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Keep on Rolling

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Abstract: *The continuous spin object delocalization in the light of free speed in Heraclitean dynamics was discussed.*

Keywords: *Spin object energy, unaligned and aligned delocalization energy, alignment energy, continuous delocalization, observable universe, Heraclitean dynamics, rolling speed, free speed, graviton mass candidate*

1. Introduction

The 30th step of the continuous spin object delocalization [1] obeying Heraclitean dynamics [2] is an interesting one since here the mass of the spin object coincides with the mass of the observable universe. [3] Let's explain the claim.

2. The Characteristics of the 30th Step of the Continuous Spin Object Delocalization

The characteristics of the 30th step of the continuous spin object delocalization [1] are the next:

The unaligned delocalization energy

$$E_{30}^{unaligned} = \frac{m_{object}c^2}{18{,}910{,}433{,}903{,}707{,}571{,}732{,}017{,}981{,}915{,}578{,}285{,}364{,}640{,}312{,}743{,}037{,}503{,}790{,}720{,}469{,}080{,}682{,}506{,}482.09485}. \quad (1)$$

The aligned delocalization energy

$$E_{30}^{aligned} = \frac{m_{object}c^2}{18{,}910{,}433{,}903{,}707{,}571{,}732{,}017{,}981{,}915{,}578{,}285{,}364{,}640{,}312{,}743{,}037{,}503{,}790{,}720{,}469{,}080{,}682{,}506{,}482}. \quad (2)$$

And their difference - the alignment energy

$$E_{30}^{alignment} = E_{30}^{aligned} - E_{30}^{unaligned} = 0.26524995 \dots \text{ x } 10^{-147} m_{object}c^2. \quad (3)$$

The mass equivalent of the alignment energy

$$\frac{E_{30}^{alignment}}{c^2} = 0.26524995 \dots \text{ x } 10^{-147} m_{object}. \quad (4)$$

And of the alignment profile $\frac{E_{30}^{alignment}}{m_{object}c^2}$ dependent rolling speed of localized spin object [4]

$$v_{30}^{rolling} = \sqrt{\frac{10}{7}\frac{E_{30}^{alignment}}{m_{object}c^2}}\, c = \sqrt{\frac{10}{7}\ 0.26524995 \dots \text{ x } 10^{-147}}\ c = 5.8358\ x\ \ 10^{-66} ms^{-1}. \quad (5)$$

This in Heraclitean dynamics starts with the double free speed and is dependent of the mass of the spin object (See Appendix):

$$v_{30}^{starting\ energetic\ rolling} = 2v_{object}^{free} = \frac{2\sqrt{hc}}{m_{object}} = \frac{8.9139124006\ x\ 10^{-13} kgms^{-1}}{m_{object}}. \quad (6)$$

3. The Energetic Rolling after the 30th Step of the Continuous Spin Object Delocalization

The energetic rolling starts at the equality of rolling speed and double free speed of the spin object. That is

$$\sqrt{\frac{10}{7}\frac{E_{30}^{alignment}}{m_{object}c^2}}\, c = 2\frac{\sqrt{hc}}{m_{object}}. \quad (7)$$

After rearranging the next mass of the spin object is given with which the alignment profile (and the step of delocalization) is related:

$$m_{30}^{object} = 2\frac{\sqrt{\frac{h}{c}}}{\sqrt{\frac{10}{7}\frac{E_{30}^{alignment}}{m_{object}c^2}}} = 2\frac{\sqrt{\frac{6.62607015\,x\,10^{-34}}{2.99792458\,x\,10^{8}}}}{\sqrt{\frac{10}{7}\,2.6524995\ldots\,\mathrm{x}\,10^{-148}}} kg = 1.527\,x\,10^{53} kg. \quad (8)$$

We can see that the mass of the spin object m_{30}^{object} and the alignment profile $\frac{E_{30}^{alignment}}{m_{object}c^2}$ are in inverse proportion. But the latter is inversely proportional to the step of delocalization. [1] So, in Heraclitean dynamics only heavier spin objects than the observable universe can delocalize in more than 30 steps. And vice versa, lighter spin objects than the observable universe delocalize in less than 30 steps. [1] Because the mass of the spin object in the 30th step coincides with the mass of the observable universe [3] the mass equivalent of the alignment energy of the 30th step is worth to become the candidate for the graviton mass with the value as follows applying the relation (4) and (8):

$$m_{graviton}^{candidate} = \frac{E_{30}^{alignment}}{c^2} = 0.265\,\mathrm{x}\,10^{-147} m_{object} = 0.265\,\mathrm{x}\,10^{-147} x\ 1.527\,x\,10^{53} kg = 0.40\,x\,10^{-94} kg. \quad (9)$$

4. Instead of Conclusion

Assuming that in the 1th step of the continuous spin object delocalization with the alignment profile $\frac{E_{1}^{alignment}}{m_{object}c^2} = 0.4894268\,\mathrm{x}\,10^{-6}$ [1] the rolling speed of localized spin object equals the double free speed we can following the example of equation (8) calculate the next mass of the spin object:

$$m_{1}^{object} = 2\frac{\sqrt{\frac{h}{c}}}{\sqrt{\frac{10}{7}\frac{E_{1}^{alignment}}{m_{object}c^2}}} = 2\frac{\sqrt{\frac{6.62607015\,x\,10^{-34}}{2.99792458\,x\,10^{8}}}}{\sqrt{\frac{10}{7}\,0.4894268\,\mathrm{x}\,10^{-6}}} kg = 6.32\,x\,10^{-18} kg. \quad (10)$$

What means that in Heraclitean dynamics the spin objects lighter than $6.32\,x\,10^{-18} kg$ cannot delocalize. Because no spin object can delocalize in less than one step.

Hint

We are not alone: “So keep on rolling”

Dedication

To the Proud Mary – the song of my youth

References

[1] Janez Špringer. "Spin Object Continuous Delocalization (Embrace the Space)" International Journal of Advanced Research in Physical Science (IJARPS), vol 12, no. 05, pp. 3-5, 2025.

[2] Janez Špringer (2022) “Speed at Zero Kinetic Energy in Heraclitean Dynamics” International Journal of Advanced Research in Physical Science (IJARPS) 9(8), pp.1-3, 2022.

[3] https://chatgpt.com/. Retrieved August 2025

[4] Janez Špringer. "Speed of Localized Spin Object" International Journal of Advanced Research in Physical Science (IJARPS), vol 12, no. 05, pp. 1-2, 2025.

Appendix

Actually, the formula for the rolling speed in Heraclitean dynamics should be the next

$$v_{n}^{rolling} = \sqrt{\frac{10}{7}\frac{E_{n}^{alignment}}{m_{object}c^2}}\,c + v_{object}^{free} = \sqrt{\frac{10}{7}\frac{E_{n}^{alignment}}{m_{object}c^2}}\,c + \frac{\sqrt{hc}}{m_{object}}. \quad (a)$$

If the speed is quantized the lowest rolling speed is free speed which is without kinetic energy. The first energetic rolling speed is twice the free speed. So:

$$\frac{v_n^{starting\ energetic\ rolling}}{v_{object}^{free}} = \frac{\sqrt{\frac{10}{7}\frac{E_n^{alignment}}{m_{object}c^2}}c + v_{object}^{free}}{v_{object}^{free}} = 2. \qquad (b)$$

And

$$v_n^{starting\ \ energetic\ rolling} = 2v_{object}^{free} = \frac{2\sqrt{hc}}{m_{object}}. \qquad (c)$$

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