NONCOMMUTATIVITY MUSIC AS BIOPHYSICS: NONLOCAL, NONDUAL, NEGENTROPIC, ANTIGRAVITY

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ABSTRACT: Noncommutativity was covered up by the secret music origins of Western science and now noncommutativity has returned via the music analysis of Fields Medal math professor Alain Connes. The implications are stunning for the future of life on Earth.

KEYWORDS: Nonlocal; Nondual; Negentropic; Antigravity

MUSIC AS RADICAL NONCOMMUTATIVE PHILOSOPHY OF PHYSICS

The book by math professor Ian Stewart, *Why Beauty is Truth: A history of symmetry*, gives a structural overview of mathematical physics as based on commutative geometry or the symmetric spacetime continuum.[1] We have been deeply conditioned in Western science training to define reality from an externally measured symmetric spacetime continuum starting with the introduction of the term magnitude (in Greek as epogdoic) into number ratio music theory by Philolaus, the contemporary of Plato.[2] Richard McKirahan explains that Philolaus literally flipped his lyre, musical instrument, around to then argue this empirically not true (as explained below) commutative claim of time-frequency:

> (1, 4) = (7, 5) ... In the present case this means that regardless if you go from string 1 to string 7 via string 4 or string 5, the result is the same: (1, 7) = 0.

The military engineer contemporary of Plato, Archytas then codified "magnitude" as a reductio ad absurdum music theory proof of "alogon" or irrational magnitude incommensurable number ratios, thus launching what is

[1] Ian Stewart, *Why Beauty Is Truth: A History of Symmetry*, 1st ed., New York, Basic Books, 2007.

[2] Richard McKirahan, 'Colloquium 7: Philolaus on Number,' *Proceedings of the Boston Area Colloquium in Ancient Philosophy*, 2012.

known as the "Greek Miracle" promoted by Plato (and hence Socrates).[3] Math Professor Luigi Borzacchini focuses on what he calls the "cognitive prejudice" that covered up the "alogon" or music ratio origin of "incommensurability" as irrational magnitude "Greek Miracle" science.

THE LIAR OF THE LYRE: PHILOLAUS COVERUP OF NONCOMMUTATIVE NONLOCAL PRESOCRATIC PHILOSOPHY

Let's first "unpack" what I call the Liar of the Lyre, as based on Philolaus claim, (1,4) = (7, 5), regarding the coverup of noncommutativity through the wrong music theory as the origin of the commutative geometry Western science.

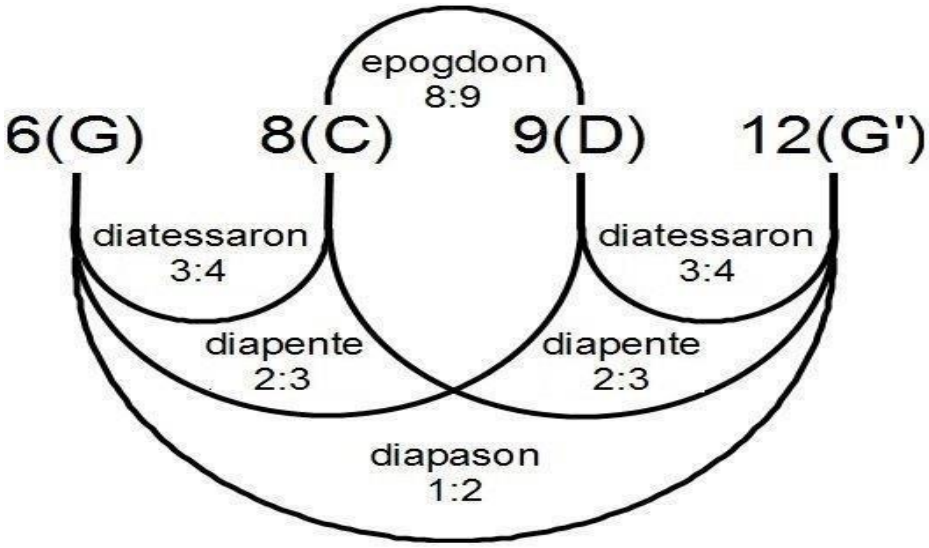


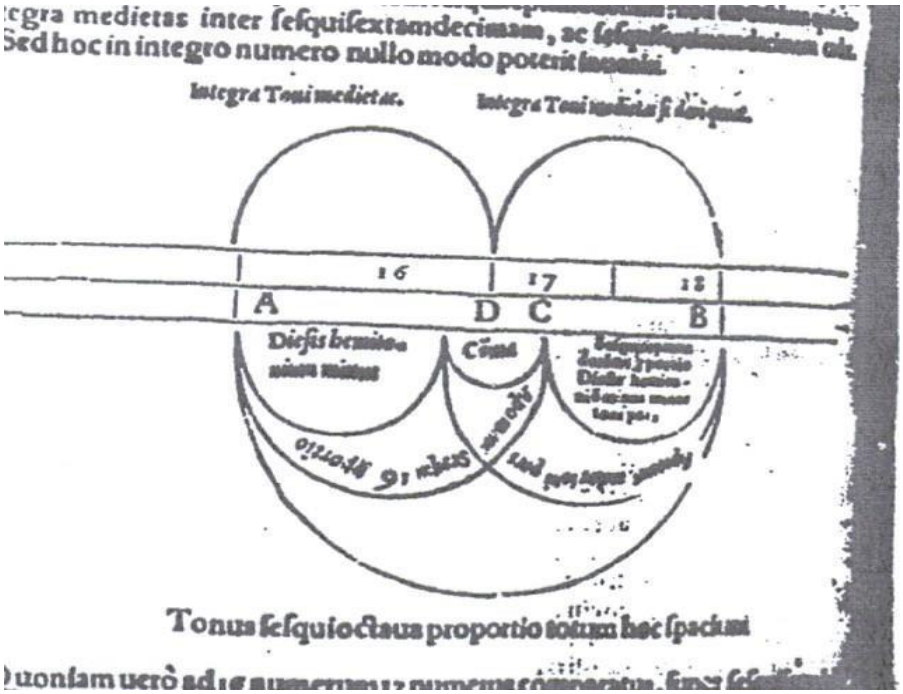
Figure 2: Pythagorean music theory: diagram showing relations between epogdoon, diatessaron, diapente, and diapason, which correspond to the Major Second (9/8), Perfect Fourth (4/3), Perfect Fifth (3/2) and Octave (2/1), respectively. Pythagorean length ratios in this figure are the multiplicative inverse of frequency relations as used in this article.[4]

So that source above does what I call the "bait and switch" (in the caption of

[3] Luigi Borzacchini, 'Incommensurability, Music and Continuum: A Cognitive Approach,' *Archive for History of Exact Sciences*, (May 2007), pp. 273-302 and see also musicology professor Ernest G. McClain, The *Pythagorean Plato: Prelude to the Song Itself,* 1st ed., illustrated. New York, N. Hays, 1977.

[4] Michael J. Bank, Nicola Scafetta, 'Scaling, Mirror Symmetries and Musical Consonances Among the Distances of the Planets of the Solar System,' *Frontiers in Astronomy and Space Sciences, Vol.* 8, 2022. https://www.frontiersin.org/journals/astronomy-and-space-sciences/articles/10.3389/fspas.2021.758184

the image) by giving the pitch of Perfect Fourth and Perfect Fifth as number ratios without the actual Pitch geometry of C to F (undertone of 2/3) or C to G (overtone as 3/2) or C to F in the other direction (harmonic ratio as 4 to 3). The difference between overtone or undertone and "harmonic ratio" are key to understanding noncommutativity in music theory.



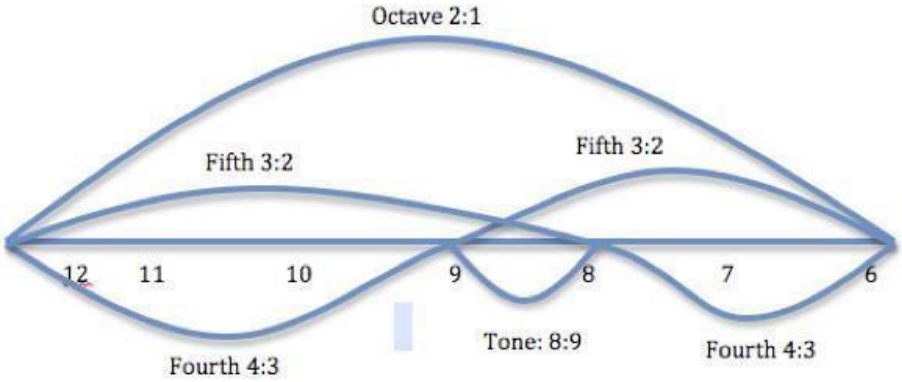
The above image[5] is from Boethius who tried to understand Philolaus and the averaging of the magnitudes (doubling without squaring) but Boethius could not crack the Philolaus code. It took Professor Richard McKirahan (in 2012!) to properly translate Philolaus. Andrew Barker states, "Boethius has already told us, in fact (Inst. mus. 3.5), that Philolaus identified the komma [531441 : 524288 aka the Ditonic Comma] with the unit, 1,".[6]

Further clarification: "Since Philolaus seems clearly to recognize that the tone cannot be divided in half, it is rather surprising that he apparently takes for

[5] Luigi Borzacchini, 'Incommensurability, Music and Continuum: A Cognitive Approach,' 2007.

[6] Andrew Barker, *The Science of Harmonics in Classical Greece*, Cambridge, Cambridge University Press, 2007, p. 273.

granted—*what is false* [my emphasis] in terms of the Sectio – that there are half 'dieses' and half 'commas.'"[7]



Clearly, as the above Pythagorean tuning image shows[8], the wavelength as inverse to frequency is not symmetric with the number ratios. For example, "This musical property is the counterpart of the principle mathematical characteristic of the Pythagorean diatonic, very Pythagorean indeed, constituted by the fact that each interval of the scale is expressed by the ratios of type 2 to the m divided by 3 to the n or 3 to the m divided by 2 to the n."[9] In physics wavelength is inverse to velocity (momentum) while frequency is inverse to time as period, but this distinction already covers up the underlying noncommutative time-frequency nonlocality as Alain Connes explains (and Louis de Broglie rediscovered with his Law of Phase Harmony critique of relativity).

It was Philolaus who relied on what was called the "Greater Perfect System" of "doubling the octave" to coverup the noncommutativity and thus "contain" the magnitude as an irrational magnitude or "ratio of ratios" (thereby muddling frequency with wavelength as magnitude) not dependent on the order of time and frequency. For example, Cartwright, et. al., stating, "For example, the Pythagorean intervals within the octave satisfy this property: the fifth is equivalent to that of the fourth if reversed compared to the octave, and vice

[7] Christopher Charles Whiston Taylor, *From the Beginning to Plato*, Milton, Routledge, 1997, p. 269.

[8] The image was used for a music theory class, originally at Earlham College I think but the website link was removed.

[9] Fabio Bellissima,"Epimoric Ratos and Greek Musical Theory," in *Language, Quantum, Music*, Maria Luisa Dalla Chiara, Roberto Giuntni, Federico Laudisa, (eds.), New York, Springer Science & Business Media, 2013.

versa."[10] This quote again based on the "bait and switch" lie is derived from Philolaus flipping his lyre around to replace a listening process to time-frequency in music with a visual external measurement physics of ratios! Both Kepler and Newton were directly inspired by Archytas who built on Philolaus.

In contrast Fields Medal math professor Alain Connes whose grandmother was a piano teacher, (and thus Connes trained in music from an early age, rewiring his brain to increase his corpus callosum), emphasizes listening, instead of an external visual measurement. So, Alain Connes is emphasizing we do not hear the scale as just a symmetric ratio that adds and subtracts the "harmonics" - rather we hear the ratio as a multiplication or power factor and thus to reverse the order is the noncommutative reversal of the exponentiation. As Connes points out, the Pythagorean Comma is 3 to the 12th against 2 to the 19th while reversed back into the octave scale it is 3 to the (1/19th) against 2 to the (1/12th). Another way to state this is the inverse of the Perfect Fifth as 3/2 is not commutative since 2/3 is C to F and 3/2 is C to G and therefore 3/2 x 2/3 does not equal one as the root tonic (see the below Wikipedia image for this error discussed further)! Connes points out that the exponential difference (19 minus 12) is also the noncommutative inverse since the Perfect Fifth (3/2 or 2/3) is the 7th note of the 12 note Pythagorean music scale of the octave.

G	perfect fourth	$\frac{2}{3} \times 2$	$3^{-1} \times 2^{2}$	$\frac{2^2}{3^1}$	$\frac{4}{3}$	498.04	−1.96
D	unison	$\frac{1}{1}$	$3^{0} \times 2^{0}$	$\frac{3^0}{2^0}$	$\frac{1}{1}$	0.00	0.00
A	perfect fifth	$\frac{3}{2}$	$3^{1} \times 2^{-1}$	$\frac{3^1}{2^1}$	$\frac{3}{2}$	701.96	1.96

So, in terms of Pitch if we assume "C" as the root tonic or unison then the Perfect Fifth is "G" as 3/2 and the Perfect Fourth is "F" as 4/3 clearly showing a reversal of time of the Perfect Fifth from 2/3 and thus noncommutative since the "F" is derived from the octave as a reversal of time against the root tonic, i.e. a Perfect Fifth in the other direction of time (from the future) as an undertone.[11]

[10] J.H.E. Cartwright, D.L. González, O. Piro, 'Dynamical Systems, Celestial Mechanics, and Music: Pythagoras Revisited,' *Math Intelligencer* 43, 25–39, 2021.

[11] "Scientists claim to have found evidence of 'negative time' after observing photons exiting a material before entering it".... "These results suggest that negative values taken by times such as the group delay have

The only way this can be justified in terms of the overtone series assuming a root tonic as the starting point in time is to use a *different* root tonic as Philolaus did yet covered it up! So therefore, the true wavelength of the root tonic must assume a double octave with the ratios doubled as the common denominator for conversion to symmetric commutative irrational magnitude yet the frequency to time is noncommutative and nonlocal.

So therefore, for Philolaus, 4/3 as a commutative ratio is now derived from a different fundamental tone, a 0 to 8 root tonic frequency, with a 6/8 wavelength for an 8/6 frequency. So, the ratio of wavelength is indeed the same as 3:4 but the root tonic or "fundamental tone" (0 to 8 and not 0 to 12) is different therefore creating noncommutative geometry instead of symmetry as the fundamental "ordering" process of listening to frequency via time. There is an inherent nonlocal asymmetric shift in time inherent to pitch processing.

The first logarithmic equation was created from music theory based on this "Liar of the Lyre" Philolaus flipping his lyre around so that 0 to 12 fundamental tone root tonic is 3/2 frequency as 8/12 wavelength and thus the Perfect Fourth (8/6 magnitude) *plus* the Perfect Fifth (12/8 magnitude) = the Geometric Mean magnitude Squared as 12/6 (again assuming geometric ratio as symmetry is definitive and *not* the ordering of time via listening!) To quote Richard McKirahan translating Philolaus (emphasis added):

> We begin by taking the length corresponding to the ratio 3:2, namely the length 12 to 8. In other words, **we start at** 12 and take 2/3 of its length. Then we add a length corresponding to the ratio 4:3, but this time we are **starting not at** [meaning changing the root tonic of the "one" that we listen to]12 but at 8 and we want to take 3/4 of *that*. [italics in original]. So instead of taking 12:9, which is 3/4 of 12, we take 8:6, which is 3/4 of 8.[12]

Richard McKirahan translates Philolaus: "beginning at the bottom note...and descending via another (a fifth above the bottom note)." So McKirahan says "bottom note" twice to emphasize they are "commutative" and then says "via another" to not emphasize that the "another" is the noncommutative change of

more physical significance than has generally been appreciated," the researchers noted. https://www.the-independent.com/tech/time-negative-quantum-physics-clock-b2621812.html So, we are assured that such superluminal group delays are just a phase shift that cannot be a "signal", but my claim is that in quantum biology they can indeed be a signal since no external medium is being used as a measurement.

[12] McKirahan, 'Colloquium 7: Philolaus on number,' p. 262.

order in time from the octave. That is the bait and switch - and then, as quoted above, McKirahan says: (1, 4) = (7, 5) but what is (1, 4)? It is a Perfect Fourth which is the *pitch* of C to F (harmonic ratio, 4/3). What is (7, 5)? It is a Perfect Fourth which is the noncommutative *pitch* of C' [octave] to G![13]

So, for Philolaus, this contradiction was still not totally covered-up until it was codified by Archytas such that the order reversal that Philolaus called "subcontrary" is now called "Harmonic Mean":

> The term subcontrary may refer to the fact that a tone based on this mean reverses the order of the two fundamental musical intervals in a scale. It is believed that Archytas or one of his contemporaries gave the name "harmonic" to the subcontrary mean ....[14]

See the below image demonstrating the first Philolaus image from above, now codified into the Archytas "proof" that requires the ratios to be commutative as 4 to 3 and 3 to 2 (not 2/3 as an undertone) for the geometric mean squared irrational magnitude proof as the foundation of Western Science, the "Greek Miracle" promoted by Plato. Thus, the secret "flipping of the lyre" by Philolaus based on the different fundamental tone of 0 to 8 instead of 0 to 12 is now covered up!

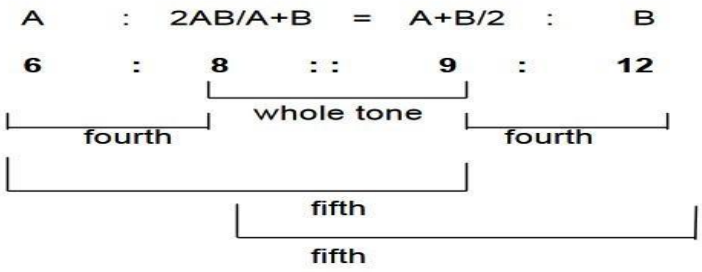


Figure 2. The Harmonic Proportion

[13] To emphasize this importance of "pitch" being noncommutative, there is a difference shown between listening to the group phase that is shifted for the Perfect Fifth to the octave or root tonic (aka fundamental pitch). This group phase shift caused a big debate between Koenig and Helmholtz. The amplitude of the frequency changes but the pitch is still the same as a Perfect Fifth multiplied ratio, only the fundamental tonic shifts to the Perfect Fourth as an inversion of the Fifth. More details provided in the "drone" listening example from India.

[14] Daniel D. Bonar, Michael J. Khoury, Michael J. Khoury Jr., *Real Infinite Series*, Providence, RI, MAA Press: An Imprint of the American Mathematical Society, p. 244

In other words, no longer can the Pythagorean Tetractys show the ratios of two to three and three to four as is found in the first image shown above! The first image neglects to point out that Philolaus was using a different fundamental tone or root tonic to produce 4/3 as the ratio from 0 to 8 for the logarithmic magnitude of the fundamental tone of 0 to 12! Alan Bowen makes this point also:

> Any who doubt that the musical ratios are all of greater inequality, i.e., that the antecedent or first term in each is greater than the consequent or second term, should consult Archytas DK 47 B 2. This Fragment requires that the ratios be of this form if the assertions about the three means [arithmetic, harmonic and geometric] are to be true. Accordingly, the ratios assigned to the octave, fifth, fourth and minor sixth, must be 2:1, 3:2, 4:3 and 8:5, and not 1:2, 2:3, 3:4 and 5:8, respectively, as Mosshammer and others would have them.[15]

And thus the "great tradition" of commutative geometry Western science was launched and promoted by Plato:

> Accordingly, adding two intervals of the same size amounted to elevating their ratio to the second power and so on: the ditone was expressed by the ratio 81/64=(9/ 8) squared, the tritone by (9/8) cubed [approximating the square root of two as the Power Axiom Set], etc. Philolaus also mentions an interval smaller than the epogdoic, the diesis ('something that has been thrust through something else'), which was the difference between a fourth and a ditone. Its ratio was therefore 4/3: (9/8)squared = 256/243 and could be calculated without any instrument. (These were, in fact, the intervals used by Plato's Demiurge in constructing the World Soul.4)[16]

Ph.D. Pythagorean philosopher Peter Kingsley focuses on how Aristotle and Plato misrepresented the PreSocratic philosophy and thus wisdom was lost from the West, ironically at the same time PreSocratic Wisdom was used to construct Western science. See also "What can music tell us about the nature of the mind? A Platonic Model" by Brian D. Josephson[17] & Tethys Carpenter in Stuart R. Hameroff, Alfred W. Kaszniak & Alwyn C. Scott (eds.), *Toward a Science of*

[15] Alan C. Bowen, "The Minor Sixth (8:5) in Early Greek Harmonic Science," *The American Journal of Philology*, 1978.

[16] Massimo Raffa, 'Measuring Musical Beauty: Instruments, Reason, and Perception' in *Ancient Harmonics. The Cambridge Companion to Ancient Greek and Roman Science*, Cambridge, Cambridge University Press, 2020, pp. 248–267.

[17] I did contact Nobel Physicist Brian Josephson about his music-mind research. We had a cordial correspondence several times, regarding the connection to meditation and the paranormal. But Nobel Physicist Brian Josephson finally informed me he was not interested in noncommutativity.

Consciousness. MIT Press (1996) stating (passim):

> specific forms that appear to be favoured in music,…. an intuitive ability to be aware of the creative potentials of particular patterns of sound even when considered in their most elementary forms,...intelligence would be the product of a collection of adaptations capable of being specified by a coding system related to that of music.... intelligence of the individual is the consequence of preexisting ideas in some mind-sphere.... the idea that there is a fundamental connection between sound and form is an ancient one, dating back thousands of years in the Eastern philosophical tradition.

We can now consider traditional Eastern music tuning to demonstrate the inherent noncommutativity in listening to the source of the root tonic!

> The thesis can be expressed in the following way: If two drones either a fourth or fifth apart are sounded, one of these will 'naturally' sound like the primary drone. It is not always the lower of the two which will sound primary, but the one which initiates the overtone series to which the other note (or one of its octaves) belongs. By amplifying a prominent overtone the secondary drone lends support to the primary and intensifies its 'primary' character. Ma [Perfect Fourth as 4/3], although consonant to Sa (root tonic), is alien to the overtone series [aka F is not an overtone of C] and is not evoked in the sound of Sa. On the other hand, Sa is evoked in the sound of Ma, since Sa is a fifth above Ma and is its second overtone.
>
> For this reason it can be argued that the tendency to view Ma [the Phantom Tonic] as the ground-note [noncommutative undertone as Perfect Fifth] has a 'natural' basis. The same cannot be said for Pa [Perfect Fifth] as Sa is not part of its overtone series.[18]

The empirical truth of noncommutative music listening is not realized in Western music theory except only by Fields Medal math professor Alain Connes! Only even a few Western music theorists point out the difference between the overtones versus the commutative ratios.

> Nicolas Slonimsky once pointed out, in an effort to dissuade readers from the idea that Western tonality is the inevitable result of how we hear (as opposed to a largely artificial invention), that no matter how high one goes in the harmonic series, a fundamental pitch will not produce a perfect fourth above the fundamental.[19]

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[18] N. A. Jairazbhoy, *The Rags of North Indian Music: Their Structure and Evolution*, Islamabad, Popular Prakashan, 1st ed., 1971, p. 72.

[19] https://newmusicusa.org/nmbx/IV-The-Phantom-Tonic/

Noncommutative music theory (the true Pythagorean Logos), as detailed by Fields Medal math professor Alain Connes in his regularly repeated lecture, "Music of Shapes," has thus restored the true meaning of music as a PreSocratic Wisdom philosophy. Connes (from his lecture, "Music of Shapes" that has several versions posted on youtube, and in this case, transcript of a conference given by Alain Connes, 'Duality Between Shapes and spectra,' given at the Collège de France, on October 13, 2011.):

> The 12 comes from the fact that there are 12 notes when you make the chromatic range. And the 19 comes from the fact that 19 is 12 + 7 and that the seventh note in the chromatic scale, this is the scale that allows you to transpose. So what does it mean? It means that going to the range above is multiplying by 2 and the ear is very sensitive to that. And transpose is multiplication by 3, except that it returns to the range before, i.e. so it is to multiply by 3 / 2, that agrees. Well, that's the music, well known now, to which the ear is sensitive, etc. Okay. But... there is an obvious question! It is "is there a geometrical object which range gives us the range we use in music?". This is an absolutely obvious question.... Due to the exponential growth of this spectrum, it cannot correspond to a familiar shape but to an object of dimension less than any strictly positive number." Connes explains again elsewhere, "Because if we calculate its size using what I told you before, we obtain that it is an object of dimension 0, an object of dimension 0 in the sense that its dimension is smaller than any number, not zero but positive."[20]

Connes makes this distinction between Western tuning and Pythagorean tuning (discrete noncommutative) elsewhere also, stating, "The fact that the ratio log 3/log 2 is only approximated by the rational number 19/12 is responsible for the difference between the 'circulating temperament' of Baroque music (e.g. the Well Tempered Clavier) and the 'equal temperament' of XIX century music."[21]

Now Connes is explicitly talking about noncommutative time-frequency based on listening! Connes (another version of "Music of Shapes" talk in 2011)

> The shapes on the sphere are different, the sound we hear is the same. [my emphasis, Isospectral but not isomorphic]. And that is what we call spectral multiplicity, that is to say that in the spectrum, what will happen is that we will have the same value, but it will happen multiple times. I will come back to this for the

[20]Connes & Prochiantz, 2018 interview, http://denise.vella.chemla.free.fr/1-trad-ac-ap.pdf

[21] Connes & Marcolli, *Noncommutative geometry, quantum fields and motives*, Providence RI, American Mathematical Society, Colloquium Publications, Volume 55, 2007, p. 388.

> musical shape, that, we will see that later....[22]

This Pythagorean Connes connection is noted by math professor Micho Durdevich citing Connes, with Durdevich stating, "On the other hand, the ancient Pythagorean musical scales naturally lead to a simple quantum circle.... The oscillating modes ...will be quantum (noncommutativity of the algebra V)."[23] When we think of music as noncommutative philosophy (again only Alain Connes figured out this noncommutative music secret that I was also calling in my University of Minnesota master's thesis "complementary opposites" as "sound-current nondualism" based on my young music training insight), we also need to realize that time is no longer defined as a "function" of space or "commutative geometry." Connes emphasizes that all science thus far has been based on commutative geometry and thus noncommutativity is considered "strange" and a "nuisance."

For example, Nobel Physicist Roger Penrose has realized with his new "palatial twistor" model of reality that indeed, citing Connes, the foundation is noncommutativity.[24] Yet Penrose also admits (in one of his youtube posted talks) that he is not good at noncommutative geometry aka quantum algebra math and Penrose does indeed consider noncommutativity a nuisance (again mentioned in his talks posted on youtube). Physics Professor Basil J. Hiley (he helped Penrose coin the term "twistor") considers noncommutativity to be a necessary "radical" restructuring of physics at its foundation (as per our several email conversations), and thus Hiley points out that even Richard Feynman and Paul Dirac both covered up this noncommutative foundation of reality.

> However non-commutativity is deeply ingrained in quantum phenomena and is not, in my opinion, "only mathematics". The early pioneers of QM, such as Heisenberg, Born, Jordan, Dirac and others showed this feature of non-commutativity in great detail.... It [Hiley's physics] is a very different approach which is based on an exploration of non-commutative geometry, in the same spirit

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[22] Alain Connes, 'Transcript of a conference given by Alain Connes, Duality Between Shapes and spectra, given at the Collège de France,' 2011. https://denisevellachemla.eu/mai8-en.pdf

[23] Micho Durdevich, 'Music of Quantum Circles,' in *The Musical-Mathematical Mind: Patterns and Transformations* (Gabriel Pareyon, Silvia Pina-Romero, Octavio A. Agustín-Aquino, Emilio Lluis-Puebla. Springer, Oct 20, 2017).

[24] Matilde Marcolli, Roger Penrose, 'Gluing Non-commutative Twistor Spaces,' *The Quarterly Journal of Mathematics*, Volume 72, Issue 1-2, June 2021, Pages 417–454, https://doi.org/10.1093/qmath/haab024

of Alain Connes but using more physical intuition.[25]

Hiley: "I am writing my take on the relation of his [Alain Connes'] work to what I have been doing. It [noncommutativity] is really deep stuff which moves us well away from the way physics is normally presented."[26]

Hiley clarifies:

> quantum theory in the context of a non-commutative dynamics... They [particles and trajectories] appear as projections from the noncommutative phase space into space-time. This structure leads us to a more radical view of quantum processes involving individual particles.... This approach is radically different.[27]

How does Hiley explain noncommutativity in layman terms? Consider his interview with the science writer George Musser:

> Basil j. Hiley: In noncommutativity. Every day in our life, we always have to be careful of the order. You've got a cup in the cupboard. You've got to open the cupboard door before you can take the cup out. All our experience is doing things in the right order, so our activity is noncommutative. It comes into quantum mechanics because Heisenberg sought to explain atomic energy levels and what he found was he had to make his objects into things that didn't commute with each other. The order was vital....It seemed to me that he [Heisenberg] was actually discussing a process. He was talking about how something goes from one to the other, and he called that a momentum transition, and a position from one position to another. In other words, it wasn't x and p, p and x. It was rather x0, x1, p1, p2, and so on.[28]

The even stronger key insight of Professor Basil J. Hiley is that noncommutativity does not require a "collapse of the wavefunction" paradox aka the "quantum measurement problem" and thus noncommutativity can self-amplify or resonate into the macroscale!

Hiley points out in his 2022 book chapter co-authored with neuroscience professor Paavo Pylkkänen, "Can quantum mechanics solve the hard problem of consciousness?" that indeed, the whole problem of quantum biology thus far has

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[25] Basil J. Hiley email to author, February 22, 2022.

[26] Basil J. Hiley email to author, Sep 25, 2022, 11:20 AM

[27] B. J. Hiley, *Foundations of Quantum Theory in the Light of Bohmian Noncommutative Dynamics*. The Finnish Society for Natural Philosophy 25 Years K.V. Laurikainen Honorary Symposium 2013

[28] https://www.scientificamerican.com/blog/critical-opalescence/the-wholeness-of-quantum-reality-an-interview-with-physicist-basil-hiley/

been ignoring noncommutativity and thus, wrongly assuming that quantum coherence is lost at the macroscale:

> This is not the place to discuss these proposals in detail but we feel it is essential to draw the reader's attention to this rapidly developing field [quantum biology] which has been held back in the belief that "wave decoherence" is the fatal factor that destroys quantum effects in living systems. This negative outlook traps us in a totally obscure notion of "wave- particle duality" and all the conflicting images that it throws up.[29]

As math professor emeritus Luigi Borzacchini has pointed out, in our correspondence discussions regarding the hidden music origins of Western science, this noncommutativity foundation of reality means that the paranormal is normal! Noncommutativity at the macroscale was the emphasis of Stanford Linear Accelerator Center (SLAC) physicist Eddie Oshins who coined the phrase "quantum psychology."[30] Oshins called macroscale noncommutativity as mind-body meditation or "neigong" to be "self-referential motion" based on the secret of the noncommutative Dirac Dance. For example, the outside of the hand is yang and the lower body is yin while inside of the hand is yin and upper body is yang. Similarly, the oldest philosophy of India, "three gunas of no guna" is based on the same music theory secret of noncommutativity as is found in Taoism. (see my free book, *Ancient Advanced Acoustic Alchemy* pdf for details).[31] So, the Dirac Dance (a demonstration of the 720-degree spin of the measured electron from noncommutativity of ½ spin) - is practiced as the Silk Reeling exercise in Tai Chi as Eddie Oshins points out in collaboration with his Chinese Neigong researchers!

INHIBITION OF THE NEURONS LEADS TO DEEPER NONLOCAL NONDUAL PROTOCONSCIOUSNESS THAT IS PRECOGNITIVE NEGENTROPY OF REALITY

Sir Roger Penrose uses the term *protoconsciousness* that appears to have been coined by quantum physicist Bernard d' Espagnat to refer to a nonlocal active

[29] Basil J. Hiley & Paavo Pylkkänen, 'Can Quantum Mechanics Solve the Hard Problem of Consciousness?' in Shan Gao (ed.), *Consciousness and Quantum Mechanics*, London, Oxford University Press, 2022.

[30] Eddie Oshins website remains up at http://www.quantumpsychology.com/

[31] https://www.academia.edu/41008216/Ancient_Advanced_Acoustic_Alchemy_2018

information as the foundation of reality (what is called "formless awareness" or the Absolute Void or Emptiness in nonwestern philosophy aka the "Cosmic Mother"). This is also the focus of David Bohm and his collaborator Professor Basil J. Hiley who both emphasize that quantum physics is not "mechanics" at all but rather an organic process of a deeper implicate nonlocal "active information" as a "novel force" from noncommutativity. Hiley points out that the Moyal algebra of 1949 made the same physics equation discovery as David Bohm in 1952 with the quantum nonlocal potential being just a part of normal quantum physics mathematics.

Classical physics thus "emerges" as the limit of the noncommutative math (Math Professor Lou Kauffman lectures on this same noncommutative foundation of reality) but Hiley again emphasizes classical physics does not have to be the case! It was Pascual Jordan who first realized, in the 1930s, that noncommutativity enabled a quantum biology that self-amplified into the macroscale. And so, in terms of the quantum algebra noncommutative mathematics this is also called "fundamental time" by Roger Penrose (a term from Lee Smolin who had Professor Herbert J. Bernstein as his first quantum physics teacher, just as I took Bernstein's class when I also attended at *Hampshire College* for my first year of college).

Bernstein teaches the "Dirac Dance" to demonstrate nonlocality and Eddie Oshins then relies on the Bernstein example to explain the noncommutativity of self-referential mind-body motion. Math Professor Lou Kauffman produced a video also based on his Dirac Dance collaboration research with Eddie Oshins. Oshins:

> In a manner similar to Bernstein's resolution of translational human movements into Fourier components, I hope to attempt a decomposition of motion of a Chinese "internal" (image-based) martial art (such as Pa Kua Chang or T'ai Chi chuan) into normal modes having rotational symmetries, such as (spinor) spherical harmonics or Bessel functions in order to demonstrate integrated movement and an adaptive economy for certain natural motions....
>
> Then again, this property of "noncommutivity" in itself might be valuable in some way.... momentum is a vector operator and thereby does not commute with the angular momentum.... addition of turns is noncommutative... the noncommutivity

of the addition of turns"[32]

Oshins also directly makes the connection to PreSocratic philosophy[33] just as the term "primordial time" is used by the former collaborator of Oshins, math Professor Louis Kauffman (Lou) - again referring to this "almost mystical" (Kauffman) active information from the future – an asymmetric nonlocal time shift of the future and past overlapping. The term "primitive time" is used by Alain Connes to again refer to this frequency-time algebraic process that is "more dense" than the symmetric spacetime continuum. So instead of distance to measure space, rather gravity emerges from a fundamental time-frequency nonlocality as noncommutativity, most easily explained by music theory, what Connes calls, "two, three and infinity."

Professor Basil J. Hiley has pointed out that in fact the "weak measurement" experiments that have been the focus of Yakir Aharonov (who collaborated with David Bohm) rely also on noncommutativity. And these weak measurement experiments also demonstrate a "gravitationally repulsive"[34] active information as well – just as Alain Connes argues. Connes, 2015 talk to physicists:

> There is an overall motion. ...I always hesitated to give this talk. It's an intuitive idea. It's based on mathematics....the intuitive idea is that there are factorizations with infinite degrees of freedom that they generate their own time and of course it's related to thermodynamics...[35]

The source of the gravitational potential energy originating in quantum nonlocal negentropy, as Penrose points out, is this discrete noncommutative

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[32] Eddie Oshins, 'A Test for Classical Psychospinors' in F., Abdullah, (ed.), *Conservation and Invariance*. Cambridge, UK, Alternative Natural Philosophy Association, 1993.

[33] Eddie Oshins, "The experience of nature from Anaximander's apeiron to Oshins' quantum psychology," invited March 30, 1994, talk at 90th annual meeting of the Association of American Geographers on panel: Relativism I, Roots and Varieties of Relativism in Human Studies; MRI.TAPE.1994/Q- .03a.1.)

[34] "In particular, this implies the possibility of gravitational repulsion rather than attraction within the weak reality. Moreover, not only the gravitational mass, but also the inertial mass will be shown to admit a negative sign." in M. Waegell, E. Cohen, A. Elitzur, J. Tollaksen, Y. Aharonov, "Quantum reality with negative-mass particles," Proc. Natl. Acad. Sci. U.S.A. 120 (32) e2018437120, https://doi.org/10.1073/pnas.2018437120 (2023). See also: "In addition, our study indicates that the gravitational force can behave as a repulsive force because of the weak measurement." Kiyoharu Kawana, Daiki Ueda, Amplification of gravitational motion via quantum weak measurement, Progress of Theoretical and Experimental Physics, Volume 2019, Issue 4, April 2019.

[35] Alain Connes, talk to physicists posted on youtube as, "Temps et aléa du quantique," 2015.

precognitive protoconsciousness. Alain Connes thus explains that indeed our brains are doing a kind of frequency-time noncommutative transform on spacetime itself when we then perceive reality in the typical modern left-brain dominant Westernized linear time and symmetric spacetime perceptual realm.

THE ECOLOGICAL CRISIS AS IMMINENT "BIOLOGICAL ANNIHILATION" IS FROM INCREASED GRAVITATIONAL ENTROPY AS COMMUTATIVE GEOMETRY SCIENCE.

Sir Roger Penrose points out that gravitational entropy is the opposite of the entropy of matter and that gravitational potential originates from nonlocal noncommutative quantum negentropy. Our commutative geometry technology attempt to decrease the entropy of matter has increased gravitational entropy on Earth. Since all matter originates from photons due to ½ spin as Nobel Physicist Gerard 't Hooft emphasizes in his article, "Light is Heavy," (coauthored by Martin van der Mark)[36], then the quantum negentropy as a gravitationally repulsive novel force that is nonlocal is from the noncommutative time-frequency, first realized by de Broglie's Law of Phase Harmony critique of relativity.

The abrupt global warming crisis is based on our current CO_2 emissions being a rate 100 times faster than the natural background rate of 12 gigatons per 200 years, as Physics Professor Raymond Pierrehumbert points out. NASA physicist James E. Hansen has emphasized recently that the main current cause of temperature increase in the atmosphere is due to the reduction of the Aerosol Masking Effect. Thus, as per the research of Daniel Rosenfeld's group, a 40% reduction of burning coal (sulfur particles that reflect photons) heats up Earth another 1-degree Celsius global average. The Arctic is heating up at least four times faster than the global average and there is 1200 gigatons of pressurized methane in the world's largest ocean shelf, the East Siberian Arctic Shelf (ESAS). That methane will double global warming with just a fifty gigaton "abrupt eruption" that is highly probable; increasing global temp average by .6 Celsius, as the methane continues to accelerate out of the ESAS into the atmosphere. Growing food at scale is already directly at risk due to the extreme weather from abrupt global warming.

[36] https://arxiv.org/pdf/1508.06478 and for a follow-up presentation posted on youtube: https://www.youtube.com/watch?v=fBwFo68KgTY

THE QUAGMIRE OF IMMINENT BIOLOGICAL ANNIHILATION IS SOLVED BY NONCOMMUTATIVITY

Music as meditation via noncommutativity thus presents an ancient yet highly advanced means of restoring negentropy as the origin of life not just on Earth but in the Universe as well. In terms of ecology, microalgae, by having the most efficient photosynthesis[37], is also able to store 100 gigatons of CO_2 per year - if microalgae is promoted, as taught by Sir David King and double Ph.D. marine biologist Raffael Jovine. Professor Stuart Hameroff, working with Roger Penrose, has explained the microtubule origin of quantum coherence protoconsciousness in the brain. Anirban Bandyopadhyay, the Ph.D. experimental physicist has corroborated the claims of Hameroff and Penrose by demonstrating that ultrasound activates the strongest electrical conductance of the microtubules, a 3000 times amplification only possible as nonlocal quantum coherence with the tubulin.

It is in tinnitus research that it was discovered that the highest pitch we hear externally, when focused internally, resonates as ultrasound in the whole brain. Normally this type of frequency precision in listening is limited by Fourier Uncertainty or time-frequency uncertainty, the same origin of the Heisenberg Uncertainty principle of position and momentum. Physics Professor Manfred Euler considers the two ears with the two phases to be an analog of the double slit experiment in physics – in other words the quantum coherence of deep listening(especially with music training proven to be up to 10 times faster than Fourier Uncertainty[38]) in phase is a physical demonstration of quantum nonlocality as negentropy at room temperature; such room temperature Josephson quantum superconductivity has been proven in photosynthesis for example.

Dr. Mae-Wan Ho, the quantum biologist, also emphasized this quantum coherence phase coherence of the right and left ear listening at the microsecond

[37] "...kind of like a set of bells all ringing perfectly in tune. This allows energy to move around the material with zero friction….a similar state called superconductivity…it can as much as double the efficiency." https://news.uchicago.edu/story/scientists-find-link-between-photosynthesis-and-fifth-state-matter

[38] https://phys.org/news/2013-02-human-fourier-uncertainty-principle.html

wavelength (ultrasound frequency) thereby corroborating the direct quantum biology nonlocality claim of Hameroff-Penrose via deep listening to frequency.

Physics professor Lawrence or Larry Domash also describes this quantum coherence of listening to the origins of mantras in the brain – a type of attention in meditation – that then relies on the noncommutativity of the quantum coherence to resonate the nonlocal quantum potential as about the foundation of reality. Domash:

> ...superconductivity within one neuron could become phase coherent with that in an adjoining cell by virtue of quantum tunnelling, and this could be stimulated by the macroscopic analog of stimulated emission (alluded to before in connection with the mantra), that is an AC Josephson effect. ...At a more interesting level, the quantum vacuum state may be said to be empty (of excitation) and yet full in the sense of pure potentiality; it contains "virtual" (unphysical) representatives of all possible modes of matter and excitation in the form of vacuum fluctuations or "virtual particles" (zero-point excitations of each field mode, assigned one-half quanta of energy, due directly to the non-commutative property of the field operators).[39]

Domash is corroborated by Professor William Bialek:

> It is the presence of this device, a quantum limited amplifier, which makes the perception of sound [listening] a macroscopic quantum phenomenon....In the quantum-limited regime the phase of the signal is translated into the phase of the amplifier wavefunction, as is clearly true in Josephson junction devices, for example....they must be coherent....phonon super-radiance provides a natural means of explaining the macroscopic quantum effects.[40]

This deep music listening as logical inference, "the sound of silence," is then the source of the neuron inhibition that Eddie Oshins wanted to examine via MRI, demonstrating a resolution in quantum psychology, but also demonstrating a "self-referential motion" of mind-body-spirit noncommutativity. Ernest R. Hilgard:

> ... A further point is his [Oshins'] emphasis on the role of negation ... that unconscious processes (primary processes) lack negation. Negation [prefrontal inhibition], Oshins says is necessary for conscious processes, for mature judgment

[39]Lawrence Domash, https://www.miu.edu/assets/collected_papers/doma1975t1coll1-99.pdf *Scientific Research on Transcendental Meditation, Vol. 1,* Maharishi International University of Management, 1975.

[40] William Bialek, "Quantum Effects in the Dynamics of Biological Systems," Lawrence Berkeley National Laboratory, 1983.

and to form boundaries between the self and others.[41]

ANTIGRAVITY LEVITATION IS A REALITY IN DEEP NONCOMMUTATIVE MEDITATION

Physics has been searching to demonstrate antigravity (assuming the need for a "nuts and bolts" external engineering approach) on a macroscale yet Professor Michael Grosso has detailed how Saint Joseph de Copertino was well-documented to levitate, with most of the testimonials as witnesses against Saint Joseph de Copertino – protesting his levitation ability (see Grosso's book *The Man Who Could Fly*[42]). My own qigong teacher, Chunyi Lin, who was the subject of peer reviewed research done by Mayo Clinic Dr. Ann Vincent (proving "especially impressive results"[43]), said, in 2000, he also had levitated, spiraling up nine feet while in full lotus meditation, soon after he left the cave at Mt. Qingcheng where he did 28 days (about 4 weeks) of nonstop full lotus meditation (with no sleep) - this was around 1995.

So, in fact, antigravity is the key to being alive itself as noncommutative nonlocal nondual negentropy as Connes has detailed – stating what appears to be random originates from this deeper noncommutative time-frequency discrete nonlocality. Professor Basil J. Hiley has emphasized that most physicists cannot handle or accept nonlocality (due to this noncommutativity foundation) and instead, physicists try to impose classical commutative geometry physics onto quantum noncommutativity! Thus, noncommutativity is incorrectly considered to be an "extension" or "extra wiggle" (in terms of the Feynman diagrams) to commutative geometry.

The focus of our original human culture, the San Bushmen, was that all males are required to train (called Tshoma) in noncommutative spiritual healing force called N/om. New DNA science has now shown the Pygmies (sic.) split from the San Bushmen around 200,000 years ago[44] and the Pygmies (sic.) also practice this

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[41] from the http://quantumpsychology.com

[42] Michael Grosso, T*he Man Who Could Fly: St. Joseph of Copertino and the Mystery of Levitation*, New York, Rowman & Littlefield, 2016.

[43] Ann, Vincent, J. Hill, KM Kruk, SS Cha, Brent A. Bauer, 'external qigong for chronic pain.' Am J Chin Med. 2010; 38(4):695-703.

[44] M. Lipson, I. Ribot, S. Mallick, *et al.* 'Ancient West African foragers in the context of African population history,' *Nature* **577**, 665–670 (2020). https://doi.org/10.1038/s41586-020-1929-1

same music mind-body dance spiritual healing training! And it was the San Bushmen culture that then spread around the world (the music parallels are documented by Dr. Victor Grauer in his book *Sounding the Depths*) with even Australian aborigine "african-trait" humans arriving in the Amazon equatorial rainforest starting over possibly 20,000 years ago! (DNA science has proven this but the Australian aboriginal African-traits can still be seen in the phenotypes of these Amazon rainforest tribes, the Suruí and Karitiana people of the Amazon.

As Ph.D. anthropologist Elizabeth Marshall Thomas documented in her book *The Harmless People*, based on her living with a previously uncontacted original human culture, the N/om energy healing training required by all the males enabled humans to live peacefully without war or destruction of ecology. Clearly this is a more advanced way of living than the increased gravitational entropy from the commutative geometry first developed with the ritual origins of commutative geometry science in patriarchal plow-based agriculture 10,000 years ago, as detailed by math professor Abraham Seidenberg.

Radical anthropology professor Jerome Lewis who has lived with the Pygmies (sic.), argues that music does indeed precede language as the true focus of human culture. Even Professor Noam Chomsky now considers the musilanguage model to be probable and Chomsky replied to me in a recent email that he wished he could study noncommutativity if he had the time. I have provided a free training manual link in noncommutative music as philosophy found in docdroid or academia in the footnotes.

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