PULSARS AND THE LARMOR FREQUENCIES OF ATOMIC ELEMENTS (2007; rev. 2026)

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This paper describes the mapping of frequencies from pulsars and atomic elements (Larmor Frequencies). For a more in-depth description of a similar process with DNA, see "*The Infrared Frequencies of DNA Bases, Science & Art,*" *IEEE Engineering In Medicine and Biology* (oursounduniverse.com).

1) PULSARS: MUSIC OF THE COSMOS

Space is a new playground for composers. NASA keeps providing us with tantalizing bits such as the cacophony of sounds from a black hole recently collected by the Chandra X-Ray Observatory... sounds said to be 58 or 59 octaves below middle C! There's also the CMB microwave hiss/hum of the Universe at 4080 Megahertz (4080 million hertz) - a B tone, not to mention the huge, glacially slow frequencies of planetary rotations, orbits, and innumerable cosmic spins available for artistic invention. My own fascination with space has focused on black holes, atomic elements created by stars and the pulsars.

In 1993 I experimented with pulsars, those dense spinning magnetic dervishes that are sometimes left-over from supernova explosions. Pulsars are interesting to me because they spin rapidly and beam out a radio frequency at regular intervals, like a lighthouse. Those regular pulse/flashes are already measured by astronomers in Hertz (cycles per second), so all that is left for me to do is to find the corresponding tone on a tuning chart and adjust the octave either up or down. Then I send the frequency to my synthesizer. Pulsars are incredibly powerful electric generators, spewing out the entire spectrum of radiation. We know of at least 1500 of them. Because of their power, some speculate that they might affect life on earth. Only two known pulsars also produce visible light: Vela X (PSR 0833) and the Crab (PSR 0531). Vela X, from the constellation Vela in our Milky Way, was seen on earth about 8000bce. One astronomer described it this way:

"It would have hung low over the Mediterranean, shining as bright as the moon, with an endlessly dancing, varying mass of fire, shooting spears of intense color every way like a fountain... flooding pulsing illumination." (author unknown)

Vela X beams a cheerful little clip that sounds like dancing chopsticks, at 11.24Hz, or F# if translated literally into a tone. The Vela has been enthusiastically written about by George Michanowsky in The Once And Future Star. He feels it was probably the most important star in the history of humanity, and would certainly have had an organizing effect on humanity's cultural evolution both because of the psychological shock, and also from possible spontaneous mutation. The Crab pulsar is also in our Milky Way in the Crab Nebula, constellation Taurus. It probably blew 1200 years ago and was sited as the "Guest Star" by the Chinese, although curiously not by Europeans. It blazed

by day for three weeks, and at night for nearly two years. Its frequency is 30.21Hz; tone B.

I have about twenty of these pulsar tones programmed in my synthesizer. They make a beautiful collection of sound together. The Vela X can be heard on the soundtrack of the film "short" with Diana Hobson's video work: *Zero Waiting,* and clipping along in the MP3 sound clip of the F# Pyramid Chords - this site. See also Paul LaViolette's exciting work with the Crab and Vela pulsars in his book *Decoding The Message of The Pulsars*.

2) ELEMENTS OF LIFE: LARMOR FREQUENCIES

Some years ago (1993) I was asked to come up with the sounds of atomic elements which are first formed by stars and released during supernovas: carbon, hydrogen, oxygen, nitrogen, phosphorus, helium, sulfur, and silicon. I took my puzzle again to Dr. Deamer who continues to support me, no matter how strange the request. He suggested something called a Larmor Frequency. This is a radio wave ranging from 60-500 MHz that is emitted from the nucleus of an atom. It is used in nuclear magnetic resonance...medical tissue-imaging. I found the charts in UCSC's Science Library, converted these frequencies to sound and discovered some fascinating things. Several of them together were harmonically ordered....perfect reflections of the harmonic series (overtone series), representing perfect octaves, perfect fifths, and exact third ratios. For a musician, this is an astounding discovery. The mathematical odds of this happening are beyond imagining. Here are the most exciting finds, and the stories I think they illustrate:

All of the elements listed below except for helium and silicon make up 99% of all life on our planet. I was excited to find out how they related to each other, and amazed to find that many of their relationships mirrored the "perfect" low, prime-number intervals in the harmonic (overtone) series that was first revealed to us by Pythagorus in the 6thC bce...i.e: octaves, perfect fifths and thirds. Following are the original Larmor measurements for the most prevalent elements and their lower octaves in sound:

LARMOR FREQUENCIES

Original Hz Numbers from 6 elements which make up 99% of all life on earth: CHNOPS

Hydrogen:	42.5776 x 10 to 6th Hz	(42,577,600Hz)	(tone E)
Phosphorus:	17.236 x l0 to 6th Hz	(17,236,000Hz)	(tone C/C#)
Carbon:	10.705 x 10 to 6th Hz	(10,705,000Hz)	(tone E)
Oxygen:	5.772 x l0 to 6th Hz	(5,772,000Hz)	(tone F/F#)
Sulfur:	3.266 x l0 to 6th Hz	(3,266,000Hz)	(tone G/G#)
Nitrogen	3.076 x l0 to 6th Hz	(3,076,000Hz)	(tone F#/G)

8va iterations of Hertz Numbers

x10	x11	x12	x13	x14	x15	x16	x17	x18	x19
HYDROGEN (H)									
41,576	20,788	10,394	5197	2598.5	1299.25	649.6	324.8	162.4	81.2
CARBON (C)									
10,452	5226	2613	1306.5	653.25	326.6	163.3	81.66	40.8	
NITROGEN (N									
3004	1502	751	375.5	187.75	93.88	46.94			
OXYGEN (0)									
5636	2818	1409	704.5	352.25	176.1	88.06	44.03		
PHOSPHORUS (P)									
16,832	8416	4208	2104	1052	526	263	131.5	65.7	32.8
SULPHUR (S)									
3188	1594	797	398.5	199.25	99.6	49.8			
SILICON (Si)									
8259.7	4129.88	2064.9	1032.47	516.24	258	129.06	64.53	32.26	
HELIUM (He)									
	7918.7	3959.3	1979.6	989.8	494.9				

To measure the harmonic proportions use the following ratios:

Octave: 2/1

Perfect 5th: 3/2

Perfect 4th: 4/3

Just 3rd: 5/4

Doing the math reveals several very close matches:

One of hydrogen's octaves is 324.8

One of carbon's octaves is 326.6

One of phosphorus's octaves is 263

One of silicon's octaves is 258

In both cases, the sonic distances between the two are almost imperceptible....extremely small. A very good ear could tell, but just barely. This means that the two elements are in very strong resonance...bonded. They are heavily entrained and want to be together.

Checking for Perfect fifths/fourths (mirror images of each other) revealed that:

1) Hydrogen and helium are in the relationship of a perfect fifth/fourth, almost EXACTLY. Their tones are: hydrogen - E; helium - B/C. This is staggering. The fifth interval in music is the next strongest bond, after the octave. It is the child of the octave in the overtone series...the fundamental tone first produces its octave, then a fifth above that. What hydrogen has done is to create helium as its child

IN REVERSE...since hydrogen is higher and lighter. It's a mirror image of the overtone series. Helium is 'birthed' a fourth below, instead of above. This is exciting, because the by-product of this creation is light....stars! Stars, then, are generated from a relationship that is harmonically ordered in the world of vibration, and from the "Regal Fifth." The fifth is a more exciting interval than the octave because octaves can only reproduce their same tone, either higher or lower (2/1). But a fifth relationship is a brand NEW creation and expands into uncharted territory, spiraling for infinity.

The next example of a perfect fifth union is equally exciting to me. It is between oxygen and phosphorus. Technically they are a 12th apart (one octave plus a fifth); still an incredibly strong resonance. Oxygen's tone is between an F/F#; phosphorus is C/C#. Together they create phosphate. Phosphate is part of the ATP molecule, or adenosine triphosphate. It is the energy currency of the cell, transferring energy from chemical bonds to reactions within the cell. ALL the energy of our cells comes from these chemical processes; our cells can't use light or thermal energy. Phosphate is literally responsible for life.

Recording: *Elements As Tone* features these sounds from atomic elements in the order in which they were created from a dying star. It is available at oursounduniverse.com.

The Pyramid/Larmor Connection - 2026

In 2024, many years after the first Larmor project was created, I discovered something fascinating while reading Christopher Dunn's newest book: *Giza, The Tesla Connection*. In it Dunn continued the research begun in his first book *The Giza Power Plant; Technologies of Ancient Egypt*. With his background in engineering Dunn was exploring the idea that the Great Pyramid might have been used as a power plant, among other things. One of his research collaborators was Robert Vawter whose specialty was frequency and acoustics. In *The Tesla Connection* I read about Vawter's findings when he explored and mapped the frequencies in the Pyramid's Grand Gallery. The numbers looked familiar...could they be Larmors?? They matched almost identically! This discovery led to an invitation from Chris Dunn to join him and five other scientists who had been involved with his book at NASA's SETI Institute (Search For Extra-Terrestrial Life) in Mountain View, California. This was a dream come true for me. I had always wanted to be part of that Institute somehow. I brought my data to share and passed the numbers around. The other scientists looked impressed but perplexed; this was unexplainable. Sadly Robert Vawter had passed away just before that meeting...a personal tragedy for me both because I had liked him when we had met before, and because the chance to brainstorm this mystery with him was lost forever. I offer the data here in case anyone has a clue as to why tiny electromagnetic radio waves from atomic elements might have related to sound frequencies in the Great Pyramid.

Vawter Frequencies in Great Pyramid's Grand Gallery and Larmors from Atomic Elements

	Sound in Hertz	Larmors in Hertz
Corbel 7/roof	**327.4 (E)**	**324.8 (E) Hydrogen 19th iteration**
Corbel 6	286.5 (D)	263 (C/C#) Phosphorus 16th it. (difference is more than 1/2 step)
Corbel 5	**254.6 (C)**	**258 (C) Silicon 15th it.**
Corbel 4	229.2 (A#)	247.45 (B/C) Helium 17th it. 1/2 step difference
Corbel 3 w/slot	208.2 (G#)	199.25 (G/G#) Sulphur 14th It. 1/4 step
Corbel 2	191.0 (G)	199.25 "
Corbel 1	**176.3 (#F)**	**176.1 (#F) Oxygen 15th it.**
Floor level wall to wall	**163.7 (E)**	**163.3 (E) Carbon 16th it.**

Hydrogen, Oxygen, Carbon and Silicon are virtually right on: tones C, E and slightly sharp F. The ear could not distinguish between them if both were sound. The others are no wider than ½ step.

Conclusions

As a bio-musician, my partnership with nature is sustained by respect and fascination. Nature is The Master Teacher and artist; to explore her is irresistible. The central issue for me is always beauty...will it show up? I love the sounds for themselves, but there is also a strong metaphysical fascination; a quest for deeper understanding. Sacred geometry, sacred proportions such as the Golden Mean, and studies in consciousness always inform my thinking. For instance, can the body recognize itself if it hears sonic DNA patterns? Is an interval in sound a carrier for any kind of information? Do mathematical patterns also represent 'stories,' archetypal messages? Do they matter? Is there a bigger picture here?

My work so far has revealed a sentient universe, a connective, holistic presence that communicates. It is endlessly creative, powerful and stunning. Since we are nature too, this is cause for rejoicing.