A Treatise on Quantum Geometry

C. Austin Cooper*‡

*Independent Researcher

(c.austincooper@yahoo.com)

‡ Corresponding Author; C. Austin Cooper, Independent Researcher, c.austincooper@yahoo.com

Received: 16.03.2013 Accepted: 11.04.2013

Abstract- This treatise is a summary assessment of ten symmetrical polyhedrons that generate milli-equivalent levels of energy through non-mechanical means. Their discovery arose from a decoded cipher found in early Greek philosophical texts, which detailed the processes to transfer the musical chord's harmonic properties into four isosceles triangles. These triangles configured a group of polyhedrons that produced 130 milli-equivalent volts of energy root mean square on average in triangular patterned waveforms of 183.84meV peak with 1.8meVDC present in a signal distorted 41.5%. The entire group held a fundamental frequency of 60 Hz in a 4-1500 hertz range among 41.5 averaged blocks of frequency. The structures within this geometry were of two basic types or classes, apexal and linear. The apexal class consists of vessels with many apexes, primarily the cube and octahedron, which formed internally precise voids. The dodecahedron and icosahedron are of the linear class, being elongated and internally un-precise voids. The polyhedrons also had an interesting range in size, with an averaged volume of 5,273 cu. cm (329 cu. in.). Further investigations into this revolutionary geometry can certainly have a significant impact in the field of physics as well as geometry, having the possibility to become a potent tool in the fields of applied sciences.

Keywords- «keywords»

1. Introduction

This treatise began when an unrelated query into the philosophical writings of Thales, Pythagoras et al. [1] led to documents laden with technical data concerning the formation of polyhedrons. Their assertion that right triangles imparted with the principles of harmony would configure the referenced geometry was supported by physical details and over time, portions of the texts became more akin to verbal blueprints or instructions rather than philosophical idioms, developing into a basic understanding of the fundamental procedures to transfer musical properties into isosceles triangles. This process began with a pair of congruent right triangles placed in a leg-leg reflective correspondence, which formed a larger, isosceles triangle whose parts were converted from the congruent pair when solidified. The hypotenuse of the isosceles triangle was the congruent pair's legs at the base of the arrangement, while the pair's hypotenuses became the isosceles triangle's legs. The length of the legs at the correspondence establishes a new dimension to the isosceles triangle's measurement, the vertex height. Here, the ancient Greeks equated the vertex to a musical octave [2] through interval distance. Where the vertex height of an isosceles triangle equals half the length of the hypotenuse creates a musical octave and chord

An octave results from the interval distance or spaces between two notes which causes the upper note to vibrate at half the frequency of the lower note. Musically, if a note is placed at the vertex of an isosceles triangle and another is positioned center of its hypotenuse, the vertex note would oscillate at half the vibrations per second of the hypotenuse note. In Fig. 1, two cans of soup were selected from an identical group of four soup cans (A, B, C, D). Can A is positioned at the vertex, which is a musical octave away from Can B that is centered on the hypotenuse. Harmonically, can A would establish the tonality of both cans by vibrating at a frequency one-half that of can B. For example, if can A vibrates at 30 cycles per second, then the frequency of can B must be 60 hertz.

This process was extended to the musical chord [3] in Fig. 2 with the inclusion of an additional two cans of soup (C & D) inserted at each hypotenuse-leg juncture. A chord is merely a combination of notes synchronously vibrating at frequencies analogous to harmonic tones.

In understanding this process, the focus then became the polyhedrons referenced in the texts configured from these theoretical triangles. To develop a baseline of polyhedron information, the number of segments in the pyramid, cube, octahedron, dodecahedron, & icosahedron were averaged into ten segments per shape. This was actually quite significant, as it happened that ten was also part of an unusual mathematical statement (1+2+3+4 10) found within the texts, where the equal sign was noticeably absent.

It was believed that if the number 10 was referring to the polyhedrons, then logically the other numbers in the expression should also equate to reoccurring words and phrases within the passages as well.

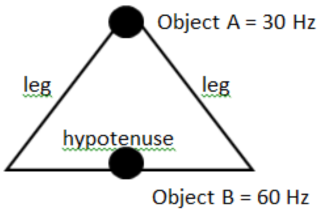


Fig. 1. Harmonic Transduction

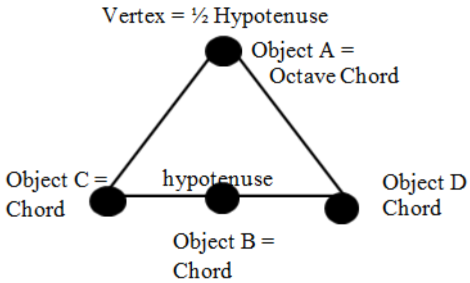


Fig. 2. Harmonic Isosceles Triangle

To that end, the number 1 was associated to unity, while the number 2 was assigned symmetry and/or duality. 3 represented the sides of a triangle with the number 4 representing the intervals on a standard musical clef or stave. 10, of course, is the averaged number of segments. Next, two terms from the cipher, 3 & 4, were interwoven with the amount of segments in a given configuration into an algebraic formula (Eq. 1) to find the hypotenuse length, and by default, the vertex height of the alleged segments. Where S = # segments, 3 = triangle sides, and 4 = intervals;

$$3S \div 4 \tag{1}$$

Accordingly, each triangle in the pyramid configuration had a hypotenuse 7.62cm in length and a vertex of 3.81cm. The cube arrangement held six segments with hypotenuses of 11.43cm and vertices of 5.715cm. The octahedron contained eight segments with hypotenuses 15.24cm in length and vertices of 7.62cm. The dodecahedron had twelve segments, each with a hypotenuse of 22.86cm and vertex of 11.43cm. The icosahedron would contain twenty segments with hypotenuses of 38.1cm and vertices of 11.43cm. The endpoints of the lines in each instance were connected to create the legs (L) in harmonic isosceles triangles, which could also be determined by multiplying the hypotenuse (H) against the vertex (V), and then taking the square root of the product as in Eq. 2.

$$L = \sqrt{(HV)} \tag{2}$$

There was another term heavily referenced in the texts not a part of the cipher. The term "sphere" was taken mathematically as 360° degrees, and divided by the number of segments in a given shape to find the bevel edge in degrees on a theoretical triangle as in Eq. 3.

$$360\text{-}\div \# \text{ segments} \tag{3}$$

The bevels for the segments in a pyramid were ninety degrees, while the cube's bevel was sixty. The octahedron had a bevel of forty-five degrees. The dodecahedron, thirty, and the icosahedron eighteen degrees. The significance of these bevels became clear during Styrofoam modeling. Their application to both faces was in response to the reference for duality in the cipher, which dramatically altered the segments into two-dimensional triangles with a static, inside diameter (I.D.) and a variable outside diameter (O.D.). While the fixed, extrapolated measurements are responsible for the I.D., the variability in the O.D. is directly related to material thickness. Again using the duality reference, the segments per shape were halved to ascertain the hemispherical alignment of each polyhedron, which led to the pyramid's dismissal from the investigation. Its two hemispherical segments could not configure the required symmetrical structure, and the bevels were clearly straight edges that formed regular isosceles triangles. The focus at this point became the fabrication of the units from a solid material with the subsequent assemblage of the polyhedrons.

2. Methods

The stock material for unit fabrication was 1.90 cm (.75 in.) thick poplar wood. Zinc binding posts required in the bench-testing phase were incorporated into the designs of the future structures as well. Accordingly, the first designation belonged to the cube, formed with unit C (A3). Its inner triangle had a hypotenuse (h) of 11.43 cm (4.5 in.), with a vertex (v) of 5.72 cm (2.25 in.). The length of the legs (L) was 8.07 cm (3.18 in.) on a 60° dual bevel edge (b).

The octahedron was the next polyhedron extrapolated, formed with unit O (A4). The hypotenuse of the inside diameter (I.D.) was 15.24 cm (6.0 in.) in length with a vertex of 7.62 cm (3.0 in.). Its legs were 10.77 cm (4.24 in.) long on a 45° bevel edge. Unit D arose from the dodecahedron, having a bevel edge of 30°. The I.D. hypotenuse was 22.8 cm (9.0 in.), with a vertex of 11.43 cm (4.5 in.) and legs 16.16 cm (6.36 in.) (A5)

Finally, Unit I assembled the icosahedron with an 18° bevel. The hypotenuse's I.D. was 38.1 cm (15.0 in.) (A6). The vertex is 19.05 cm (7.5 in.) having legs of 26.92 cm (10.60 in.). Table 1 is a compilation of the data extrapolated thus far. These units configured their designation structures and the other configurations as well. For example, Unit C did indeed configure a symmetrical cube, but it also configured a symmetrical octahedron, dodecahedron, and icosahedron. This new development greatly enlarged the scope of study from four to sixteen polyhedrons. The tangent created as a result of this unfolded into an understanding that the four original polyhedrons were in fact a family of symmetrical vessels, where any given unit will configure any given polyhedron, populating that specific family with four member units. Next, these structures were bifurcated into apexal and linear classes according to their physicality.

Table 1. Unit Dimensions

	units							
	C		O		D		I	
B°	60°		45°		30°		18°	
	cm	*in*	*cm*	*in*	*cm*	*in*	*cm*	*in*
H	11 .43	4 8/16	15 .24	6	22 .86	9	38 .1	15
V	5 .71	2 4/16	7 .62	3	11 .43	4 8/16	19 .05	7 8/16
L	8 .07	3 3/16	10 .77	4 4/16	16 .16	6 6/16	26 .92	10 10/16

The apexal class contained the cube and octahedron, as their structures have many apexes, along with the highest degrees of external and internal precision. This ability was absent from the linear class, the elongated vessels of the dodecahedron and icosahedron that contained perforations among their respective hemispherical seams. Severe time and fiduciary constraints greatly narrowed the scope of fabrication to the entire apexal class and the designation vessels in the linear class. Upon entering the bench-testing portion of this investigation, the internal volumes of the vessels were ascertained with a mechanical CAD program, while signal analysis was conducted with a Fluke 199 B/S Dual Input 200 MHz Digital Handheld Oscilloscope.

3. Results

While the averaged volume of the polyhedrons was 5,273 cu. cm (329 cu. in.), signal analysis revealed unexpected trends among the waveforms and frequencies generated. Collectively, their waveforms were triangular patterned and superimposed over an unseen sinusoidal trace, with an averaged energy output of 120.73meV rms. The frequencies ranged from 4-1500 hertz in 49.7 averaged blocks of frequency.

The apexal class was the first to undergo analysis, beginning with the Cube family (A7). This group was populated by the units of C, O, D, & I that formed a scale of identical vessels of varying volumes ranging from 679-4,212 cu. cm (42.5-263 cu. in.), with an average capacity of 1846.63 cu. cm (115 cu. in.). On average, these structures produced 131meV Pk of energy with a fundamental frequency of 60 Hz. Their frequencies ranged from 4-1220 Hz in 50 averaged blocks of frequencies.

Unit C assembled the first structure with a volume of 679 cu. cm (42.5 cu. in.) in an externally precise fit, while the alignment of its interior was un-precise. The vessel of Unit O had a volume of 864 cu. cm (54 cu. in.), with an external and internal precision of the highest degree (tight). The cube of Unit D had a volume of 1,632 cu. cm (102 cu. in.) which lacked external precision, although it possessed a high degree of internal precision. Unit I configured the largest vessel in this family, with a volume of 4,212 cu. cm (263 cu. in.) and precision identical to the structure of Unit D. A summary of this and other data tables appears in the appendix section.

In Table 3, the vessel of Unit C had an output of 240meV Pk, with an rms of 170meV. There was 7meVDC present in its signal with a total harmonic distortion (THD) of 18.8%. Unit O produced 140 meV Pk in 99meV rms with 7meVDC present with a THD of 33.7%. Unit D had the lowest totals, generating 140meV Pk of energy in a waveform that had an rms of 99 meV. There was -2meVDC present in a THD of 14%. The signal of Unit I was 220meV Pk with an rms of 156meV. It had 14meVDC present with the lowest THD of the family at 13% (A8-11).

In Table 4, the frequencies of Unit C ranged in 62 block increments from 20-1220 Hz upon a fundamental frequency of 60 Hz. Unit O had 25 freq. blocks in a diminished range of 20-500 Hz, also having a fundamental frequency of 60 Hz. The cube of Unit D contained 20 blocks of frequency ranging from 20-1220 Hz with a fundamental frequency of 60 Hz as well. Unit I held 58 frequency blocks ranging from 4-244 Hz, again with a fundamental frequency of 60 Hz (**A**12-15).

The remaining family in the apexal class is the octahedron (A16), also populated with the units of C, O, D, & I. These vessels again created a scale of varying volumes that were larger than the cubes, ranging from 891-5,616 cu. cm (56-351 cu. in.) with an average capacity of 2,458.46 cu. cm (154 cu. in.). The average amount of energy generated was also higher at 141meV Pk with a fundamental frequency of 60 Hz in 37.5 averaged blocks of frequencies in an array from 20-1500 Hz.

The alignments of the vessels in the Octahedron family were quite similar to those of the Cube. Once again, Unit C configured an externally precise, internally un-precise octahedron with a volume of 891 cu. cm (56 cu. in.). Unit O created the most un-precise structure both externally and internally with a volume of 1,152 cu. cm (72 cu. in.). The octahedrons arising from Units D & I were externally un-precise with a high degree of internal precision in volumes of 2,176 cu. cm (136 cu. in.) and 5,616 cu. cm (351 cu. in.) respectively, as summarized in Table 5.

In Table 6, the vessels of Unit C had an energy output of 180meV Pk with an rms of 127meV and 1meVDC present in a THD of 21%. Unit O produced a peak voltage of 120meV Pk in 85meV rms with -1meVDC present in a THD of 118%. Unit D generated 220meV of peak energy in a waveform that had an rms of156meV with -3meVDC present in a THD of 16%. The output signal of Unit I was the highest at 280meV Pk with an rms of 198meV without any DC present, its total harmonic distortion was just 14% (A17-20).

In Table 7, the frequencies of Unit C spanned 25 block increments from 20-500 Hz upon a fundamental frequency of 60 Hz. Unit O had 75 blocks of frequency within a 20-1460 Hz range at a fundamental frequency of 60 Hz. The octahedrons of units D & I contained 25 frequency blocks ranging from 60-1500 Hz, again with a fundamental frequency of 60 Hz (A21-24).

There were only two structures assembled from the linear class of vessels, with the units of D & I configuring their respective designating geometries. The dodecahedron of Unit D (A25) formed an externally / internally un-precise structure with a volume of 3,263 cu. cm (204 cu. in.).

The icosahedron from Unit I (A26) also configured a structure with similar precision. However, its volume was 13, 524 cu. cm (84.5 cu. in.) as listed in Table 8.

In Table 9, the dodecahedron of Unit D had an output of 80meV Pk, with an rms of 57meV. There was -2meVDC present in its signal with a THD of 147%. The icosahedron of Unit I produced a peak voltage of 218meV in an rms 154meV, with -3meVDC present in a THD of 21% (A27-28).

In Table 10, the frequencies of the dodecahedron ranged in 75 block increments from 20-1500 Hz upon a fundamental frequency of 60 Hz. The icosahedron contained 25 frequency blocks ranging from 20-500 Hz, again with a fundamental frequency of 60 Hz (A29-30).

4. Conclusion

Further research into this extraordinary geometry certainly has the potentiality to advance the field of physics well beyond current levels to unprecedented heights. This new area of study offers a high degree of adaptability in its applications among other subjects as well, from the development of hemispherical quantum generators for renewable energy, to molecular crucibles in pharmaceutical research, or the formation of new compounds in advanced chemistry. The knowledge garnered from such investigations guarantees an attractive and lucrative future with intensive research and funding.

References

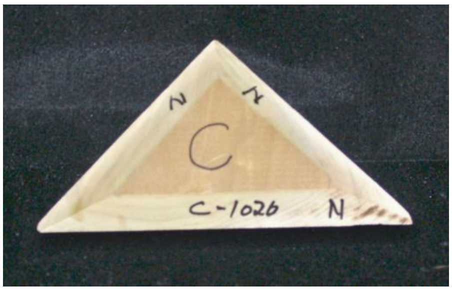
[1] A. Fairbanks, *The First Philosophers of Greece*. London: K. Paul, Trench, Trubner, 1898, pp 132-156.

[2] *Webster's New Twentieth Century Dictionary*. The World Publishing Co. 1966, pp 1238.

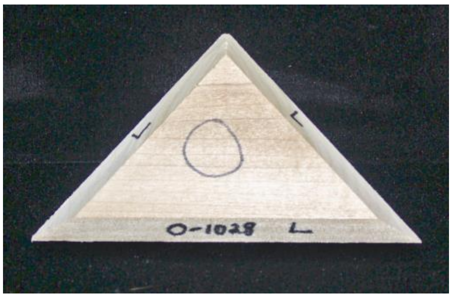
[3] *The Book of Music*. Prentiss-Hall Inc 1978, pp-174

Acknowledgements

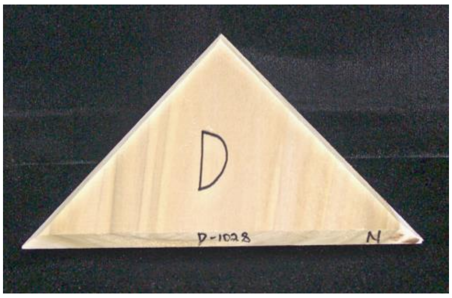
Quantum Geometry Units



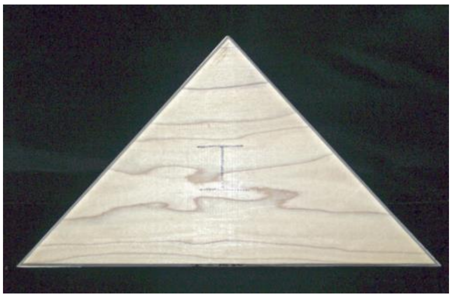
A3- Unit C inside dimensions b=60°
h=11.43 cm, v=5.72 cm, L=8.07 cm



A4- Unit O inside dimensions b=45°
h=15.2 cm, v=7.62 cm, L=10.77cm



A5- Unit D inside dimensions b=30°
h=22.8 cm, v=11.43 cm, L=16.16 cm



A6- Unit D inside dimensions b=18°
h=38.1 cm, v=19.05 cm, L=26.92 cm

Quantum Geometry Data Tables

Table 2 - Cube Volumes			
		cu. cm	cu. in.
units	C	679.18	42.45
	O	863.63	53.98
	D	1,631.52	101.97
	I	4,212.16	263.26

Table 3 - Cube Voltages (meV)					
		Peak	RMS	DC	THD%
units	C	240	169.68	7	18.89
	O	140.4	99.26	7	33.675
	D	140	98.98	-2	13.97
	I	220.00	155.54	14	12.65

Table 4 - Cube Frequencies (Hz)				
		Freq. Blocks	Fund. Freq.	Freq. Range
units	C	62	60	20-1220
	O	25	60	20-500
	D	20	60	60-1140
	I	58	60	4-245

Table 5 - Octahedron Volumes			
		cu. cm	cu. in.
units	C	890.64	55.67
	O	1,151.52	71.97
	D	2,175.52	135.97
	I	5,616.16	351.01

Table 6 - Octahedron Voltages (meV)					
		Peak	RMS	DC	THD%
units	C	180	127.26	1	20.65
	O	120	84.84	-1	118.12
	D	220	155.54	-3	15.52
	I	280.00	197.96	0	13.51

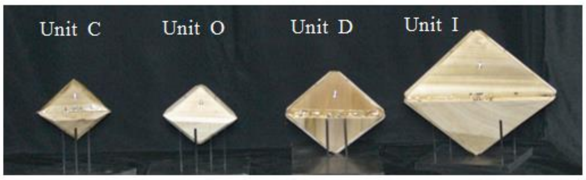
Table 7 - Octahedron Frequencies (Hz)				
		Freq. Blocks	Fund. Freq.	Freq. Range
units	C	25	60	20-500
	O	75	60	20-1460
	D	25	60	60-1500
	I	25	60	60-1500

Table 8 - Dodecahedron & Icosahedron Volumes		
	cu. cm	cu. in.
Dodecahedron - Unit D	32,63.2	203.95
Icosahedron - Unit I	13,524	845.25

Table 9 - Dodecahedron & Icosahedron Voltages (meV)				
	Peak	RMS	DC	THD%
Dodecahedron - Unit D	80	56.56	-2	147.3
Icosahedron - Unit I	218	154.13	-3	20.74

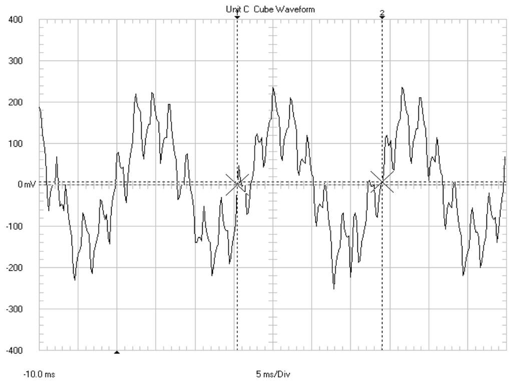
Table 10 - Dodecahedron & Icosahedron Frequencies (Hz)			
	Freq. Blocks	Fund. Freq.	Freq. Range
Dodecahedron - Unit D	75	60	20-1460
Icosahedron - Unit I	25	60	20-500

Quantum Geometry - Family Energy Signatures & Frequency Histograms

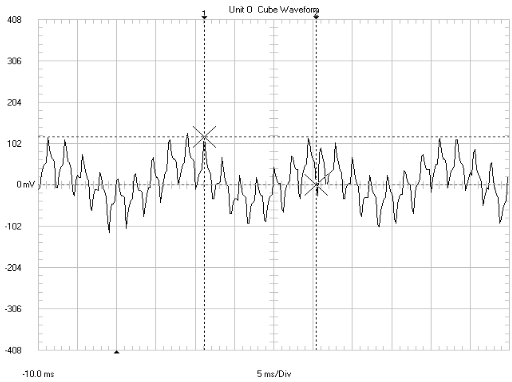


A7 – The Cube Family

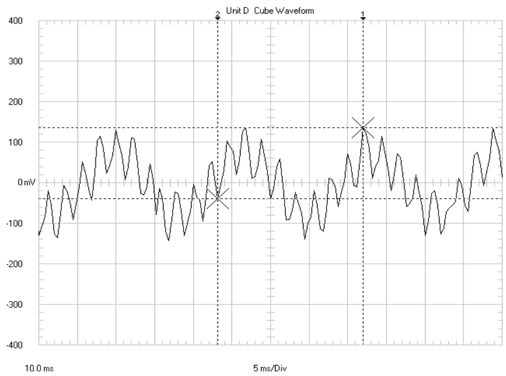
Cube Family - Energy Signatures, A8-11



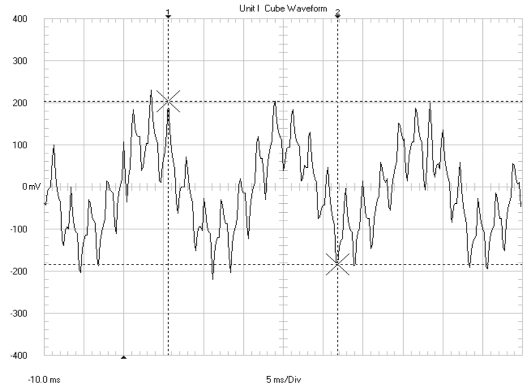
A8 – Cube, Unit C



A9 – Cube, Unit O

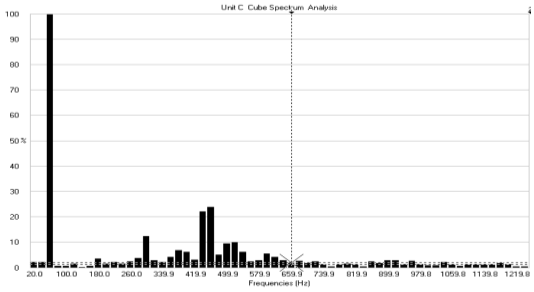


A10 – Cube, Unit D

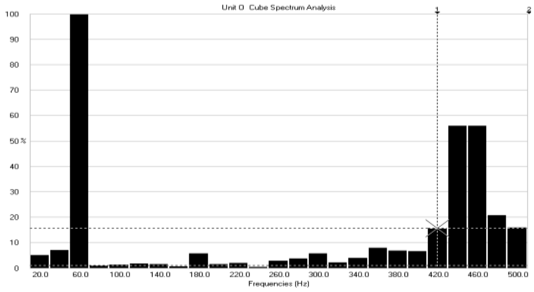


A11 – Cube, Unit I

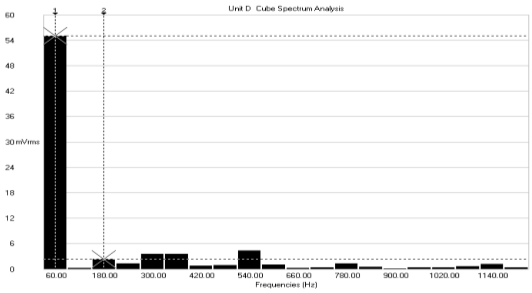
Cube Family – Frequency Histograms, A12 - 15



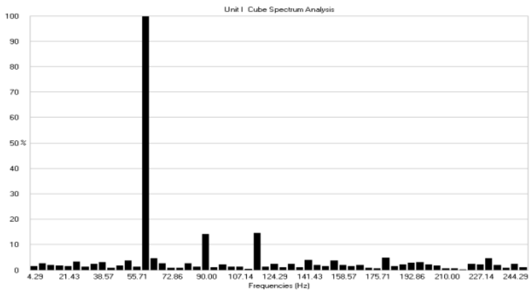
A12 – Cube, Unit C



A13 – Cube, Unit O

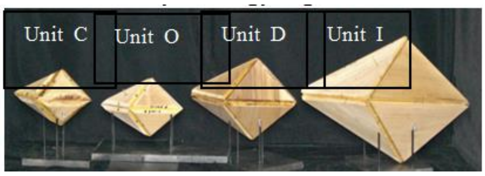


A14 – Cube, Unit D

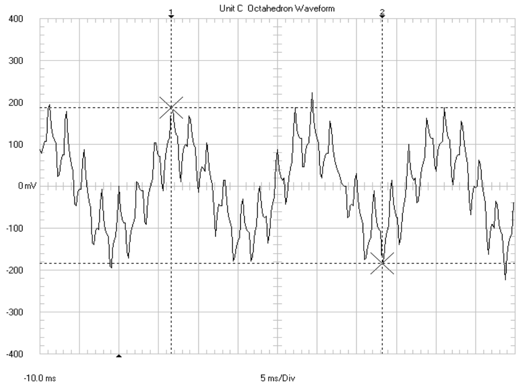


A15 – Cube, Unit I

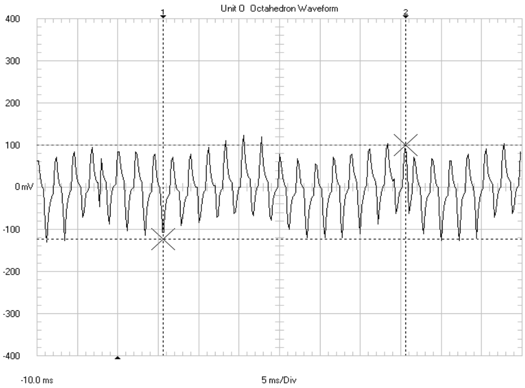
Octahedron Family - Energy Signatures, A17 – 20



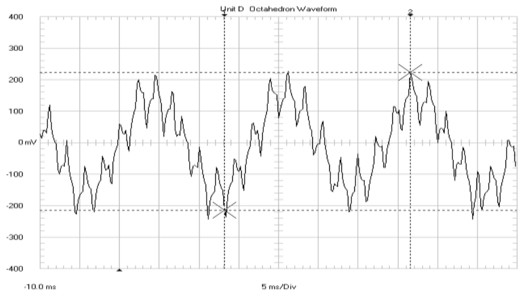
A16 – The Octahedron Family



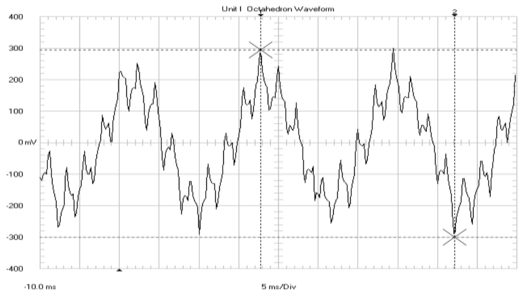
A17 – Octahedron, Unit C



A18 – Octahedron, Unit C

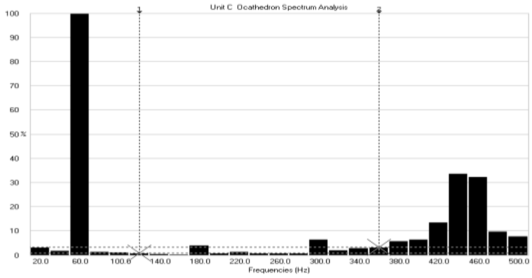


A19 – Octahedron, Unit D

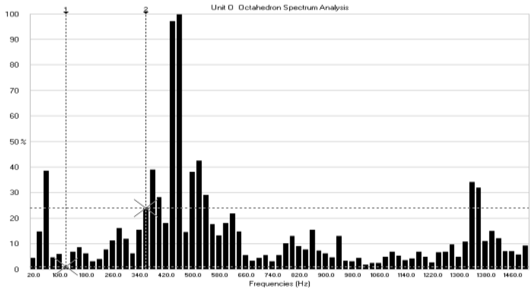


A20 – Octahedron, Unit I

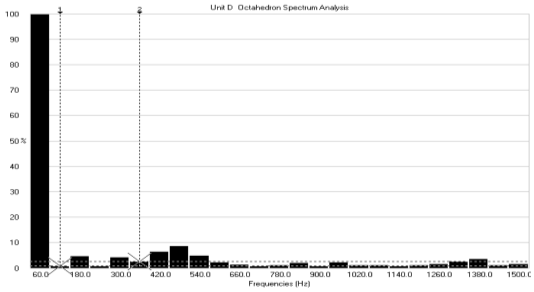
Octahedron Family - Frequency Histograms, A21 - 24



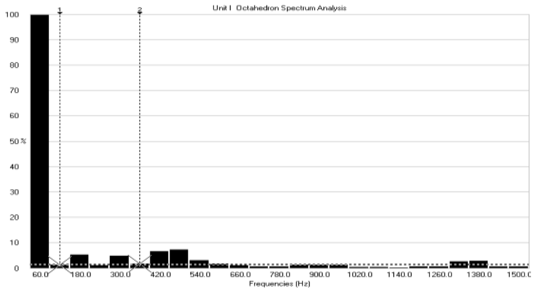
A21 – Octahedron, Unit C



A22 – Octahedron, Unit O

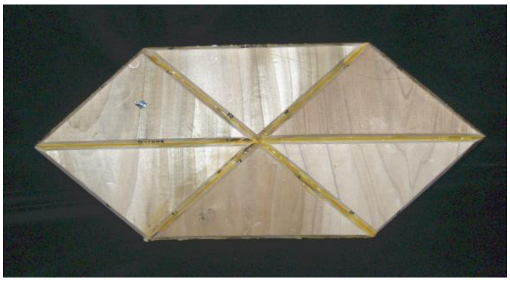


A23 – Octahedron, Unit D

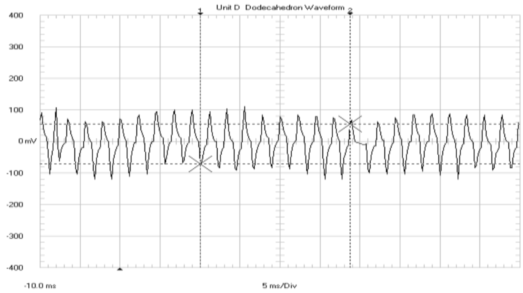


A24 – Octahedron, Unit I

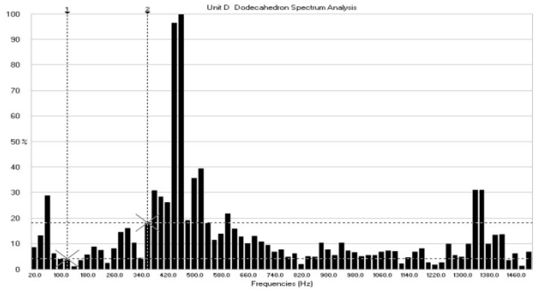
Dodecahedron Energy Signature & Frequency Histograms, A25-27



A25 – Unit D, Dodecahedron

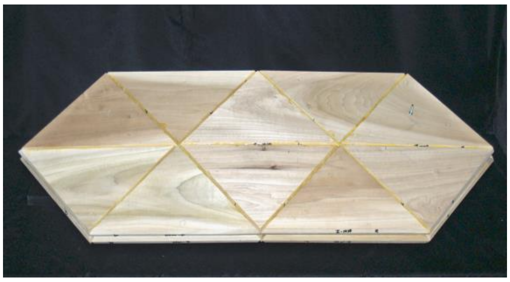


A26 – Dodecahedron, Unit D Energy Signature

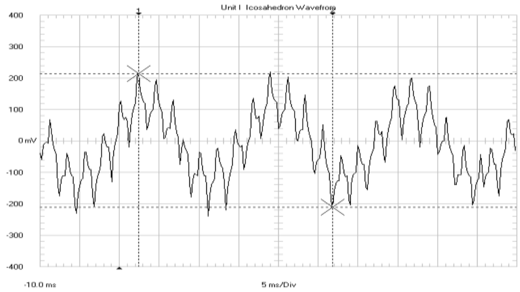


A27 – Dodecahedron, Unit D Frequency Histogram

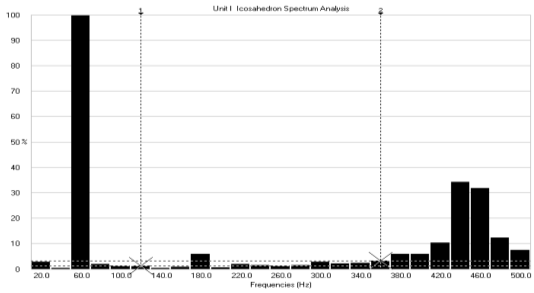
Icosahedron Energy Signature & Frequency Histogram A 28-30



A28 – Icosahedron, Unit I



A29 –Icosahedron, Unit I Energy Signature



A30 -Icosahedron, Unit I Frequency Histogram