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Glashow Energy Versus Special Fundamental Mass

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Abstract: *Glashow energy of 6.3 PeV is comparable to the special fundamental mass* $m_{fundamental}^2 c^2 = k(1 - lnk)$ *in Heraclitean dynamics applying the dynamics constant* $k = \sqrt{1 + \frac{1}{c^2}}hc \approx hc$ *where h is Planck constant and c is the speed of light.*

Keywords: *Glashow energy, special fundamental mass, Heraclitean dynamics*

1. Glashow Energy

The essence of the Glashow energy [1] is a very specific, almost magical resonance in particle physics where a neutrino suddenly becomes extraordinarily interactive. Here's the core idea. At energy of about 6.3 peta–electron volts (PeV), an electron antineutrino $\bar{\nu}_e$ hitting an electron e^-can resonate to form a real W^- boson:

$$\bar{\nu}_e + e^- \to W^-. \tag{1}$$

That energy — ≈ 6.3 PeV — is what people call the Glashow resonance energy. Why this matters:

- Normally, neutrinos barely interact with anything — they ghost through matter.
- At the Glashow energy, the interaction probability spikes dramatically.
- This happens because the center-of-mass energy exactly matches the mass of the W^- boson (~80 GeV), creating a resonance, like pushing a swing at just the right moment.

Why it's special:

- It was predicted by Sheldon Glashow in 1960, before the W boson was even discovered.
- It only works for electron antineutrinos, not neutrinos or other flavours.
- It sits at an astrophysical energy scale, meaning the neutrinos likely come from extreme cosmic sources (blazars, AGNs, cosmic accelerators).
- Detectors like Ice Cube look for it as a smoking gun of high-energy cosmic antineutrinos.

In one sentence:

Glashow energy is the point where a neutrino stops being shy and briefly announces itself by creating a W^-boson. So says artificial intelligence [1].

We can only offer some words in the addendum [2]

2. Addendum

Glashow energy of 6.3 PeV is comparable to the special fundamental mass $m_{fundamental}$ defined as $m_{fundamental}^2 c^2 = k(1 - lnk)$ in Heraclitean dynamics which is otherwise governed by the law F = dp/dt + d(k/p)/dt and consequently holds the relation between the relativistic mass $m_{relativistic}$ and its speed ac:

$$m_{relativistic}^2 c^2 a^2 = e^{\frac{m_{fundamental}^2 c^2 - k(1-lnk) + m_{relativistic}^2 c^2 (a^2-1)}{k}}. \tag{2}$$

Applying the dynamics constant $k = \sqrt{1 + \frac{1}{c^2}}hc \approx hc$ by taking into account Planck constant, $h = 6{,}626\ 070\ 15\ .\ 10^{-34} Js$, and the speed of light, $c = 2{,}997\ 924\ 58\ .\ 10^{8} ms^{-1}$, the special fundamental mass is the next:

$$m_{fundamental} = 1.131\ 033\ 510\ 688\ 174 \ldots\ x\ 10^{-20} kg. \qquad (3a)$$

Or

$$m_{fundamental} c^2 = 6.344\ 632\ 692\ 077\ 30 \ldots\ PeV \approx 6.3\ PeV. \qquad (3b)$$

Like the mass of the antineutrino, the special fundamental mass is also shy, because it is without any kinetic energy. Although it possesses a free speed $a_{free}c$ defined as:

$$m_{fundamental}^2 c^2 a_{free}^2 = k. \qquad (4a)$$

And with the help of relation $m_{fundamental}^2 c^2 = k(1 - lnk)$ we have

$$a_{free}c = \sqrt{\frac{1}{1 - lnk}} = 0.131\ 444\ 430\ 931\ 782 \ldots c. \qquad (4b)$$

3. Conclusion

Like antineutrino mass, a special fundamental mass in Heraclitean dynamics must be sacrificed to create something

Dedication

To artificial intelligence and creativity

References

[1] https://chatgpt.com/. Retrieved February 2026

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