

Functional Domains in the Encrypted Inverse Fine-Structure Constant

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ABSTRACT

The inverse fine-structure constant $1/\alpha = 137.035999\dots$ is encrypted by a numerical 137 035 999 ... triplet code, and functional domains of this code are separated from each other by 999 triplets.

Keywords: Fine-Structure Constant, Numerical Triplet Code.

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I. INTRODUCTION

In physics, the fine structure constant, commonly denoted by α (the Greek letter alpha) is a fundamental physical constant characterizing the strength of the electromagnetic interaction between elementary particles. Fine structure was first measured precisely for the hydrogen atom by Albert Michelson and Edward Morley in 1887 and was theoretically treated in the early 1920s by Arnold Sommerfeld, who introduced the fine-structure constant alpha (α). The commonly used abbreviated expression for the fine-structure constant is $\alpha = e^2 / \hbar c$, where e is the elementary charge, \hbar the reduced Planck constant, and c the speed of light in vacuum. Since the early 1920s, physicists have suspected that the number 137 in the inverse fine structure constant $1/\alpha = 137.035999\dots$ would lay at the heart of a grand unified theory, relating theories of electromagnetism, quantum mechanics and gravity. For many years, the number 137 in the reverse value of alpha has intrigued physicists. In the 1930s, Arthur Eddington proposed a relation with the number of protons in the observable universe, but this assumption later turned out to be wrong. Nevertheless, Eddington's premise that the number 137 in $1/\alpha$ should refer to a measurement that would itself be dimensionless, seems logical. Later, Richard Feynman [1] referred to the 137 in the inverse fine-structure constant saying: "...It has been a mystery ever since it was discovered, and all good theoretical physicists should put this number on their wall and worry about it. Immediately you would like to know where this number for a coupling comes from: is it related to Pi (π) or perhaps to the base of natural logarithms? Nobody knows. It is one of the greatest mysteries of physics: a magic number that comes to us with no understanding by man... [1].

II. CODATA AND QHE

The fine-structure constant alpha (α) has been assessed by the CODATA Task Group on Fundamental Constants [2] giving $1/\alpha = 137.035999\dots$ Starting in the 1980's a new and wholly different measurement approach using the quantum Hall effect (QHE), also yielded $1/\alpha = 137.035999\dots$ but between CODATA and QHE there were varying differences in the triplets after the 999 triplet, yielding for instance 137.035999084(21) as CODATA result [2], and 137.035999173(35) as QHE result [3],[4]. This perhaps indicates that with both CODATA and QHE methods, the 999 triplets serve as "stop codons" by keeping the 137 035 triplets safe from coming in contact with triplets that are after the 999 triplets.

III. COSMOLOGY

The fact that 137, by being a Pythagorean prime number is the sum of two squares (*i.e.* $137=11^2 + 4^2$) has suggested that $1/\alpha = 11^2 + 4^2 + 0.035 = 137.035$, with 11 being the 11 dimensions of M-theory, and 4 the number of dimensions of Einstein's space-time [5]. Recently this was extended to the possibility that the 035 triplet in $1/\alpha = 137.035$ by standing for 0.035, might mean a 3.5 percent visible universe, thereby indicating 96.5 percent dark energy and dark matter [6]. This is close to the values obtained by astronomical measurements [7].

IV. MULTI-UNIVERSE

The universe we live in has an inverse fine-structure constant of 137.035999..., which is about 137, so it might be that other universes only exist if their inverse fine-structure constants are Pythagorean primes, *i.e.* if they possess $1/\alpha$ values of about 5, 13, 17, 29, ..., 137... etc. [5]. Stable matter, and therefore life and intelligent beings could

not exist if the value of $\alpha = 1/137$ were much different. For example, were α to change by 4 percent, stellar fusion would not produce carbon, so that carbon-based life would be impossible. If α were larger than 0.1, stellar fusion would be impossible and no place in the universe would be warm enough for life as we know it [8].

V. RIGHT TRIANGLE

That $137 = 11^2 + 4^2$ suggests the possibility of a right triangle formed by the frontal part of $1/\alpha$ with respective sides $x = 11$, $y = 4$, and $z = \sqrt{137} = 11.7046999\dots$. Here the number 11.7046999... is the square root of 137 and is encrypted as 117 046 999. Thus the 999 triplet in the z-side of the triangle would allow 117 046 to be expressed, but not the 999 triplet or the triplets that are found *after* the 999 triplet. It is possible that codes 137 035 and 117 046 are involved in the fine-structure splitting of atomic spectral lines. Interestingly, the decimal digit sums of $1+3+7+0+3+5=19$ and of $1+1+7+0+4+6=19$, both add up to 19, suggesting some affiliation.

VI. DISCUSSION

It has been proposed that our external physical reality is really a mathematical structure, that the physical universe is not merely described by mathematics, but ‘is’ mathematics [9]. If this turns out to be true, it will be interesting to know if that Mathematical Universe is constructed of the kind of triplet code described in this paper. It would be very interesting if $1/\alpha$ codes, genetic DNA codes, and Mathematical Universe codes, all three would turn out to be triplet codes.

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