Way to Beauty

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Abstract: *On the way to beauty, the relation between the speed of the expanding universe and the number of spatial dimensions has been discussed.*

Keywords: *speed of the expanding universe, number of spatial dimensions, beauty*

1. INTRODUCTION

In the previous paper [1], on the way to beauty, the speed of the expanding universe in 3 spatial dimensions was discussed. The purpose of this one is to relate the speed of the expanding universe to the number of spatial dimensions.

2. THE SPEED OF EXPANDING UNIVERSE AS THE BRIDGE TO BEAUTY

The difference $\Delta = \frac{1+\sqrt{5}}{2} + \frac{1}{\sqrt{4+2\sqrt{2}}} - 2$ between the golden ratio $\phi = \frac{1+\sqrt{5}}{2}$ and the hyperbolic-elliptic unit expressed on the most favourable discrete surface) $s_{discrete}(1)/1 = 2 - \frac{1}{\sqrt{4+2\sqrt{2}}}$ could be overpassed with the help of expanding the concerned unit for the value of $\frac{\Delta}{n}$ in each dimension of n-dimensional space. For the spinning matter at the luminal speed c this could be done with the help of speed of the expanding universe $v = \frac{\Delta}{n}c$ in each dimension (See appendix). If so, the next exact speed of expanding universe related to number of spatial dimensions can be offered:

$$v_{expanding\ universe}(n) = \frac{\Delta}{n}c = \frac{\frac{1+\sqrt{5}}{2} + \frac{1}{\sqrt{4+2\sqrt{2}}} - 2}{n}\ c. \tag{1a}$$

What applying $c = 299\ 792\ 458\ \frac{m}{s}$ yields

$$v_{expanding\ universe}(n) = \frac{215,077}{n}\ kms^{-1}. \tag{1b}$$

And for 3 – dimensional space the next result is given

$$v_{expanding\ universe}(3) = 71{,}69 kms^{-1}. \tag{1c}$$

3. THE RELATION CONSEQUENCES

The above formula (1a, 1b, 1c) indicates that the speed of expanding universe $v_{expanding\ universe}(n)$ should be inversely proportional to the number of spatial dimensions n. In other words, with more spatial dimensions it is easier to bridge the difference between the golden ratio ϕ and the concerned discrete unit $s_{discrete}(1)/1$ what enables to touch the beauty. To do this at infinite spatial dimensions, for instance, no expanding of universe is needed at all. Some speeds of the expanding universe to reach the golden ratio and beauty are presented in Table 1.

Table1. *Some speeds of the expanding universe related to the number of spatial dimensions*

Number of dimensions ($n \in \mathbb{N}$)	Speed of expanding universe (kms^{-1})
0	∞
1	215,08
2	107,54

3	71,69
4	53,77
…	…
10	21,51
---	…
∞	0

We can see from Table 1 that following the present concept the values of speed of the expanding universe are discrete. The universe committed to beauty originates from the $infinite-$ dimensional point with the zero speed of expanding. In order to maintain the commitment to beauty after entering the universe of finite spatial dimensions, the universe must begin to expand with some speed. The less spatial dimensions available, the higher the speed required. The speed of $215,077 kms^{-1}$ at one spatial dimension is the greatest plausible speed of the expanding universe. The $zero-$ dimensional universe doesn't make sense since it requires an infinite speed of expanding to achieve beauty at golden ratio what is unreachable.

4. CONCLUSION

Thank God for Beauty

DEDICATION

To Eleanor Roosevelt and her quote [2]:

REFERENCES

[1] Janez Špringer (2023) "With Speed of Expanding Universe to Beauty" International Journal of Advanced Research in Physical Science (IJARPS) 10(2), pp.1-2, 2023

[2] https://blog.hubspot.com/sales/famous-quotes

APPENDIX

We have deal with the next inequality

$$\frac{\phi}{s_{discrete}} > 1. \tag{a}$$

To get the equality we multiply the denominator by a factor $\frac{c+v}{c} = \frac{ct+vt}{ct} = \frac{s(c)+s(v)}{s(c)}$. Here c is the speed of spinning in each spatial dimension and v is the speed of expanding to be distributed to all spatial dimensions:

$$\frac{\phi}{s_{discrete}\frac{c+v}{c}} = 1. \tag{b}$$

Rearranging we have

$$\frac{\phi}{s_{discrete}} = \frac{c+v}{c}. \tag{c}$$

Rearranging further we get

$$1 + \frac{\Delta}{s_{discrete}} = \frac{\phi}{s_{discrete}} = \frac{c+v}{c} = 1 + \frac{v}{c}. \qquad (d)$$

We notice

$$\frac{\Delta}{s_{discrete}} = \frac{v}{c}. \qquad (e)$$

Or

$$v = \frac{\Delta}{s_{discrete}} c. \qquad (f)$$

Mapping of hyperbolic-elliptic length per time to elliptic length per time ($v \to \frac{v}{s_{discrete}}$) gives

$$\frac{v}{s_{discrete}} = \frac{\Delta}{s_{discrete}} c. \qquad (g)$$

What yields $v = \Delta c$ and the speed of expanding universe per spatial dimension is the next

$$v_{expanding}(n) = \frac{v}{n} = \frac{\Delta}{n} c. \qquad (h)$$