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Dimensionality Choice

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Abstract: *The dimensionality choice on the double surface was discussed..*

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1. Introduction

Following the double surface concept the dimensionality (of space and time) R is proposed to be given by the elliptic length n expressed in Compton wavelengths of the mater [1]:

$$R = 2\sqrt{1+\frac{\pi^2}{n^2}} - 1. \tag{1}$$

The shorter the elliptic length n, the greater the dimensionality R.

And the elliptic length n can be deduced from the average elliptic-hyperbolic length $s(n)$:

$$s(n) = n\left(2 - \frac{1}{\sqrt{1+\frac{\pi^2}{n^2}}}\right). \tag{2}$$

The shorter the average elliptic-hyperbolic length $s(n)$, the shorter the elliptic length n, too. Thus, the shorter the average elliptic-hyperbolic length $s(n)$, the greater the dimensionality R.

The length is not upside limited. So, to the infinite elliptic length $n = \infty = s(n)$ belongs the minimum dimensionality yielding unit value, i.e. $R_{minimum} = R(\infty) = 1$.

But the length is downside limited since the average elliptic-hyperbolic length cannot be smaller than one Compton wavelength of the matter. To the average-elliptic-hyperbolic length $\lambda_{Compton} = s(n) = 1$ belongs the elliptic length $n = 0.546\,897\,427\,7\ldots$ that applying the relation (1) knocks the maximum dimensionality at $R_{maximum} = 10.66\ldots$

The dimensionality choice then lies between the next numbers:

$$1 < R < 10.66\ldots \tag{3}$$

2. The Dimensionality Choice

It is plausible to take into account natural numbers for spatial dimensions ($R \in \mathbb{N}$) and eventually half number 0.5 for the one-way time dimension ($R \in \mathbb{N} + 0.5$). Length characteristics of the dimensionality are given with the help of relation (1) written explicitly for the elliptic length n expressed in Compton wavelengths of the matter as follows:

$$n = \frac{\pi}{\sqrt{\left(\frac{R+1}{2}\right)^2 - 1}}. \tag{4}$$

The concerned dimensionality characteristics are collected in Table1.

Table1. On the dimensionality depended length characteristics expressed in Compton wavelengths of the matter

Dimensionality R	Elliptic length n (in $\lambda_{Compton}$)	Average elliptic-hyperbolic length s(n) (in $\lambda_{Compton}$)	Fraction by the matter occupied length (inversed length $\frac{1}{s(n)}$)
1	∞	∞	0
1.5	4,188 790 204 8	5,026 548 245 7	0.1989
2	2.809 925 892 4	3.746 567 856 6	0.2669
2.5	2.187 524 340 4	3.125 034 772 0	0.3200
3	1.813 799 364 2	2.720 699 046 4	0.3676
3.5	1.558 666 443 9	2.424 592 460 7	0.4124
4	1.371 103 441 7	2.193 765 506 7	0.4558
4.5	1.226 352 199 9	2.006 758 145 3	0.4983
5	1.110 720 734 5	1.851 201 224 2	0.5402
5.5	1.015 930 850 5	1.719 267 593 1	0.5816
6	0.936 641 964 1	1.605 671 938 5	0.6228
6.5	0.869 234 031 2	1.506 672 320 8	0.6637
7	0.811 155 735 2	1.419 522 536 6	0.7045
7.5	0.760 551 348 2	1,342 149 379 9	0.7451
8	0.716 035 419 6	1.272 951 857 1	0.7856
8.5	0.676 550 651 3	1.210 669 586 6	0.8260
9	0.641 274 915 1	1.154 294 847 1	0.8663
9.5	0.609 558 510 3	1.103 010 637 6	0.9066
10	0.580 880 687 1	1.056 146 703 9	0.9468
10.5	0.554 818 816 3	1.013 147 403 7	0.9870
10.661 565 554	0.546 897 427 7	1	1

Due to dimensional limitations, matter cannot occupy the entire available length. Maximum length is occupied at the dimensionality 10.5 where only 1.3% of the average elliptic-hyperbolic length remains unoccupied. What could mean that during the placement of matter in 10.5-dimensional space-time the surplus energy of 0.013 mc^2 being released. In the case of the electron the mentioned energy amounts to 6.63 keV as follows:

$$\Delta E_{electron} = (1 - 0.987)m_e c^2 = 0.013\ x\ 511\ keV = 6.63\ keV. \quad (5)$$

3. Instead of Conclusion

The mentioned value coincides with the discovery of a strong 6.6 keV emission feature from EXO 1745-248 after the superburst in 2011 October. [2] Even more precisely, the observed X-ray spectra for RW Aurigae noticed the absorption and emission feature at 6.63 keV during the 2017 dimming event. [3]

4. Conclusion

Forget about coincidences if they don't lead to an answer.

References

[1] Janez Špringer. "Ratio of Hyperbolic Length to Elliptic Length as Measure of Dimensionality" International Journal of Advanced Research in Physical Science (IJARPS), vol 11, no. 10, pp. 1-2, 2024.

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[3] Hans Moritz Günther *et al* 2018 *AJ* **156** 56

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