir supply of that which is flowing outward from those particles is required at the center of all particles to support the billions of years of their outward flow;

Therefore:

- The reservoir is the spherical "core" of radius δ at the center of all particles;
- That it is impenetrable is because of its immense density concentration [billions of years worth of flow of the flow substance [*Medium*] in the minute ($\delta = 4.05134 \times 10^{-35}$ meters radius spherical core) of every particle], and.
- The *Spherical-Center-of-Oscillation* is a spherical oscillation of that immensely concentrated flow substance.

Then, what "contains" that core's supply or why doesn't it all just quickly "slosh" out and be gone ? The answer is that it is trying to do just that, to "slosh" out, as hard as it can. It cannot help propagating outward because it has no container, no physical boundary. But it can only propagate outward at the limiting rate determined by its surface area, $4 \cdot \pi \cdot \delta^2$ and the fastest speed possible for flow, the speed of light, c. Thus is the *Propagated Outward Flow* of what we term *medium*.

The Speed of the Flow – The Speed of Light

Every oscillation that we know in nature exhibits, and the very theory of oscillations in the abstract requires, that the oscillation consist of two aspects of the substance which is oscillating [e.g. pendulum position and velocity or electric potential and current] storing and

exchanging back and forth the energy of the oscillation. With one aspect varying in oscillatory fashion then when that aspect decreases there must be some "place" for its energy to go, a place in which it is stored until it reappears in that aspect when it increases again. It cannot completely disappear or be lost because the oscillation would die. That "place" is the oscillation's second aspect and it obviously must vary in a manner related to the first aspect's variation with its energy storage in opposite phase.

The matter of the universe is largely a mass of particles each a spherical *[1 - Cosine]* form oscillation propagating outward.

Like electric inductance and capacitance determining the speed of propagation along a transmission line, μ_0 and ε_0 determine the speed of the *[1 - Cosine]* form oscillation propagation in "free space" by setting the two aspects of the oscillation in which they are involved, the aspects between which the oscillation energy exchanges back and forth.

But, when the original oscillation came into existence it did so in absolute nothing. There was no "free space" with μ_0 and ε_0. There was nothing but the original oscillation. And, after the immediate explosion into all of the particles of the universe, each of those particles was sending its *Propagated Outward Flow* into nothing, into emptiness.

Where did the *Propagated Outward Flow*'s μ_0 and ε_0 come from? The only thing they could have come from was the source of the oscillation. There is no other possible source because everything else was absolute nothing, "the zero of existence". The μ_0 and ε_0 are inherent in the substance of the oscillation, which means, μ_0 and ε_0 are also inherent in the outward propagation. Each particle's *Propagated Outward Flow* contains its own μ_0 and ε_0.

The form of matter is not that of the "particles" of classical modern physic's Standard Model. Rather the form is:

- *Spherical-Centers-of-Oscillation*, spherical oscillations of *[1 - Cosine]* form;
- Propagating spherically outward a continuous oscillatory *Propagated Outward Flow* of *Medium* in *[1 - Cosine]* form, according to its source *Spherical-Center-of-Oscillation* magnitude, sign, and frequency;
- The speed of the *Propagated Outward Flow*, c, being set by the net μ_0 and ε_0 in the *Medium* being propagated;

(6-11) $$c = \frac{1}{\sqrt{\mu \cdot \varepsilon}}$$

SUMMARY

The *Spherical-Center-of-Oscillation* consists of a central "core", a spherical volume of radius $\delta = 4.051,34 \times 10^{-35}$ meters that consists entirely of a high density concentration of the oscillating *Medium*, which propagates outward at an extremely low rate as restricted by the surface area of the "core" and the radial outward speed of flow of the propagated *Medium,* the speed of light, c.

That *Propagated Outward Flow* is a communication from every particle in the universe to every other – an intra-particle network of communication.

The next section, Section 7, addresses the issue of what is the information so communicated.