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Time in Heracletean Dynamics (Additional Article)

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Abstract: *The discussion about consistency of time in Heracletean dynamics has been supplemented.*

Keywords: *Heracletean dynamics, elliptic and hyperbolic time*

1. Introduction

The subject of interest of this paper is to supplement the discussion about the inconsistency of time of matter in Heracletean dynamics as a consequence of the mass dependent wave time $t_{wave} = \frac{\hbar}{mc^2}$[1].

2. The Wave Time on the non-Euclidean Sphere and Euclidean Plane

The geometric time can solve the inconsistency of time in Heracletean dynamics ensuring that the same time belongs to matter independently of its ground mass.[1] But at the finite sphere radius R[2]two possibilities are allowed for the vectorial time sum $\overrightarrow{t_{sphere}}$ of the real wave time $\overrightarrow{t_{wave}}$ and the imaginary wave time $\overrightarrow{it_{wave}}$ of the same nominal value written as:

$$\overrightarrow{t_{sphere}} = \overrightarrow{t_{wave}} + \overrightarrow{it_{wave}}. \tag{1}$$

A) On the elliptic sphere holds:

$$\cos\frac{t_{elliptic}}{R} = \cos\frac{t_{wave}}{R}\cos\frac{it_{wave}}{R}. \tag{2}$$

Here the vectorial time sum $t_{elliptic}$of both times (t_{wave} ,it_{wave}) on the elliptic sphere is positive real. Since:

$$t_{wave}^2 + (it)_{wave}^2 = t_{euclidean}^2 = 0 < t_{elliptic}^2. \tag{3a}$$

And consequently:

$$t_{elliptic} = x \ \ where\ x \in \mathbb{R}^+. \tag{3b}$$

The x-value depends on the sphere radius R.

B) On the hyperbolic sphere holds:

$$\cosh\frac{t_{hyperbolic}}{R} = \cosh\frac{t_{wave}}{R}\cosh\frac{it_{wave}}{R}. \tag{4}$$

Here the vectorial time sum $t_{hyperbolic}$ of both times (t_{wave} , it_{wave}) on the hyperbolic sphere is imaginary. Since:

$$t_{wave}^2 + (it)_{wave}^2 = t_{euclidean}^2 = 0 > t_{hyperbolic}^2. \tag{5a}$$

And consequently:

$$t_{hyperbolic} = ix \quad where\ x \in \mathbb{R}. \tag{5b}$$

The x-value depends on the sphere radius R.

At the infinite sphere radius R both non-Euclidean spheres transform into Euclidean plane so holds:

$$t_{wave}^2 + (it)_{wave}^2 = t_{euclidean}^2 = 0. \tag{6}$$

And consequently $t_{eucledean} = 0$.

3. The Consistent Time

It is plausible to propose that the existence of both non-Euclidean spheres is equally possible so the sphere wave time $\overrightarrow{t_{sphere}}$ could be a vectorial sum of the elliptic wave time $\overrightarrow{t_{elliptic}}$ and the hyperbolic wave time $\overrightarrow{t_{hyperbolic}}$ on the Euclidean plane as follows:

$$t_{sphere}^2 = t_{elliptic}^2 + t_{hyperbolic}^2. \tag{7}$$

Applying the equation (2) and taking into account $t_{wave} = \frac{h}{mc^2}$ the elliptic wave time $t_{elliptic}$ is given:

$$\cos\frac{t_{elliptic}}{R} = \cos\frac{\frac{h}{mc^2}}{R}\cos\frac{i\frac{h}{mc^2}}{R}. \tag{8}$$

And applying the equation (4) and taking into account $t_{wave} = \frac{h}{mc^2}$ the hyperbolic wave time $t_{hyperbolic}$ is given:

$$\cosh\frac{t_{hyperbolic}}{R} = \cosh\frac{\frac{h}{mc^2}}{R}\cosh\frac{i\frac{h}{mc^2}}{R}. \tag{9}$$

So the sphere wave time can be expressed with the help of the equations (7), (8) and (9) as follows:

$$t_{sphere}^2 = \left(R\,\mathrm{arcos}(\cos\frac{\frac{h}{mc^2}}{R}\;\cos\frac{i\frac{h}{mc^2}}{R})\right)^2 + \left(R\,\mathrm{arcosh}(\cosh\frac{\frac{h}{mc^2}}{R}\;\cosh\frac{i\frac{h}{mc^2}}{R})\right)^2 = 0. \tag{10}$$

We can further assume the equivalence of particle time[1] and individual sphere wave time $t_{elliptic}^2 = t_{hyperbolic}^2 = t_{particle}^2 = \frac{h}{c^3}$. Such sphere wave time of matter being independent of mass is achieved on the account of the mass dependent time curvature where the time sphere radius R is in inverse proportion to the mass of matter *m*.

4. Conclusion

The time consistency of matter in Heracletean dynamics can be achieved by the mass dependent curvature of time.

Figure1. *Time in Heracletean dynamics*

Dedication

To Merry Christmas and Happy New Year 2021

References

[1] *JanezŠpringer, (2020 Time in Heracletean Dynamics. International Journal of Advanced Research in Physical Science (IJARPS) 7(12), pp.11-12, 2020.*

[2] Špringer J. Fine Structure Constant as a Mirror of Sphere Geometry. *Progress in Physics*, 2013, v. 1, 12–14.

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