Matter Obeying Heracletean Dynamics

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Abstract: *Dual nature of matter obeying Heracletean dynamics has been discussed.*

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1. INTRODUCTION

Matter has dual nature – it behaves as a physical body as well manifests as a wave – as shown in Figure1.
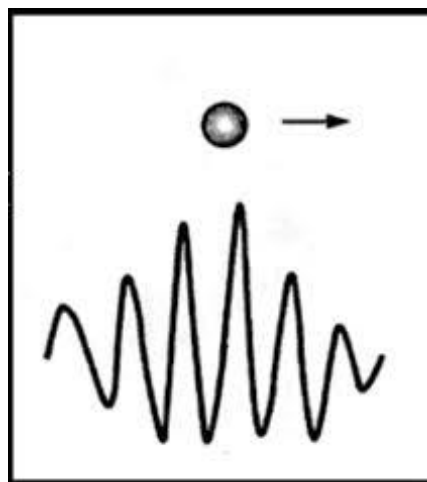

Figure1. *Dual nature of matter*

Let us see how the concerned duality copes with Heracletean dynamics where a physical body spins with some typical – of ground mass dependent – speed [1] and a wave propagates with a speed of light [2].

2. SPINNING OF THE PHYSICAL BODY

In Heracletean dynamics expressed as F = dp/dt + d(k/p)/dt a physical body cannot stay still but spins – around the mass centre in apparent rest – at a ground speed v_{ground} related to the ground mass m_{ground} as follows:

$$v_{ground} = \frac{\sqrt{k}}{m_{ground}}. \tag{1}$$

Where the dynamics constant k of the ordinary matter equals the product of Planck constant h and the speed of light c [1]:

$$k = hc. \tag{2}$$

A great dynamics constant k determines a great spin v_{ground} of the physical body.[1] Spin is provided in the ground path s_{ground} which equals Compton wavelength $\lambda_{Compton}$ of the ground mass m_{ground}. The ground path and the ground mass are in inverse proportion as written below:

$$s_{ground} = \lambda_{Compton} = \frac{h}{m_{ground} \ c}. \tag{3}$$

The spin of any ground mass is then (1), (2), (3) concluded at the ground time of the physical body, denoted $t_{physical\ body}$. So:

$$t_{physical\ body} = \frac{s_{ground}}{v_{ground}} = \frac{\frac{h}{m_{ground}\ c}}{\frac{\sqrt{hc}}{m_{ground}}} = \sqrt{\frac{h}{c^3}} = 4.959\ 032\ 525\ \dots\ x\ 10^{-30}s. \tag{4}$$

This means that obeying Heracletean dynamics any physical body in ground circumstances passes the ground path of the physical body in about 5 x 10^{-30} seconds.

3. THE LIGHT WAVE PROPAGATION

Spinning of the mass body is accompanied by the light wave propagation having the invariant speed $v_{wave} = c$ [2] provided in the same path $s_{ground} = s_{wave} = \frac{h}{m\ c}$ but in the consecutive time, denoted t_{wave}. So:

$$t_{wave} = \frac{s_{wave}}{v_{wave}} = \frac{\frac{h}{m_{ground}\ c}}{c} = \frac{h}{m_{ground}\ c^2}. \tag{5}$$

Comparing the equations (4) and (6) we can find out that in Heracletean dynamics the ground time of one spin of physical body $t_{physical\ body}$ equals the propagation time of one accompanied wave of light t_{wave} only in a special case of the next nominal equality $m_{ground} = \lambda_{wave} = \sqrt{\frac{h}{c}}$. Because it applies:

If

$$t_{physical\ body} = t_{wave}. \tag{6a}$$

Then

$$\sqrt{\frac{h}{c^3}} = \frac{h}{m_{ground}c^2}. \tag{6b}$$

And consequently

$$m_{ground} = \frac{h}{\sqrt{\frac{h}{c^3}}\ c^2} = \frac{h}{\sqrt{hc}} = \sqrt{\frac{h^2}{hc}} = \sqrt{\frac{h}{c}} = 1.486\ 680\ 56\ x\ 10^{-21}kg. \tag{6c}$$

As well as

$$\lambda_{wave} = \frac{h}{mc} = \frac{h}{\sqrt{\frac{h}{c}}c} = \sqrt{\frac{h^2}{hc}} = \sqrt{\frac{h}{c}} = 1.486\ 680\ 56\ x\ 10^{-21}m. \tag{7}$$

According to the above number 1.487 x 10^{-21} we can define micro and macro world as presented in Table1.

Table1. *The characteristics of micro and macro world*

Micro world	m_{ground} < 1.487 x 10^{-21} kg	λ_{wave} > 1.487 x 10^{-21} m	$t_{physical\ body}$ = 5 x 10^{-30}s < t_{wave}
Macro world	m_{ground} > 1.487 x 10^{-21} kg	λ_{wave} < 1.487 x 10^{-21} m	$t_{physical\ body}$ = 5 x 10^{-30}s > t_{wave}

From the above Table1 it is evident that in micro world the wave nature exceeds the physical body nature since there holds $t_{wave} > t_{physical\,body}$. And vice versa, in macro world the physical body nature exceeds the wave nature since there holds $t_{physical\,body} > t_{wave}$.

4. CONCLUSION

Obeying Heracletean dynamics (taking into account that the dynamics constant *k* for mass equals the product of Planck constant *h* and the speed of light *c*, i.e.: k = hc) any physical body in the ground circumstances passes its Compton wavelength in about 5 x 10^{-30} seconds. On the other hand the light wave propagation time is of ground mass dependent. So the wave nature of matter prevails in micro world of low mass and contrarily the body nature of matter prevails in macro world of great mass. Both statements are in line with experience.

DEDICATION

This fragment is dedicated to Complexity and Perseverance

Figure2. *Complexity and perseverance*

ADDENDUM

Actually we have deal with the duality of the time of matter t_{matter} being the sum of two times – of the wave t_{wave} as well as of the physical body $t_{physical\,body}$ – as follows:

$$t_{matter} = t_{wave} + t_{physical\,body.} \qquad (8a)$$

Or applying the equation (4) the next form for the ground time of matter is given:

$$t_{matter} = \frac{h}{m_{ground}c^2} + t_{physical\,body.} \qquad (8b)$$

Respecting the above relation where the ground time of physical body should be constant (4) the duality of time vanishes only at infinite ground mass and at zero ground mass the duality is not defined.

REFERENCES

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