SECTION 11

Calculating The Anomalous Acceleration from The Decay Constant

The Universal Exponential Decay is the gradual depletion of the *medium* supply in the *core* of every particle throughout the Universe, depletion by its *Propagated Outward Flow* of some of that *medium*. The flow at a decaying speed and wavelength results in all of the various decay effects, but the essential basic decay is the *core* content of *medium* decaying by the gradually decaying outward flow of *medium* from it at a decaying speed.

The speed of the flow is what we call the speed of light. It is not that the speed of traveling light gradually decays. Rather it is that each instant of light carrying medium as successively emitted from its source core is successively at a slightly further decayed speed than its predecessor.

That decaying speed of the flow is per equation *(11-1)*.

(11-1) $$c(t) = c(0)\cdot\varepsilon^{-t/\tau} \qquad \text{a velocity.}$$

Its rate of change, that is its acceleration [in this case deceleration], is its first derivative, as equation *(11-2)*.

(11-2)
$$\frac{d[c(t)]}{dt} = -\frac{c(0)}{\tau}\cdot\varepsilon^{-[t/\tau]} \quad \text{in general.}$$
$$\frac{d[c(now)]}{dt} \equiv \frac{dc}{dt} = -\frac{c(now)}{\tau}\cdot\varepsilon^{-[0/\tau]} = -\frac{c(now)}{\tau} = -\frac{c}{\tau} \quad \text{at time now}$$
$$a_A = -\frac{c}{\tau} = -\frac{2.99792458\cdot 10^{8}}{3.57532\cdot 10^{17}} \quad \text{now}$$
$$= -8.38504\cdot 10^{-10}\ {}^{m}/_{s^2} \quad \text{the anomalous acceleration}$$

That result is that the rate of change, the acceleration of the Universal Decay, is an inward acceleration, the universal contraction, that matches the experimentally measured anomalous acceleration inward, a_P, of $(8.74 \pm 0.94)\times 10^{-10}\ m/s^2$ of the Pioneer Anomaly of Section 7 within the limits of its (just above) precision.

It is the rate of the universal contraction, the un-accounted for centrally directed acceleration demonstrated in galactic rotation curves, the Flybys Anomaly and the Dark Flow Anomaly.

Because the decay time constant is so large relative to human life times the decay appears to us to be a constant unchanging state.

Because everything including our instrumentation, our measurement standards, our atoms and ourselves are all experiencing the same decay, the decay is unnoticeable to us and is generally undetectable by us except for unusual circumstances such as the anomalies presented above.

CONCLUSION

The calculation of the anomalous acceleration, a_A, is dependent on the value of the decay time constant, τ, derived in Section 3, equations *(3-6)*, *(3-9)*, and *(3-10)*. That it gives a resulting value that matches the experimentally observed value of the anomalous acceleration obtained from the Pioneer Anomaly and galactic rotation curves is confirmation of the Universal Exponential Decay and the value of its time constant, τ.

Next: Further Experimentally Validating the Universal Exponential Decay