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Diverse Untouchable Mass in Heraclitean Dynamics (Counting on Double Surface)

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Abstract: *The diverse untouchable mass in Heraclitean dynamics has been proposed as well as presented in the case of the molecule* $HCNO_2$.

Keywords: *Heraclitean dynamics, diverse untouchable mass, double surface, alignment energy, molecule* $HCNO_2$

1. Introduction

In Heraclitean dynamics [1] the ordinary matter [2] with the nominal equality of Compton wavelength and mass $\lambda = m = \sqrt{\frac{h}{c}}$ at the luminal speed $v = c$ [3] possesses the ground speed being the maximal speed at the same time so such a mass is untouchable per se regarding the ability of receiving and giving a kinetic energy [4]. The diverse untouchable mass in Heraclitean dynamics is the subject of interest of this paper.

2. The Diverse Untouchable Mass

The untouchable mass per se is determined by Planck constant h and the luminal speed c:

$$m = \sqrt{\frac{h}{c}}. \tag{1a}$$

Or written in a squared way

$$m\,.\,m = \frac{h}{c}. \tag{1b}$$

The diverse untouchable mass can be developed as a geometric mean of different masses:

$$m_1.m_2 = \frac{h}{c}. \tag{2a}$$

$$\sqrt{m_1.m_2} = \sqrt{\frac{h}{c}} = m. \tag{2b}$$

Where m_1 and m_2 is the lighter and heavier feature of the diverse untouchable mass $m = \sqrt{m_1.m_2}$, respectively. If so, taking advantage of the diverse untouchable mass every mass of the ordinary matter of type $m_1 < m$ and $m_2 > m$ could spin untouchable at the luminal speed with the help of co-mass of type $m_2 > m$ and $m_1 < m$, respectively. The mass $m = \sqrt{m.m} = \sqrt{\frac{h}{c}}$ is untouchable per se because it is co-mass to itself. The concerned diversity of mass is presented in Table 1.

Table1. *The diverse untouchable mass* $m = \sqrt{m_1.m_2} = \sqrt{\frac{h}{c}}$ *of the ordinary matter of mass* m_1 *or* m_2

Mass	Co - mass
$m_2 > \sqrt{\frac{h}{c}}$	$m_1 < \sqrt{\frac{h}{c}}$

$m_2 = m_1 = m = \sqrt{\frac{h}{c}} = 1{,}486\,680\,56\,.\,10^{-21} kg = 895\,299{,}961\,438\,73\ Da$	
$m_1 < \sqrt{\frac{h}{c}}$	$m_2 > \sqrt{\frac{h}{c}}$

We can conclude from data presented in Table 1 that elementary particles possessing lighter mass than the untouchable mass $m_1 < \sqrt{\frac{h}{c}}$ can create the diverse untouchable mass $m = \sqrt{m_1.m_2} = \sqrt{\frac{h}{c}}$ at luminal speed with the help of the heavier co-mass $m_2 > \sqrt{\frac{h}{c}}$.

3. The Energy Sustainability of the Diverse Untouchable Mass

The energy sustainability of the diverse untouchable mass of the elementary particle $m = \sqrt{m_1.m_2}$ created from the ordinary mass $m_1$and co-mass m_2 can be justified by Heraclitean dynamics written as

$$F dt = dp + k\, d\left(\frac{1}{p}\right). \tag{3a}$$

If taking into account $k = hc$ for the ordinary matter [2] as well as applying the modification $d \rightarrow \Delta$ due to discrete variables. This gives:

$$F \Delta t = \Delta p + hc\, \Delta\left(\frac{1}{p}\right). \tag{3b}$$

Replacing Δt by $\frac{\Delta s}{c}$ at luminal speed c we get:

$$F \Delta s = c \Delta p + hc^2 \Delta\left(\frac{1}{p}\right). \tag{3c}$$

And considering $\mathrm{p = mc}$ we have:

$$F \Delta s = c^2 \Delta \mathrm{m} + hc\, \Delta\left(\frac{1}{m}\right). \tag{3d}$$

Or more evident

$$F \Delta s = c^2 (m_2 - m_1) + hc\, \Delta\left(\frac{1}{m_2} - \frac{1}{m_1}\right). \tag{3e}$$

At zero work $F\Delta s = 0$ the above equation (3e) step by step reveals the proposed diverse untouchable mass as follows:

$$0 = c^2 (m_2 - m_1) + hc \left(\frac{1}{m_2} - \frac{1}{m_1}\right). \tag{3f}$$

$$-h \left(\frac{1}{m_2} - \frac{1}{m_1}\right) = c (m_2 - m_1). \tag{3g}$$

$$h \left(\frac{1}{m_1} - \frac{1}{m_2}\right) = c (m_2 - m_1). \tag{3h}$$

$$h \frac{m_2 - m_1}{m_1 m_2} = c (m_2 - m_1). \tag{3i}$$

And finally

$$\frac{h}{c} = m_1 . m_2 . \tag{3j}$$

$$\sqrt{m_1 . m_2} = \sqrt{\frac{h}{c}}. \tag{3k}$$

The equation $(3k)$ equals the equation $(2b)$.

4. The Ratio between the Heavier Co-mass and the Lighter mass of an Elementary Particle

The ratio between the heavier co-mass m_2 and the lighter mass m_1 of an elementary particle is the next:

$$R = \frac{\lambda_1}{\lambda_2} = \frac{m_2}{m_1} = \frac{\frac{\frac{h}{c}}{m_1}}{m_1} = \frac{\frac{h}{c}}{m_1^2} = \frac{m^2}{m_1^2}. \quad (4)$$

It tells us how the longer Compton wavelength λ_1 of the lighter mass $m_1$is counted by the shorter Compton wavelength λ_2 of the heavier co-mass m_2 as well as how the heavier co-mass m_2 is counted by the lighter mass m_1.

At counting on a double surface [5] the double surface unit $s(1) = \left(2 - \frac{1}{\sqrt{1+\pi^2}}\right)$ should be taken into account, too. Then the next ratio between the heavier co-mass m_2 and the lighter mass $m_1$is given expressed with the untouchable mass per se m and the mass of the elementary particle m_1:

$$R_{Counting\ on\ a\ double\ surface} = \frac{m_2}{m_1} s(1) = \frac{\frac{h}{c}}{m_1^2} s(1) = \frac{m^2}{m_1^2} s(1). \quad (5)$$

The above ratio between the heavier co-mass m_2 and the lighter mass m_1 of the elementary particle is not aligned in principle denoted as $R \neq s(n \in \mathbb{N})$. [6] To become aligned denoted as $R = s(n \in \mathbb{N})$ the input of the alignment energy is needed.

5. The Alignment Energy of the Diverse Untouchable Mass

Conceptual alignment energy [6] - enabling in the present case the alignment of the lighter mass $m_1$with the heavier co-mass m_2 of the diverse untouchable mass $m = \sqrt{m_1 . m_2}$ - is given by the next formula:

$$E_{alignment} = \left(\frac{R_{unaligned}}{R_{aligned}} - 1\right) m_1 c^2. \quad (6)$$

Where $R_{unaligned}$ denotes the unaligned ratio between the heavier co-mass m_2 and the lighter mass m_1 of the elementary particle modified by the factor $\left(2 - \frac{1}{\sqrt{1+\pi^2}}\right)$ to obey the double surface geometry [5] as follows:

$$R_{unaligned} = \frac{m_2}{m_1} s(1) = \frac{m^2}{m_1^2} s(1) = \frac{\frac{h}{c}}{m_1^2}\left(2 - \frac{1}{\sqrt{1+\pi^2}}\right). \quad (7)$$

And round down value of $R_{unaligned}$ – justified in particular for large ratios [7] - is a good approximation of $R_{aligned}$:

$$R_{aligned} \approx ROUNDDOWN(R_{unaligned}). \quad (8)$$

Therefore, the following formula is useful for calculating the approximate alignment energy of the diverse untouchable elementary particles, too:

$$E_{alignment} \approx \left(\frac{R_{unaligned}}{ROUNDDOWN(R_{unaligned})} - 1\right) m_1 c^2. \quad (9)$$

Of course, in order to recognize tiny values of alignment energies, an exact equation has to be used [7]:

$$E_{alignment} = \left(\frac{R_{unaligned}}{s(n)} - 1\right) m_1 c^2. \quad (10)$$

Taking into account the next double surface relation

$$s(n) = n\left(2 - \frac{1}{\sqrt{1 + \frac{\pi^2}{n^2}}}\right), n = ROUNDDOWN(R_{unaligned}). \quad (11)$$

If the calculator fails at calculations with large numbers, a friendlier approximation formula for this occasion comes in handy [7]:

$$s(n) \approx n\left(1+\frac{1}{2}\,\frac{\pi^2}{n^2}\right). \qquad (12)$$

6. The Alignment Energy of the Diverse Untouchable Mass of the molecule HCNO2

Let us test the concerned theory on the example of the molecule $HCNO_2$.

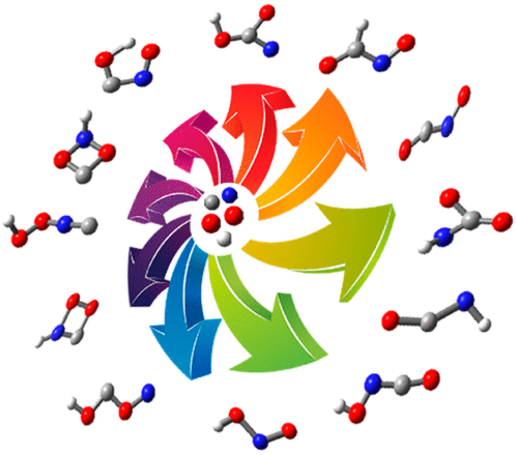

Figure1. $[H, C, N, O, O]$ *pentatomic molecular system [8]*

There are two reasons for this selection:

a) The masses of the atomic constituents considered are given with the greatest precision [9].

b) Moreover, this system is involved in fundamental combustion and atmospheric processes being of potential interest for astrophysics. [8]

Needed data for the calculation of mass m_1 of the molecule $HCNO_2$ are found in reference [9] and presented in Table 2.

Table2. *The mass m_1 of the molecule $HCNO_2$ and its atom constituents H, C, N and O*

Hydrogen ^{1}H mass (Da)	Carbon ^{12}C mass (Da)	Nitrogen ^{14}N mass (Da)	Oxygen ^{16}O mass (Da)	$HCNO_2$ mass (Da)
1,007 825 031 898	12	14,003 074 004 251	15,994 914 619 257	59,000 728 274 663

The mass m_1 of the molecule $HCNO_2$ is given as a sum of masses of its atom constituents H, C, N and O. Then using formulas from section 4 and values of essential constants from reference [10] the alignment characteristics of the diverse untouchable mass $m = \sqrt{m_1.m_2}$ of the molecule $HCNO_2$ are found:

$$h = 6{,}626\,070\,15\,.\,10^{-34} Js.$$

$$c = 2{,}997\,924\,58\,.\,10^{8} ms^{-1}.$$

$$Da = 1{,}660\,539\,066\,60\,.\,10^{-27} kg. \qquad (13)$$

$$m = \sqrt{\frac{h}{c}} = 1{,}486\,680\,56\,.\,10^{-21} kg = 895\,299{,}961\,438\,73\ Da. \qquad (14a)$$

$$m_{HCNO_2} = 59{,}000\,728\,274\,663\text{ Da}. \qquad (14b)$$

$$R^{HCNO_2}_{unaligned} = \left(\frac{895\,299{,}961\,438\,73\text{ Da}}{59{,}000\,728\,274\,663\text{ Da}}\right)^2 .\,1{,}696\,685\,528\,946\,7 = 390\,682\,306{,}0789. \qquad (14c)$$

$$R^{HCNO_2}_{aligned} \approx 390\,682\,306. \qquad (14d)$$

$$R^{HCNO_2}_{aligned} = 390\,682\,306{,}000\,000\,01. \qquad (14e)$$

$$m_{alignment}^{HCNO_2} = \left(\frac{390\ 682\ 306{,}0789}{390\ 682\ 306{,}000\ 000\ 01} - 1\right).59{,}000\ 728\ 274\ 663\ \text{Da} = 1{,}211\ 181\ 052\ 929\ .10^{-8}\text{Da}. \quad (14f)$$

$$m_{alignment}^{HCNO_2} = 2{,}011\ 213\ 455\ 11\ .10^{-35} kg. \quad (14g)$$

$$E_{alignment}^{HCNO_2} = 11{,}28\ eV. \quad (14h)$$

Results are collected in Table 3.

Table3. *The alignment characteristics of the diverse untouchable mass $m = \sqrt{m_1.m_2}$ of the molecule HCNO*$_2$

m_{HCNO_2}	$R_{unaligned}$	$R_{aligned}$	$m_{alignment}$	$E_{alignment}$
59,000 728 274 663 Da	390 682 306,0789	390 682 306,000 000 01	1,211 181 052 929 .10^{-8} Da	11,28 eV

The calculated alignment energy $E_{alignment}$ of the diverse untouchable mass $m = \sqrt{m_1.m_2}$ of the molecule $HCNO_2$ is interesting since being 11,3 eV it to one decimal place equals the first ionisation energy of carbon atom C [11]:

$$11{,}28\ eV = E_{alignment}^{HCNO_2} \approx 11{,}3\ eV\ (1110\ \text{Å}) \approx E_{ionisation}^{C} = 11{,}26\ eV. \quad (15)$$

So, the photon energy (corresponding to a wavelength of 1110 Å) necessary to remove an electron from the neutral C atom could also align the diverse untouchable mass $m = \sqrt{m_1.m_2} = \sqrt{\frac{h}{c}}$ of the molecule $HCNO_2$.

7. Conclusion

In order to manage such a small difference in energy, the help of a guardian angel is needed.

Dedication

To the coming year 2023 and Guardian angel

Figure2. *Guardian angel [12]*

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