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# Quintessential Nature of the Fine-Structure Constant

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## Abstract

An introduction is given to the geometry and harmonics of the Golden Apex in the Great Pyramid, with the metaphysical and mathematical determination of the fine-structure constant of electromagnetic interactions. Newton's gravitational constant is also presented in harmonic form and other fundamental physical constants are then found related to the quintessential geometry of the Golden Apex in the Great Pyramid.

## 1. Introduction

The geometry of the Great Pyramid of Giza, as stated by Eckhart Schmitz in *The Great Pyramid of Giza*, "... demonstrates extraordinary precision in relaying highly accurate geodetic knowledge ..." and "it is evident, with a very high degree of probability, that the design parameters were expressly intent on conveying this advanced knowledge." [1].

In *The Essence of the Cabalah*, William Eisen describes the fundamental geometry of what was known as the Golden Apex of the Great Pyramid and the ancient pre-pharaonic science of the Agashan Masters [2].

## 2. Golden Geometry of the Great Pyramid

The Golden Apex of the Great Pyramid is the side of a square in the upper part of the capstone resulting from four exponential curves at the base of the Great Pyramid [2]. The Golden Apex of the Great Pyramid is  $A$ :

$$A = e^\pi - 7\pi - 1 \simeq 0.1495 \quad (1)$$

The inverse of the Golden Apex  $A^{-1}$  is a harmonic of Newton's gravitational constant  $G$ .  $A^{-1} \simeq \phi\sqrt{2\pi e} \simeq \phi/\ln(4/\pi)$  and  $4/\pi \simeq \sqrt{11A}$ .  $A + 1 \simeq R \simeq 1.152$ , approximate

radius of the regular heptagon with the side equal to one.  $A \simeq \pi/\sqrt{440} \simeq \sqrt{\pi/140}$ , base of the Great Pyramid is approximately 440 cubits, and the height is  $2 \times 140 = 280$  cubits.  $140/360 \simeq e/7 \simeq \sqrt{A}$  and  $4 \times 440 \simeq 2\pi \times 280$ . The height of the Golden Apex,  $4A/2\pi \simeq S^{-2}$ , the silver constant of the heptagon, see Eq. (4).

$$RA \simeq \sqrt{\phi}/e^2 \simeq \ln(\pi/\sqrt{7}) \quad (2)$$

The golden ratio approximates the squaring of the circle and is also closely related to the heptagon geometry.  $2R = \csc(\pi/7)$  and  $R \simeq \phi/\sqrt{2} \simeq 13/7\phi \simeq \ln \pi \simeq 2/\sqrt{3} \simeq 7/\sqrt{37}$ . In radians  $\tan S^{-1} \simeq \pi^{-1}$ . In the *Timaeus*, Plato “considered the golden section to be the most binding of all mathematical relationships and the key to the physics of the cosmos,” quoted by Robert Schoch and Robert McNally in *Pyramid Quest* [3].

Quintessence is associated with the dynamic aether and embraces the four known forces of nature.

$$Q = C/\sqrt{2} \simeq \sqrt{e}/\phi \simeq 1 + \alpha\phi^2, \quad (3)$$

where  $\alpha \simeq 1/137$  is the fine-structure constant and  $Q \simeq 377/370 \simeq \sqrt{11}/S \simeq 1.019$ .  $C^2$  is the approximate inner diameter of the regular heptagon with side equal to one.  $C^2 \simeq \cot(\pi/7) \simeq 1/\ln \phi$ .  $CQ \simeq \sqrt{\phi}R \simeq \csc \alpha^{-1}$ . The golden ratio  $\phi \simeq A + CQ$  and  $\phi^2 \simeq A + C + Q$ . In elementary form,  $22 = 1 + (3 \times 7) \simeq 7\pi$ . Also,  $C = \sqrt{2}Q \simeq 1.441$ .

Aristotle coined the term *quinta essentia* for Plato’s fifth element, often represented by the dodecahedron. The quintessence is described in Malcolm Macleod’s geometry of angular momentum model as the harmonic  $Q$  and also has units from the square root of Planck angular momentum [4].

The golden ratio is an approximate harmonic of the Planck length in meters and harmonics of fundamental units have a geometric basis in ancient metrology [5].  $R$  is a harmonic of half the Great Pyramid base length in meters, and  $CQ$  is a harmonic of the height in meters. The  $\ln A^{-1} \simeq \sec Q \simeq 6/\pi \simeq \pi/\sqrt{e}$ , the cube-sphere ratio.

With golden ratio overlay software, a golden spiral centered on the Eye of Ra in Robert Temple’s plan of the Giza Plateau, is shown to pass through both the Golden Apex of the Great Pyramid and the Great Sphinx of Giza. The ratio of the length of the sides of Temple’s Perfect Square of Giza/Shadow Square of Giza is approximately equal to  $Q$  [6].  $Q \simeq \sqrt{7A} \simeq \ln \sqrt{R/A} \simeq A + R^{-1}$  and  $\ln(S/Q) \simeq \pi/e$ . In radians,  $\tan Q \simeq \phi$ .

$$A \simeq \sqrt{11}/7\pi \simeq \sqrt{e}/11 \simeq 2\pi\alpha S \quad (4)$$

The silver constant  $S$  from the regular heptagon,  $S = 4 \cos^2(\pi/7) \simeq 2\sqrt{2}R \simeq 2 \tan Q \simeq \tan \sqrt{\phi} \simeq 3.247$ .  $CQ \simeq \sqrt{7/S}$ .  $1 + 3 + 7 = 11$ .  $2\pi\alpha$  is the ratio between the Compton wavelength of the electron in hydrogen and the Bohr radius.

From the hyperdimensional aether, elementary charge and spin angular momentum (determining the fine-structure constant) is manifested through the proportions of the golden ratio.  $A \simeq \sqrt{S}/12$ ,  $AS^2 \simeq 11/7 \simeq \pi/2$  and  $\alpha^{-1} \simeq A^{-2} \tan 72^\circ$ , with the regular pentagon angle.  $S \simeq \sqrt{7\pi}/C$  and  $C^2 \simeq R\sqrt{S} \simeq \cot(\pi/7)$ .

Jean-Paul and Robert Bauval describe in the *Secret Chamber Revisited* how prime numbers 7 and 11 are significant keys to the Great Pyramid [7]. The number seven was

“especially dedicated to Sirius,” [1, 8, 9]. Half the face apex angle of the Great Pyramid is approximately  $32^\circ$  [10].  $11 \times 11 = 121$  and  $121/137 \simeq \sqrt{2} \tan 32^\circ$ .  $G_a \simeq 1/\sqrt{RA} \simeq 2\sqrt{C} \simeq \ln 11 \simeq 2.4$ , where  $G_a$  is the golden angle in radians. From the pyramid face apex angle,  $\tan 64^\circ \simeq \sqrt{11}/\phi \simeq 137/67$ .

The special number 528 translates as the *Key* to the *Pyramid of Light* [11, 12]. The harmonic  $5.28 \simeq 37/7 \simeq 2\sqrt{7} \simeq e\pi/\phi$ . Also,  $2\pi \simeq \ln(528)$  and  $5.28 \simeq 2\pi/\sqrt{C} \simeq \pi/4A$ . Found in several places,  $2.64'$  is the width and height of the Ark of the Covenant, the proportioned Golden Apex height and section lengths above the  $5.28'$  rise in the Grand Gallery.  $2.64 \simeq Q/\sqrt{A} \simeq \sqrt{7}$ .

### 3. Mathematics of the Fine-Structure Constant

The fine-structure constant was introduced by Arnold Sommerfeld with the addition of elliptic orbits to Bohr’s atomic model [13]. The fine-structure constant determines the strength of the electromagnetic interaction and being related to quintessence it is involved in all aetheric phenomena.

The usual definition for alpha, the fine-structure constant is  $\alpha = e^2/\hbar c$  in *cgs* units. Mark Rohrbaugh’s review of Nassim Haramein’s work motivated the question of recombining the formula for the classical electron radius  $r_e = e^2/m_e c^2$  with the formulation by Haramein for the proton charge radius, from the modified Eq. (31)  $r_p = 4\hbar/m_p c$  [14].

$$\alpha = 4/(m_p/m_e)(r_p/r_e) \quad (5)$$

When substituting the reference value for alpha and using the latest reference values for the proton and electron mass with the classical radius of the electron, gives a value for the proton radius  $r_p \simeq 0.8412$  fm. The proton/electron radius ratio:  $r_p/r_e \simeq \tanh S^{-1} \simeq 2A$ , with the Golden Apex of the Great Pyramid. The inverse ratio:  $r_e/r_p \simeq 5\pi/\sqrt{7\pi}$ . The inradius of the regular pentagon,  $\sqrt{25+10\sqrt{5}}/10$ , is approximately equal to  $-e^\pi + 7\pi + \ln 2\pi$ . Also, the heptagon diameter divided by the pentagon inradius is approximately equal to  $r_e/r_p$ .

The approximate value for the inverse fine-structure constant from Eqs. (9 – 11):

$$\alpha^{-1} \simeq 137.035\,999\,168 \quad (6)$$

Latest value by Aoyama et al,  $\alpha^{-1} \simeq 137.035\,999\,157(41)$ , determined from quantum electrodynamic theory and experiment [15]. M. Temple Richmond says that in the esoteric tradition 137 is a representation of the Law of One, the Three Cosmic Laws and the Seven Rays [8].

Given  $G_w$  is the Wilbraham-Gibbs constant and the sinc function  $\text{sinc } x = \sin x/x$ , then:

$$G_w = \int_0^\pi \text{sinc } x \, dx \simeq \phi \ln \pi \simeq e \sin \alpha^{-1} \quad (7)$$

The Wilbraham-Gibbs constant  $G_w \simeq \sec(1) \simeq \phi^2/\sqrt{2} \simeq 1.852$ . The Wilbraham-Gibbs constant is related to the overshoot of Fourier sums in Gibbs phenomena [16].  $\ln G_w \simeq$

$1/\phi$  and  $137 \simeq (37 + 37)G_w$ .  $G_a/G_w \simeq KA \simeq 3/2R \simeq \sqrt{e/\phi}$ , where  $K$  is the polygon circumscribing constant. Again with  $K$ , the Wilbraham-Gibbs constant  $G_w \simeq \pi/(K-7)$ . The polygon circumscribing constant  $K$  [13]:

$$K = \frac{\pi}{2} \prod_{n=1}^{\infty} \operatorname{sinc}\left(\frac{2\pi}{2n+1}\right) = \prod_{n=3}^{\infty} \sec\left(\frac{\pi}{n}\right) \quad (8)$$

The polygon circumscribing constant  $K \simeq 2 + 3\sqrt{5} \simeq \sqrt{11}\phi^2 \simeq 8.7$ .  $KA \simeq R + A \simeq \sqrt{e/\phi} \simeq \phi^2/2$ . Also,  $1 + \phi^{-2} \simeq K/2\pi \simeq \sqrt{6/\pi} \simeq \sinh^2(1)$ .  $KA + RA \simeq CQ$  and  $K \simeq 10/R$ . A curious relationship between the *Key* harmonic 528 and the polygon circumscribing constant  $K$ ,  $528/140 \simeq K/D$ , where  $D = 2R$  is the heptagon diameter.

The internal angle of the nonagon is  $140^\circ$  and is also the central angle in the hieroglyph for gold [10].  $D \simeq 85/37 \simeq \sqrt{\phi^2 + \phi^2}$ .  $85/11 \simeq R/A$  and  $528/85 \simeq 2\pi$ .  $440/85 \simeq \pi\sqrt{e}$ ,  $137/85 \simeq \phi$  and  $12 \times 44 = 528$ .  $528/440 \simeq \pi/\phi^2$ , see [13].  $504/280 \simeq \sqrt{S}$  and  $504/440 \simeq \ln \pi$ .  $528/504 \simeq 7A$ . With the angular harmonic,  $\sin \alpha^{-1} \simeq 504/85K = 7!/(713 + 137)K$ .

$$\sin \alpha^{-1} \simeq 7!/(713 + 137)K, \quad (9)$$

with the same approximate value for the inverse fine-structure constant as Eq. (6). Plato's favorite symbolic number  $5040 = 7!$ .  $504/396 \simeq 108/85 \simeq \sqrt{\phi}$ . 7920 represents the canonical harmonic of the Earth's diameter.  $7920/5040 = 11/7$  and  $25920/7920 = (14 + 22)/11$ . 25920 represents the precession of the equinoxes.  $2592/1370 \simeq 6/\pi$ .  $792/528 = 3/2$ ,  $792/396 = 2$  and  $792/264 = 3$ .

The harmonic of Newton's gravitational constant,  $A^{-1} \simeq \ln 792$ .  $14 \times 20 = 280$  and  $22 \times 20 = 440$ .  $DK \simeq 20$ .  $504 = 7 \times 8 \times 9$  and  $\sqrt{14} \simeq SR$ . Also,  $\sin \alpha^{-1} \simeq 2 \sin(\pi/9)$ .  $CQ$  is the approximate circumradius of the nonagon. Other relationships include  $\csc \alpha^{-1} - \sin \alpha^{-1} \simeq \pi/4$  and  $\tan^{-1}(4/\pi) \simeq 51.85^\circ \simeq 2 \times 25.92^\circ$ , the Great Pyramid base angle.  $4/\pi \simeq \sqrt{S/2} \simeq \sqrt{\phi}$  and  $RA \simeq 3/2K$ .  $2.592 \simeq 1/\sqrt{A} \simeq \sqrt{7}/Q$ .  $D\sqrt{A} \simeq 8/9$ , the proportion for "squaring the circle."  $D = 2R \simeq \csc(\pi/7)$  and  $R \simeq \cot^2 \alpha^{-1}$ .

In degrees, the modern golden angle,  $G_a = 360^\circ/\phi^2$  and the related  $26.57^\circ \simeq \tan^{-1}(1/2)$  is the ancient Golden Angle of Resurrection according to Robert Temple [6]. Along with the Golden Angle of Resurrection, Robert Temple states the Pythagorean Comma  $P_c$  was one of the greatest secrets of the ancient Egyptians [6],  $P_c \simeq \sqrt{2\phi/\pi} \simeq \sqrt{7}/\phi^2 \simeq 370/365$ .  $Q^5 \simeq P_c^7$  and  $P_c = (3/2)^{12}/2^7 \simeq 1.0136$ . Also,  $2^{7/12} \simeq 3/2 \simeq ARK$ .

Another form of calculation involves the prime constant [13], described as a binary expansion corresponding to an indicator function for the set of prime numbers. The inverse fine-structure constant:

$$\alpha^{-1} \simeq 157 - 337P/7, \quad (10)$$

with the same approximate value for the inverse fine-structure constant as determined in Eq. (6), having three prime numbers and the prime constant. The prime constant  $P \simeq \sqrt{RA} \simeq \phi^2/2\pi \simeq 220/528 \simeq 0.4147$ .  $PQ \simeq 2\sqrt{2}A$  and  $PK \simeq 2\sqrt{S}$ .  $KA \simeq P\pi \simeq e \ln \phi$ .  $85^2 + 132^2 = 157^2$ . Grand Gallery length in the pyramid is  $157'$ .  $137 - 90 = 47$  and  $47 + 85 = 132$ .  $132/90 = 528/360 \simeq CQ$ .  $157/288 \simeq 288/528$ .  $180/157 \simeq R$  and

$337/180 \simeq \phi R$ . With the *Key*,  $528/337 \simeq \pi/2$  and  $157/528 \simeq 2A$ , proton/electron radius ratio. With pyramid base,  $440/337 \simeq \phi^2/2$  and  $440/157 \simeq \sqrt{3}\phi$ . The  $\sin 140^\circ = \sin 40^\circ \simeq \sqrt{P}$ .  $528/140 \simeq K/D \simeq 7/G_w$  and  $140/360 \simeq e/7$ . The  $\sec 40^\circ \simeq P\sqrt{3S} \simeq KA$ .

$$\alpha^{-\phi} \simeq 2867.2867 + 28672^{-\eta}, \quad (11)$$

which also gives the same approximate value for the inverse fine-structure constant as Eq. (6), where  $\eta \simeq 365/365.24$  and  $\eta^\phi \simeq -\sin(14/3) \simeq 286.7/287 \simeq (\sqrt{2} - 1)/P$ , inverse of the proposed “pyramid inch” by Taylor and Smyth [17]. The Solar year harmonic is 365.24. The proton/neutron mass ratio is approximately  $m_p/m_n \simeq \eta^2$ . From the capstone height,  $8 \times 286.7 \simeq 2\pi \times 365$  [18].  $2.867/2.592 \simeq \sqrt{11}/3$  and  $25920/2867 \simeq 2\pi C$ .

The ascending and descending passages of the Great Pyramid are displaced  $287''$  to the east [3].  $365/287 \simeq \sqrt{\phi}$ .  $365/286.7 \simeq 4/\pi \simeq \sqrt{S/2}$  and  $528/287 \simeq S/\sqrt{\pi} \simeq \sqrt{11/S}$ .  $(3 \times 37)/287 \simeq \sqrt{A}$ .  $P_c^\phi \simeq Q$  and  $P_c Q \simeq (64/63)^2 \simeq \sec(1/4)$ . The inverse of the Eye of Horus fractions is  $64/63$  [6].

With the polygon circumscribing constant,  $\sqrt{7\pi - K} \simeq \sqrt{2} + \sqrt{5} \simeq 3.65$ , again from the harmonic 365 of the capstone height [18].  $504/365 \simeq \sqrt{5}/\phi$  and  $(286.7 \times 8)/2\pi \simeq 365$ .  $2.867 \simeq 3/7A \simeq 9/\pi \simeq \phi\sqrt{\pi}$ . Another expression with alpha,  $\alpha^{-\phi} \simeq 3\pi 22^3/35$ , having prime factors of 3, 5, 7 and 11 with a value approximately the same as Eq. (6). Also,  $\alpha^{-1} \simeq (\pi/A)^\phi$  and again,  $2.867 \simeq 2\sqrt{2}P_c \simeq G_w\sqrt{G_a} \simeq (4 + \sqrt{3})/2$ . The Golden Apex  $A \simeq (1 + \sqrt{5})^{-\phi} \simeq 432/2867$ . The Wilbraham-Gibbs constant  $G_w \simeq 528/286.7$  and  $2867/528 \simeq S/4A \simeq 2e$ . The harmonic of the Solar year again,  $365.24 \simeq 2\pi K/A$ ,  $365.24/140 \simeq \phi^2$  and  $365.24/37 \simeq \pi^2$ .

#### 4. Conclusion

The height of the gold pyramidion thought to be on the original Great Pyramid, as described by John Michell (with the metrology of Algernon Berriman) [19], is  $0.152 \simeq AQ \simeq 11.7/(7 \times 11)$ ,  $\sqrt{137} \simeq 11.7$  and the tenth part of the Greek cubit of  $1.52 \simeq \pi - \phi$ . The modern golden angle in radians,  $G_a \simeq 365/152$ . This small pyramidion was supposed to be the final top and possibly made of something like transmuted gold, similar to the legendary Golden Sun Disc of Mu. Reports about stargates, resurrection and the replication of golden pyramids in the hyperdimensional aether suggest the ancient Egyptian initiates were well-informed by Thoth, “Architect of the Great Pyramid.” They knew about the mathematical constants, fundamental physical constants and advanced mathematical functions inherent in the analysis and applications of the golden ratio vortices of the quintessential dynamic aether [20]-[23].

According to Manly P. Hall, the capstone of the Great Pyramid was associated with the Eye of Horus. “The exact science of human regeneration is ... when the Spirit Fire is lifted up through the ... spinal column ... passes into the pituitary body (Isis), where it invokes Ra (the pineal gland) and ... the Eye of Horus is opened.” [24].

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