Supradual Critique of the Toroidal Model of Consciousness: A Simulacrum by Meijer, Jerman, Melkhik & Sbitnev

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We review the trilogy "Consciousness in the Universe is Tuned by a Musical Master Code" by Meijer et al, published in Quantum Biosystems, vol11, no,1, 2020

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Psychologist Piaget identified topology at the early stage of a child's psychical development as the primeval mode of elaborate cognition and thought. Heidegger conceived his phenomenology, the construal of the world by the active subject, having its foundation in topology for cognition and recognition, ultimately, information. Malpas clarified this and further identified it in terms of the affections (Malpas, 2007) –the most primitive forms of consciousness as identified by Biological Psychology (Panksepp, 1998) - related to place and time, as Proust conceived our longings. Academic philosopher Steven Rosen elaborated this further to identify the topology of phenomenology given by the surfaces of self-reference: the Moebius strip and the Klein Bottle. The latter a higher-order form of self-reference which subverts the Cartesian divide and the classical conception of space and time as a container, due to its self-penetration self-generation self-containment.

This was further developed by Rapoport, to produce a novel paradigm and conception of a unity which involves logophysics as a creative agency, of form and function, the imaginal domain, time operator, material and informational organizations, perception, cognition, anatomy-physiology and sign processes. It emplaces the subject as enacting a supraduality which is also the organizing principle of the subject, in all its forms, and the physical world as well. To this effect, Rapoport introduced the concepts of a logophysics and that of ontopoiesis, in terms of supraduality, which provide the foundations of the present critique.

Rather than merely a world of objects and processes and the subject as an observer or a participant, we live, create and conceive a world of signs operating on signs as a weaving of meaning and interpretation, the world of semiosis.

Merrell identified this as related to the Peircian triad starting with Feeling (Merrell, 1997), which Rapoport extended to the HyperKLein Bottle as a higher form of self-reference which prompts, jointly with it a relatedness to alterity, a principle of hetero-reference interwoven with self-reference.

After all, the mirror-neuron phenomenology has identified the self as fully interacting and defined in relation with alterity. The 2-torus embodies nothing of the kind.

Meijer et al have presented in a recent trilogy which somewhat resumes several works of them as a group -and of separate authorship, too- of the last years, in which they claim to have presented a model of a "grand unified toroidal musical model" for which consciousness would "emerge".

They claim it to have for metaform the 2-torus, due to its claimed association with self-reference, for which then consciousness would be somewhat embodied in this surface.

They have also identified this as loosely related to the vortex, as the primeval form of Nature. In doing so they took for its fundamental operation the resonance coupling between the brain and singularities of space-time at the Planck level of the vacuum, all of them claimed to be somewhat related to the 2-torus.

The latter is repeatedly is glossed upon with no argumentation nor association with an ontology, other than the dualism set as by default. In doing so, they have presented a just-so chain of references and processes at times treated therein and at times attributed to them, which would ultimately be related, to the 2-torus and the vortex.

In their work there is no phenomenology at all, nor perception, cognition, nor a subject other than an entity from which physical processes would produce the emergence of consciousness. For them, space and time, the processes there eventuated, are given.

The cybernetics –though they refrain to mention it as such- they propose for them, though they repeatedly draw figures claiming a "circular" causality, the only circularity is the repeated attribution of the 2-torus to be the case in all of them, without a unifying ontology nor epistemology, nor to sup-port any of them separately nor their claimed unity, other than the 2-torus.

However, for a start, the 2-torus does not embody the self-reference they claim to operate if not a banal form of simple trivial repetition, so self-reference as ultimately leading to the appearance of consciousness, is no more than an attribution to the 2-torus, rather than embodied by it. Consciousness, as already said, in its most elementary form of feelings and affections operate through supradual logo-physics, the (Hyper)Klein Bottles, an interpenetration of Klein Bottles. If music would be the case, which they do not distinguish whether they mean by this the phenomenology of music as experienced, created or performed, or the world of sound, the 2-torus also fails to embody the fundamental 1:1 and 2:1 harmonics as united: A principle of twoness fused as oneness, or oneness decomposing to two-ness as its manifestation, which instead are embodied by both the non-orientable single-sided Moebius strip and the Klein bottle.

So, to resume, their whole model is a physicalist reductionism which develops in terms of attributions to what does not embody it: the 2-torus. Thus, it is no surprise that there is no ontology for its repeated appearance, nor argumentation for that matter, it is there because it is wanted, by the authors, to be the case, or someone else have claimed it too, with no ontology to sustain it too, but dualism. After all, most scientists and philosophers fail to consider themselves with their subjectivity in their theoreticzations, and attributions are taken for ontological, not an induction or projection of the subject.

So is the case of their proposal of a topological model, in the first place, as a matter of face value: it is merely an icon, raised to the sign of Being by their attribution, and static, hardly the embodiment of consciousness, after all, quite fluid at that.

So, their presentation takes the form of a tautology, in which the hypothesis of the 2-torus, is turned to be thesis, to be resurfaced at other point of their presentation as an hypothesis, recurred, till the end.

Again, the world and all that they consider, are given, no phenomenology involved in their making.

For a start, they claim it to be founded in a Grand Musical Algorithm, which they purportedly extracted from the studies of hundreds of articles in which natural frequencies are discussed.

Remarkably, they do not show how this algorithm is deduced from it, this author has failed to identify it in their other articles. Nor they identify the topology which the algorithm would presumably generate, would they refer it to the experience of tonality.

So much for a topological ontology, nor they mention what is its bearing to the different processes they refer to, other than characteristic frequencies of them. So it is hard to support in this case an attribution of musicality if not as sound, nor to the 2-torus in doing so.

Simply, the latter does not embody proportions of no kind (Rapoport, 2013, 2016)

Would an information field had arisen from the statistical inference of the frequencies incorporated into the algorithm, then its traces have been omitted, and will only be invoked allegorically, as the 'information field'.

Allegories suggest, but do not place in evidence nor explain, and it is perhaps in their retraction of informative value, that their attributional operation is most implicit, and then it is to the reader to make up for what is missing, very much as our brains fills the missing information.

This is the case of their model. If not taking a meta-cognitive stance, it is quite difficult to submit it to examination, further going thoroughly into the details to find their presentation wanting. Myths operate similarly.

Would they mean by this "music" tonal space, then certainly different models embody knots on the 2-torus which edge Moebius strips and other knots (Avrin, 2011, 2012), the former appears in Gauss' Tonnetze, tonal space, as well as the Klein Bottle, and the 2-torus.

These knots and hybrid structures of molecules are crucial to the Topological Chemistry paradigm and applications to allosteric recognition as topological transformations, all which they refrain from commenting at all (Rapoport, 2016).

Tonal space takes myriad forms, mostly depending what are the distance between the musical keys or chords are considered, and thus the Klein Bottle, or still the Clifford torus appear. Ultimately they are referred to the "circularity" of the perception of octaves around the tritone, which elicits a Moebius strip topology of the "circularity" of mental rotations.

They appear at the basis of neurological rotations as related to populations of neurons as non-linear oscillators dynamical systems, and as topological models of elementary particles as torsion geometries.

The authors, although they indicate the universality of vortices, they refrain to mention their relation to non-orientability, though they comment on knots and their relation to solitons.

Their making of a taboo (to the point of censorship and self-censorship, misrepresentations and misappropriation (see Appendices) out of torsion geometry seems perhaps be the intimate relation with supraduality which they reject upright though they propose a continuity between the brain and the vacuum Planck black holes.

Torsion geometries are the backbone of quantum mechanics, gravitation and the fundamental interactions, fluid and magnetofluid-dynamics.

Brownian processes, non-linear evolutions and chaos, morphogenesis, pattern formation and recognition, and embodied in life as liquid and ordinary crystals, fluid motions, which is the case of water, actually coherent water domains which they refrain to indicate their non-orientability in its cellular and genomic operations (Rapoport, 2013, 2016).

Remarkably, in this regard, when they discuss the creation of order and coherence as processes of self-organization, as quantum field bosonic condensates, which lay at the creations of torsion geometry of dislocations, liquid crystals, topological structures etc which are crucial to the resonance between coherent water domains, genomes and electromagnetic fields and the emergence of codes, which are fractal and non-orientable (Rapoport 2016 III, Vitiello, 2014), and basic to life and semiosis as the operation of constraints, they refrain to comment on the non-orientability and torsion geometry of them, and particularly upon interacting (genomes, coherent water do mains, electromagnetic fields, liquid crystals) (Rapoport, 2016 III).

Also remarkably, given the importance of cyclical processes, they refrain to mention that torsion establishes an elementary cycle related to spin and the Planck constant (Ross, 1989) and that this is a protoform of indication and still of semiosis. Also Dolce, though not in terms of geometry, has shown the cyclicity that supports the common basis for both gravitation and quantum theory (Dolce, 2015).

The authors refrain of mentioning all of this though remarkably they do mention the thesis by Hu and Wu of the role of spin in the brain configurations that would support consciousness.

To resume, the banal formal of the self-reference attributed to the 2-torus is one for which the cyclicity appears as given, alike a circle, but for an inert whole in the middle, it closes and can-not do anything but that.

Torsion manifests inhomogeneity, a singularity which ruptures space and thus requires to surmount it and that is what torsion does. So, in doing so reestablishes an order broken by the singularity, by integrating it into the whole process of construing a geometry, and as the agency doing so. This is the case either of a subject closing the gap, or in the lack of it Nature does it all by its own. This filling the gap is self-referential by closing the circuit- and at the same time, hetero-referential to the singularity.

A non-banal self-referentiality indeed: it already embodies hetero-referentiality. In terms of the non-orientability it takes the twist of the Moebius strip or the double twist by which the Klein bottle self-penetrates. In doing so, it creates a novel relation which cannot be subsumed as in the formula object-in-space-before-subject, which identifies the dualistic ontology that supports it: the object and the subject passively contained in space as if unrelated. Instead, the Klein Bottle dynamically creates itself, and in doing so, integrates Outside and Inside, rather than dichotomizing them, as in the dual ontology.

Torsion embodies a protoform of indication, of semiosis, the vortex the manifestation. The authors cannot have any of the kind: consciousness is to "emerge", somehow. Let us examine how they claim the magic to work.

Perhaps suffices to examine their attribution of a resonant coupling between the brain and the geometry of the vacuum's event horizons which they claim to be as a consequence of their mutual 2-torus metaform. Their attribution would stem from t'Hooft 's theory of these virtual black-holes ('t Hooft, 2018) [not quoted], in which he clearly stated that what is remarkable about them, is the stunning fact that they embody a Moebius strip surface, which supports time-like closed geodesics, which by the way, are the case of the Goedel solutions of General Relativity (Rapoport, 2013).

Here the attribution of the presumed role of the 2-torus as an embodiment of consciousness is proved not to be the case, and unfortunately, this is repeated by them all the way through in their presentation.

T'Hooft's non-ordinary topology for the event-horizon appears as the Moebius strip, as an antipodal projective identification, which is crucial also to music perception (the tritone paradox, already mentioned), the very possibility of pattern recognition and creation embodied as the Klein Bottle metaform, and the mind's modelization of vision for static objects, and for a locomoting observer moving linearly, and also for the constitution of self-hood.

Another example of mis-representation of non-orientability as a toroidal model. They claim:

"One example of a recurrent toroidal type of brain activity, might be found in the periodically repeated pattern of the so-called grid cells in brain. These have therefore been related to a *supposed* [my emphasis] toroidal architecture of brain wave attractors (McNaughton…2006)" (Meijer et al, II)

Here the mistake is both by McNaughton et al and by Meijer et al. The fact that there is a periodicity does not imply per se the torus-like character of it.

Actually, McNaughton et al draw lines through a center of the periodic grid, as already representing the antipodal character which the boundary conditions imposes, not their toroidal topology, but the Moebius one (Rapoport, 2013, 2020) and forthcoming article).

Seems that Meijer et al were aware of the mistake and chose to follow it, yet with their "*supposed*" Freudian slip for disclaimer.

Whatever, the entailment they propose is also a slant of suggestivity, no else.

As said before, this is the cognitive pattern which they fully embrace all along their presentation.

Say,

"*In the framework of the present model for brain function, both the subjective unconscious and conscious aspects…. can, in principle, be modeled as information flow and recurrent storage as taking place in a nested toroidal setting, since the human brain organization clearly shows functional circuitries and obvious fractal properties*" (p.36,II).

The nested toroidal character cannot be inferred from the recurrence they attribute to a presumed top-down or bottom-up organization, if not by suggestion.

That the brain anatomywise is a nested fractal structure does not exhaust its description, since the neural networking is crucial to its operation and organization (Guindolin, 2011), and thus the topological studies of the brain connectome.

Yet, let us proceed to the neurosciences and cybernetics. As already McCulloch noted shortly after his pioneering work with Pitts on neural networks which established the digital computational modeling of the brain, the presently acknowledged fact is the operation of feed forward process on the upper brain sectors that connect the primary cortex with the higher ones. He conceived of them as an embodiment not of hierarchical connection recurrent first-order cybernetics, but an heterarchy, by which the neural architecture abandons the 2-plane architecture, which was retaken by McCulloch's colleague Gotthard Gunther to propose supradual logics (Rapoport, 2016).

This was also discovered by Spencer-Brown in his calculus of indications, and retaken by Varela to formulate his dualistic theory of autopoiesis, by considering this reentrance in terms of extending the dual logic to include an Ouroboric third state, to immediately drop it down as a mere formalization.

Indeed, he hinted that this entailed in considering the Klein Bottle as the metaform of self-organization, but quickly dropped it, claiming that Gunther's urgence to consider supradual ontology, was "too difficult to understand". Thus, autopoiesis was laid to remain the dualistic paradigm of closed self-organization vis-a-vis the environment, by neglecting the latter, no contextualization, no adaptation, no learning, no eco-logic as an integration of self and alterity, no Klein Bottle at the ontological basis, to resume (Rapoport, 2016). So is the toroidal model of a closed purported self-organization. By the way, while anticipatory causality is the case of non-orientability, the toroid cannot hold if not as a banal impredicativity of circular form.

Actually, the self-referential nature of the brain organization rather than pointing out to a Matrushka-like nested dual organization, as Meijer et al claim, point out to a Klein Bottle "circular" cybernetics and still Hyper-Klein bottle higher order, due to the modularity-with-plasticity nature of the brain's physiology and architecture, not to mention the body/mind. Frequencies play wonders and monsters into this.

As Persinger proved, it takes a small magnetic field applied to specific parts of the brain to induce altered states of mind, even the experience of God or the state of all-as-oneness. So, no hierarchies at this, heterarchies, rather. Supraduality , all the way through.

So Meijer et al mention the brain connectome and its harmonics and its higher order dimension, and singularities.

Now, they refrain mentioning the Klein bottle topology of the primary visual and somatosensory systems, and they also refrain to mention that the harmonics that were discovered to be the case of the brain's fundamental functionality in the creation of patterns, requires a principle for both pattern formation and recognition.

This Klein Bottle unification of the objectual relation with the environment as recognition and the creation of patterns by the body/mind– which thus fuses the making of the world with the perception of it- is a manifestation of an ontology which integrates Outside and Inside dynamically. Nothing of the kind is embodied by the 2-torus.

To resume, the metaform for both pattern creation and recognition, without which there is no perception at all nor action as a unity of action and perception, is the Klein Bottle, all of which two of the authors had been informed about by this author, repeatedly (Appendices).

And the higher-dimension that have been elicited in the brain connectome are already the case of the Klein bottle itself, which due to the antipodal decomposition of signals, requires for building a unique percept out of a signal, to be removed by representing the Klein bottle by a standing wave in dimension 5 which unravels the 2 to 1 reading of the signals, not without leaving a paradoxical trace of the making (Rapoport 2013, Rapoport & Perez, 2018).

Remarkably, the authors also refrain on commenting that the Klein Bottle is the invariant structure of the phase of the receptive fields and their Gabor wavelet representation, which is recognized as the appropriate analytical form of them, and known to be the basis of holography, as Gabor himself developed.

So, where would their claim of holography come from?

In their trilogy, from the toroidal form of the black-hole event horizon, which 't Hooft stated is non-orientable, would hold the holographic information. So, a no-go, in their settings.

If form and function are manifestations of an underlying principle, which they take for duality, then the case either is the 2-torus or the Moebius strip due to the singularity being looped around. 't Hooft showed the latter to be the case,

The mistakes and misrepresentations are not restricted to neurosciences and physics of black holes. For instance, they claim that the 720^0 symmetry of fermions is embodied by the 2-torus (fig.5, p.17,I).

They cannot be more mistaken. There is no 720^0 symmetry on the 2-torus, while it is the very architecture of the Moebius strip and Klein Bottle: two complete turns along a longitudinal path to return to the identity, thus the 2:1 and 1:1 harmonics of them, as embodied, as already said, rather than their attribution of harmonics to the 2-torus.

At this point, this author cannot refrain of commenting whether the authors are aware of their making of a case of what is not and erasing all information that actually makes evident their construction untenable, or are simply inertial to their dualistic undertaking, and the latter is an unconscious obliteration of what they reject.

The latter, after all, has been the hegemonic cognitive pattern after Plato's rejection of the inherent supraduality of the conception of Parmenides, the founder of Greek philosophy and science (Kingsley, 1999).

It was subsequently adopted as the mainstay conception of the Western world, though with the brief respite thanks to Bishop Cusanus with his Coincidentia Oppositorum principle, with which Jung identified the psyche, Hegel's dialectics, and the hidden practice of alchemy, say, by the founders of the Royal Society, Isaac Newton, for one, yet which was not incorporated into their science. The Orient did not fall to it, as the doctrine of the Dao, Nagarjuna's Middle Way, or still Zen Buddhism did their own.

Thus the "simulacrum" that this author, has felt, most unfortunately, obliged to qualify their work with, appears as very much appropriate.

That dualism is the case, is also placed in evidence with their comment:

"It follows that also galaxies, suns, planets and likely the entire universe and even life systems are also to be regarded as toroidal organized information fields each projecting digital information on their respective event horizons. According to classical information theory, information always arises through *interactions of wave-particles* and entropy of information represents the *potentia*l to ask yes/no questions in such an event with regard to a particle system … According to these concepts, information is in fact the sum of *expected* information obtained from such yes/no questions" (p.33, II).

Several comments are in order.

First: that information fields would project digital information is an attribution of digitality which does not correspond to information fields in any of the meanings that science contemplates, other than Shannon's classical information theory.

One can only wonder how could the latter be invoked to be the case: In a world of quantum physics and consciousness where supraduality is the case for both the digitality rather than an a-priori is derived from supraduality as coexistent with an information associated to continuity cooperating with singularities. Remarkably, the authors have been unable to realise that quantum entanglement is a manifestation of supraduality: that duality is not the case, as argued in (Jaeger, 2008), which clearly states the inapplicability of classical dual logic and classical information theory to quantum mechanics.

Would they still insist on bringing classical "information" as associated to a conscious subject, Shannon's conception fails completely due to the lack of contextuality and inhomogeneity (Bateson's notion of information arising as differences producing differences).

Thus, it bears a complete disregard for meaning and interpretation, ultimately, semiosis, which as we said is all about supraduality. Semiosis is erased in the author's dualistic physicalist reductionism.

They can only bringing it back by attribution. Furthermore, morphogenesis cannot be ascribed to Shannon's information since due to its lack of inhomogeneity, it cannot stand for a morphogeneric field. So their whole ascription of information fields to a 2-torus topological theory, is another major incoherence of their theory. More of this below.

They mistakenly conflated digital with dual ontology promoted to information ontology, Wheeler's 'it from bit' (Floridi, 2011).

Not only there is no place for consciousness: neither there is for morphogenesis, in their theory. However, digitality is proper to the Klein Bottle, jointly with continuity

Remarkably the authors mentioned Kozyrev's work on information fields supporting "circular" causation at an astronomical level, they refrained to inform the reader that he had identified them as a torsion field, though of a kind unknown.

Simon Shnoll, also identified informational fields as supporting the palindromic shapes of the histograms of random experiments, according to the temporal cycles of the Earth- Palindromes are natural embodiments of Moebius strips or 2-torii, as well, but as in the case of geophysical morphology of the surface of Earth, in terms of the same cycles that Sholl considered, the former is the case, not the torus (Rapoport, 2013, 2016).

Again the Concidentia Oppositorum displayed in geophysical configuration shows this to be the case. The authors, chose to neglect this.

So, let us try to identify their "information fields" afresh, as if torsion and non-orientability would not be the case.

To start with: Quantum Information theory, which the authors do not mention.

The fundamental operator in this theory is the Hadamard Gate, the matrix representation of the Klein Bottle, which though has a digital coding embodied, it is as the four-state character of it: Outside-Outside, Inside-Inside, and the in-betweeness, Inside-Outside and Outside-Inside, so that it embodies both continuous analogic information with digital one, which is the key to the genome (Rapoport, 2016III).

Consider next the possibility of Information Theory as an upspring of Bayesian inferential statistics, for another paradigm, which they ignore. There the yes-no epistemology is acknowledged to be a possible simplification of a supradual ontology, but associated to continuous probabilities, so indeed it is an epistemology.

So again, it is digitality superposed with analogics, but Quantum Cognition rectifies this, as we discuss below

Remarkably, as quantum effects are supposed to be the case at the black-hole event horizon, is it remarkable that much of theoretical physics is deducible from this, the so-called Fisher Information Geometry, even Quantum Mechanics. Particularly, the Fisher metric of statistics which provides the measure of proximity of the in-formational fields of inference, the logarithmic gradients of the probability distributions, is transformed into the Fubini-Study metric of the projective (pre)Hilbert structure of this theory (Carroll).

The decision in terms of yes/no decision which Meijer et al claim to operate in the relation between the brain and the event-horizon, in terms of the Schrodinger equation for open -and also closed systems in configuration space-, is a torsion gradient field which produces the evolution of the system to a particular case: the so-called collapse of the quantum state (Rapoport, 2007).

To put it in other terms, the informational fields of statistical inference transform to the quantum field as the gradient torsion field on the Hilbert projective space.

But then, where the non-orientability of say the Moebius strip appears in the projective Hilbert space? Indeed, the temporal evolution of a quantum state traces a curve in this space, and due to the antipodal identification of the projectivity (a shift of the phase by 180º, again!) this evolution generates a Moebius strip. No-go. We give it a final try.

We examine the decision process itself. Quantum cognition has stemmed from recognizing that belief and decision processes follow the rules for quantum mechanics upon introducing contextuality to probabilities, the so-called Vaxhjo interpretation of quantum mechanics.

It can be framed in terms of Clifford algebras where the idempotent e3 holds the

superposition states as a logical operator (Conte, 2011).

It happens that is isomorphic to the torsion of cognitive space, behold by the two local orientations of the Klein Bottle, so that the decision process is tantamount to its unraveling to orientability. This is the "information" they mentioned as ascribed to holography on the event-horizon, which mistakenly they claimed a 2-torus.

Secondly, however, the brain does not function in terms of dual expectations. If the brain carries out inference at all, it is in terms of patterns which are so elusive and labile that their existence at all boils down to pattern recognition (Kalis, 2019), which as we said, stems from the Klein Bottle metaform. The Markov Blanket hypothesis which would mediate the brain inferential activity, with its four-state architecture in terms of the super-position of two categories, action and perception, for one, and accessible and inaccesible states for the other (Friston, 2010), can be naturally embodied by the 4-state Klein Bottle. So, again we run into confrontation with Meijer's et al "information" fields and dual logic, the former unidentified by them.

Thirdly: as already said, holography for the brain also ultimately rests on the coherent patterns of populations of neurons whose receptive fields can be represented by Gabor wavelets, and thus their Klein Bottle symmetry, which supports holography.

Already, the coherent neuronal patterns elicited by motoric action synchronize to pro-duce both circular patterns (the projection of the 2-torus) and the lemniscal 1d projection on a plane, ∞, of the Moebius strip and Klein bottle, the latter the gait patterns of animal loco-motion, on the solid ground, swimming in fluids, or aerial flight, and the topology of the mammal heart.

The authors do acknowledge "the vortical patterns of the attractors of neuronal, An attractor can also refer to a collection of states that will eventually attract neighboring states toward that collection. In such a manner self-awareness may be created through folding along vortex like fields" (p.37, II). However, they ignore all the previously stated and still chose only the simplest circular projection, that is associated to banal self-referentiality, as already argued.

Polyrhythmicity does elicit attractors with the 2-torus as the underlying phase space manifold (say, each of two frequencies producing one circular dimension) but the actual pattern that is elicited are the knots supported by Moebius strips (Avrin, 2012), as mentioned before, not the whole phase space. After all, attractors do not fill state-space; they confuse them.

We return to their attribution of the toroid as the singular and further nested universal metaform of morphogenesis and causal organization, toroids inside toroids as a Matrushka doll. Would that be the case, then the Moebius strip standing at the center of the Milky Way seems to disprove their claim, mysteriously though. So is disproved this allegation upon considering that the universe is predominantly made of plasma structures, and viscous fluids, they do mention the former, and yet and what they visibly elicit and the authors say nil about, is that knotted and non-orientable configurations, already appear in the Sun with its plasma outbursts, or still the appearance of the Analemma as a binary star configuration , or still as a predominant geophysical structure on the surface of the Earth arising from the tidal interactions of the crust and the rest of the Solar System (Rapoport, 2013).

The Analemma pattern produced by the torsion rotation of the Earth's axis, in the annual circumsolar rotation, is the lemniscal projection of the Klein Bottle. The authors appear to be rebuked by the n-body planetary choreographies which elicit the same pattern, not to mention the knotted patterns of the choreography of the Sun and the major planets also arising from the projections of knotted dynamics of coupled non-linear oscillators on the 2-torus manifold for the phase space. To refute their claim, consider:

Viscous turbulent fluids obey the Navier-Stokes equations, the paradigmatic scale-independent torsion in-formation field, from cosmology to body flows, disprove Meijer's contention of fractal nested toroids as the universal case: Instead, fractal hierarchical nested *helicity-cascade twisted* domains with *no definable orientability,* the exterior one twisting the interior ones, rather than toroids in which the higher-order just contains the smaller ones (Bürger, 2013). Back to music.

Merrick's psychophysical theory of music and resonances as a universal principle, makes the case of dampening cooperating with harmonic resonance. The authors retake this refraining to comment that Merrick departs from recognizing the (Moebius strip) "circularity" of tonal space, and construes the whole theory in terms of the five-fold pentagonal symmetry, i.e. torsion and the Golden Mean, nor that is psychophysics. They are quite specific in only mentioning what does not question their model, altogether, as a predetermined chosen rule, it appears. For its embodiments as genomes, and the *supradual digital* biological codes see (Rapoport & Perez, 2018).

Space limitations, obliges to defer to a more elaborate presentation. Yet, final comments are in order. The Klein Bottle logophysics supports the notion that resonance is a fundamental supradual relationship in the unified making of the universe and subjectivity. What we do reject is 1) the claim that it is supported by a dualistic logo-physics, which the authors have forwarded with their 2-torus modelization, and 2) their manipulations of the relevant information, the distortions, omissions and the kind.

Knowing and making science is a social practice of learning and adaptation, a stance that the authors clearly do not share. Not my world.

Appendices

Klei bottle logophysics, harmonics and Tonnetze.eml

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(N.B. due to space limitations we shall give a very b list; more references therein below)

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