International Journal of Advanced Research in Physical Science (IJARPS)
Volume 10, Issue 3, 2023, PP35-36
ISSN No. (Online) 2349-7882
www.arcjournals.org

Ordinary Matter Manifesting in Average Three and Half Dimensional Space-Time

Janez Špringer*

Cankarjeva cesta 2, 9250 Gornja Radgona, Slovenia, EU

Corresponding Author:** ***Janez Špringer, *Cankarjeva cesta 2, 9250 Gornja Radgona, Slovenia, EU*

Abstract: *The occurrence of matter in the expanding universe has been discussed.*

Keywords: *expanding n-dimensional universe, ordinary matter*

1. Introduction

In the previous article [1] the speed of the expanding universe was related to the number of dimensions. The interest of this paper is to find the occurrence of such n-dimensional universe.

2. The Occurrence of N-Dimensional Universe

The speed of expanding universe $v_{expanding}(n)$ is determined by the speed of the one dimensional universe $v(1)$ and is inversely proportional to the number of dimensions n [1]:

$$v_{expanding}(n) = \frac{v(1)}{n}. \tag{1}$$

It is plausible that the occurrence of expanding n-dimensional universe $p_{expanding}(n)$ depends on the kinetic energy of expanding:

$$W_{expanding}(n) = \frac{m}{2}\left(v_{expanding}(n)\right)^2 = \frac{m}{2}\frac{\left(v_{expanding}(1)\right)^2}{n^2}. \tag{2}$$

The higher kinetic energy per dimension available the higher occurrence expected. Applying the relation $\sum_{n=1}^{n=\infty}\frac{1}{n^2} = \frac{\pi^2}{6}$ [2] the next occurrence is given:

$$p_{expanding}(n) = \frac{W_{expanding}(n)}{\sum_{n=1}^{n=\infty} W_{expanding}(n)} = \frac{\frac{m}{2}\frac{\left(v_{expanding}(1)\right)^2}{n^2}}{\frac{m}{2}\left(v_{expanding}(1)\right)^2\sum_{n=1}^{n=\infty}\frac{1}{n^2}} = \frac{\frac{1}{n^2}}{\frac{\pi^2}{6}} = \frac{6}{n^2\pi^2}. \tag{3}$$

The above formula (3) indicates that the occurrence of the expanding n-dimensional universe is independent of universe mass m and maximal speed of the expanding $v_{expanding}(1)$. It is solely inversely proportional to the square of the number of universe dimensions n^2. Some values are collected in Table 1.

Table1. *Some values of the occurrence of expanding n-dimensional universe*

Number of dimensions ($n \in \mathbb{N}$)	Occurrence of expanding n-dimensional universe
1	60,8 %
2	15,2 %
3	6,8 %
4	3,8 %
5	2,4 %
6	1,6 %
7	1,2 %
8	0,9 %

9	0,8 %
10	0,6 %
11	0,5 %
12	0,4 %
> 12	5 %

It is evident from Table1 that the occurrence of expanding one dimensional universe with value of 60,8 % is the most favourable. The occurrence of expanding three and four dimensional universe is 6,8 % and 3,8 %, respectively. Interesting is their average value:

$$p_{expanding}(3{,}5) = \frac{p_{expanding}(3) + p_{expanding}(4)}{2} = \frac{6{,}8\% + 3{,}8\%}{2} = 5{,}3\% \approx 5\%. \quad (4)$$

The above value approximately equals the occurrence of the ordinary matter $p_{ordinary\ matter} = 5\%$ with which we are familiar in the present universe [3]. Thus:

$$p_{expanding}(3{,}5) = p_{ordinary\ matter} = 5\%. \quad (5)$$

3. Conclusion

An average 3.5-dimensional space-time with six spatial directions and one time direction $\left(\frac{6+1}{2} = 3{,}5\right)$ could be home of the ordinary matter residing in much larger multidimensional universe.

Dedication

To Home Sweet Home

Figure1. *Ljubo doma, kdor ga ima (Home Sweet Home) [4]*

References

[1] Janez Špringer (2023) "Way to Beauty" International Journal of Advanced Research in Physical Science (IJARPS) 10(3), pp.1-3, 2023

[2] https://www.wolframalpha.com/input?i=sum+1%2Fn%5E2. Retrieved March 2023

[3] https://science.nasa.gov/astrophysics/focus-areas/what-is-dark-energy. Retrieved March 2023

[4] https://www.c17designs.co.uk/product/home-sweet-home-artwork. Retrieved March 2023

Citation: *Janez Špringer (2023) "Ordinary Matter Manifesting in Average Three and Half Dimensional Space-Time" International Journal of Advanced Research in Physical Science (IJARPS) 10(3), pp.35-36, 2023.*