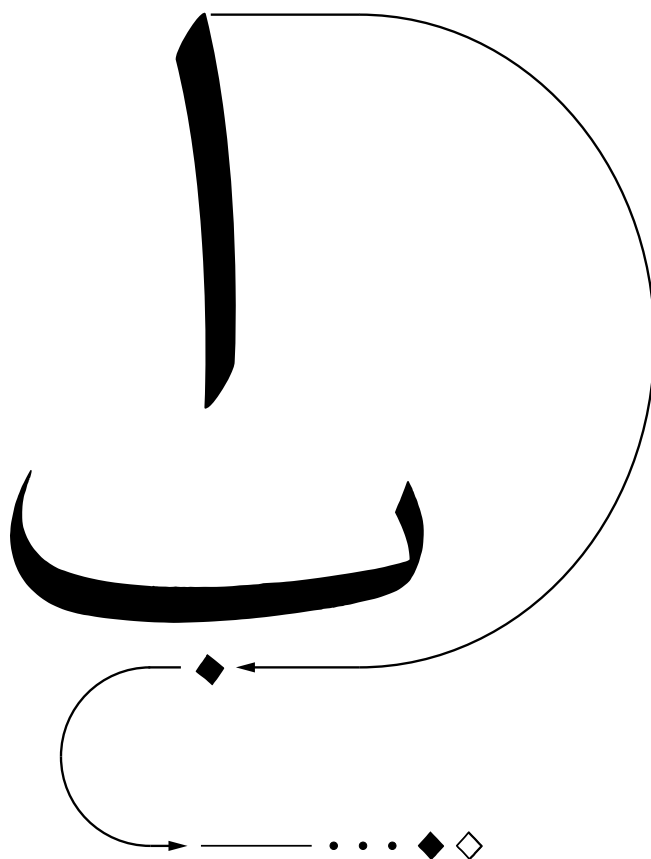


SONOILLUMINESCENCES

CATHERINE C. HENNIX



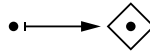
*Ṭarīqah Nūr-Samad*

AN-NŪR AN-NUN  
AND  
THE EMERALD MIRROR

Had you only observed closely,  
You would have noticed that the

Point of incision made  
Invisible by a reed writing the  
Letter ALIF in your heart is the  
Center point of the  
Dot under BA transposed by divine decree

The point, the  
Incision, in which  
ALIF begins, is also the  
Point from which the  
Dot under BA expands by the  
Extension of the  
Map



From all of the  
Points of ALIF to all of the  
Points of the  
Dot under the  
Letter BA

This mapping is the  
Opening for which there is no  
Closing beyond which point begins the  
Red glow of the  
Dot suspended above the  
Letter NUN above which  
Nūr-Samad is balancing the  
Ether

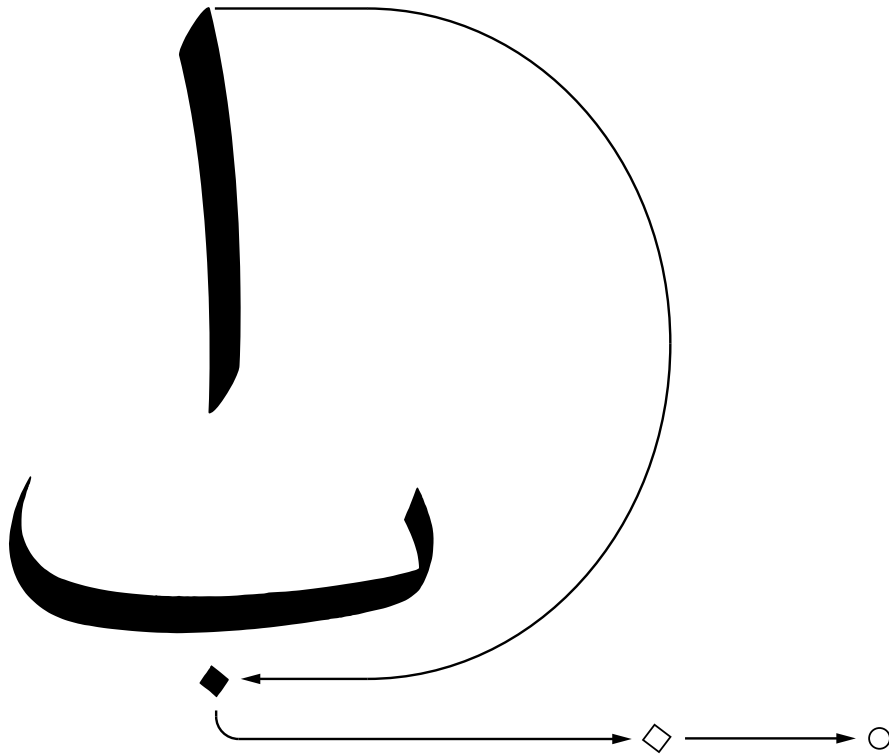
This is the  
Site of the  
Sight from the  
Reverse side of the  
Dot under BA: the

Emerald Mirror in which every  
Reflection disappears, irreversibly  
Absorbed and never again  
Emitted

(excepts, perhaps, once...,  
as your own: a  
flash..., a spark, in the  
unreversed image of the  
Beloved)



*Mirror w/ Hidden Reflection (Exposed)*



*Reverse Side (w/out Veils) w/ See-through (Mumford)*  
*Point: limitless view of the void*

(ADDRESS\*:  
TOPOS ONE

When the  
Initial noema  
Returns reconfigured,  
Coiled-up in a

Gaze which  
Docks and melts in  
Another, words, like ropes of sand,  
Melt down into a

Pile, at an instance,  
Without leaving a trace.

Only one meaning  
Remains not embalmed – which now  
Encircles everything:  
Everything which has been

Assembled into an  
Indivisible whole,  
Untorn by its  
Unveiling

# ṬARĪQAH ḤAQĪQA

SIRR

Remember: the  
Days of Allāh -  
Days still to come that were, where the  
Winds were ruffling the  
Curls of the Hyacinth

And we saw past the  
Universe - before we were accorded a  
Beautiful trial under the  
Gallows of love where we stood

Unaccustomed to the  
Downpour of red petals  
Shed by the  
Tulips in the  
Sky

For it was not *we* who  
Threw when we  
Threw our arms  
Around each other



# ṬARĪQAH MA'RIFA

Shaykhah Munajat  
a/z

You were conceived under the  
Full moon approaching - and, then,  
Receding - where your appearance were of  
His image, the

Image of you in which I live in - in  
His unabrogated presence by a single  
Glance from your innermost eye - the

Voice in your eyes is His  
Mirror, reflecting  
Him in your constant  
Creation - in your  
Glance at me in which I swoon - in  
Fan'a

ABDA

We are already all dead:  
We are all dying since  
Being born (immured, immolated,  
deformed to ashes, ravaged) - except the

One whom Allāh  
Brings back to  
Life again - and, again,  
and, again (immured, immolated,  
deformed to ashes, ravaged) - through the

Glory conferred by her  
Poverty of sufficiency and  
Contentment

\*The “address”, TOPOS ONE, of the “initial noema” was originally given rather abstractly in **Toposes & Adjoints** (1976). Since this notion is key to the meaning of this poem, the following note provides a non-technical elaboration and a comparison with Lacan’s “Master Signifier”. The significance of the initial noema is connected with the phenomenological modeling of a monistic universe in the sense of Parmenides’ *ṭariqah haqīqa* (“Way of Truth”).

(The “address” TOPOS ONE is the invisible place or maqām in “space” where Divine Love holds its enclosures the first written testimony of which were transmitted by Parmenides and more than a thousand years later, re-transmitted by the miraculous revelation of the Qur’an. Its existence is *still*, today, linked to a “*much contested argument*” as is written in Parmenides’ *Proem*.)

The discovery of the(?) “*first*” meaning as an ontological feature of the world is an epochal event in a Subject’s history, an *epoché*, whereby some fragments of perceptual elements re-arrange themselves into a new constellation which stands out against an otherwise less attended to background – a form registered as the Subject’s first concrete memory which recalls itself. Gradually, the concreteness of this first stable memory trace is whitened-out and fades away and, eventually, its attenuation erases its details until they become unrecoverable and lost by atrophy of memory’s signal paths – creating a “locus” which cannot be focused. According to Lacan, the unrecoverable initial noema signals the presence of a *divided* Subject,  $\$$ , who is haunted by the anxiety of being *cut-off* from an *origin* which is *independent* of any signifier and, consequently, unsupported by all conventional signifiers. The *Master Signifier*,  $S_1$ , serves as a “ghost” sign for the initial noema which borders, but does not trespass, on the “proto-signifier”,  $S_0$  – the latter being a spontaneous but mind-changing creation by the *undivided* Subject,  $S$  – by which the moment of the convergence of the initial noema is recorded – only to be erased as the Master Signifier withers away.

Language arises as a process of meaning formations: the *first* apprehended meaning being *both* its *initial* and *initiatory* event at the same time. This event causes a discontinuity in the “apprehension of reality” for which the initial meaning was its sign post. The Master Signifier is a “fantastic” signifier whose meaning terminates with the prohibition of the phantasm with which it was converging. A “baby language” goes through many revisions and editions before it is replaced by a language which has a stable notation in a fixed alphabet which serves the Subject’s socialization. To tamper with the latter language is considered as tampering with its cultural origins and implied social order. The pressure to verbally conform is tremendous and enduring. Lacan illustrates its range by the extreme cases of the duality between the Master Discourse and the Hysteric Discourse in which what is desired by their Subjects from the Master Signifier is to be escorted away and *decoupled* from meaning’s normative weight by a re-arrangement of its syntax and semantics – but for which the only significance consists in being *other* that the norm: the master and the hysteric are only “master” and “hysteric” relative this norm without which they would be nothing of the kind. (Lacan speaks of the central but ignored role that the signifier plays in forming the mind by the process of laying down its signal path ways. The title of the “écrit” **L’étourdi** portends to remind the reader that not only does the signifier speak (turns the mind) but the very “tour” by which it traverses mind *speaks no less* upon its reception (*le tour dit*). The title is derived from the adjective *étourdi* which means dazed or unfocused. Note that *dire* has a more encompassing range of meaning than the English infinitive *to say* by which it is usually translated.) By contrast, a Subject undergoing the initial noema experience does not know any “norms”, it is a “subjectless” Subject who is encountering a novel mental order which carries a strong, or even an irresistible, fascination by which the Subject becomes trapped for life in a desire for meaning, a meaning which will only be refused by the *other* – which here stands for the refusal of the experience of this act of creation of meaning: *All* that exists is suddenly concentrated in this moment of universal subjective meaning which presents a “world” which yet remains without signification in virtue of its singularity and chance encounter – a world *foreclosed* to every *other* posing as an “*other-Subject*”, a Subject whose Master Signifier has long since been obliterated. (Brouwer poses the *First Act of Intuitionism* in a similar vein where the “other” stands for the doctrine of classical logic. The intuitionistic Creating Subject begins in a universe unified by its emptiness and proceeds step by step as each moment gives way to another rooting every twofold by its initial unity. To maintain this unity, intuitionistic logic abolishes the infinitary laws of classical logic presupposed by ordinary language.)

The reversal of the arrow  $S \rightarrow S_1$  is *foreclosed* by the Subject’s division upon entering the *Signifying Chain*  $S_2: S_1 \rightarrow S_2$  (Lacan). Only as an echo of its origin,  $S_0$ , does  $S_1$  re-present itself when a divided Subject,  $\$$ , undergoes a sudden and irreversible re-configured existence, an *Umklaapp*, by-passing, while defying, any definite description. The world *de-signifies* itself by being re-centered around a single signifier which is *immediately recognized* and that reveals a parallel world with an alternative semantics which abolishes *all* distinctions and, therefore, *necessarily*, but not, perhaps, without a sense of paradox, *also* the distinction between the lover and the Beloved. This is the ultimate form of monism or *Unity of Being* – ana’haq. (al-Ḥallāj, Ibn ‘Arabi.)

## BISMILLĀHI-r-RAḤMĀNI-r-RAḤĪM

*Samia-Llahu li-man hamida*

*Wa'fu 'anna Ya Karim*

ALIF, ا, is the first and foremost letter of the Arabic alphabet. The letter stands for an open, non-aspirant, voiceless, silent vowel, the sound of which breathlessly whispers the witnessing experience of the mystical **Unity of Being** - *wahdat al-wujud* - by its alternative denotation, *One*, of the number 1 - a number of no number and – of every number,  $n, n = 1 + 1 + \dots + 1$ .

From this silent unity, the sounds and meanings of all the other 27 letters are born, beginning with the voiced, labial consonant BA, ب. Although not one of the formally mystical letters, the letter BA is the signature letter not only of the *Subtle Qur'an* itself but, equally, of the letter mysticism on which the Islamic science of letters (*ilm al-harūm*) is founded. Its significance is derived from its *initial occurrence* by which the text of the *Qur'an* begins. In particular, this initial occurrence of ب carries the BASMALA DOT, **the dot**, •, under ب into which all letters and the entire meaning of the Qur'anic text are condensed.

The enunciation

*BISMILLĀHI-r-RAḤMĀNI-r-RAḤĪM*

is known as the *Basmala* by which each Surah, except one, is enunciated.

ALIF is the signature signifier of *monism*, that to which everything returns after having been born - a return that effectively cancels any existing number greater than One, turning its arithmetic into the *tropical* arithmetical figure:  $1+1=1$  (no (binary) carry) – which shows that the *One* is *beyond* every cardinal number – and, equally, before every cardinal number – including itself. (Refer to the elusive field,  $F_1$ , and its “Tropical Arithmetic”.)

The series of terms that is collectively followed by all of creation takes the (delicate) shape:

$1-1+1-1+1-1\dots,$

also known as *Grandi's Series* to which is ascribed the unworthy limit  $\frac{1}{2}$  - a demotion of Reality to a tear or fracture in the invisible Unity of Being as its only witnessing (as in the “Tritonic” sound). To restore ALIF (and the fundamental tuning) to its unit value of either zero (additive unit) or One (multiplicative unit), we seek the remembrance of its *subtle* witnessing. We erase all other meaning (from our mind) in order to receive the meaning directly into the heart carried by listening to the soundless sound (*anāhata nadā*) of ALIF. The attunement to this *subtle sound* awakens another dimension of consciousness, a “floating world”, a formless form, with an elusive center, yet with an unmistakable prevalence. It may be assumed to be a form resting on only zeros and ones read as binary patterns each one of which codes a definite frequency as value - since absolute determinism is assumed there can be no “Schrödinger Cat State” (there is no (collapsing) “wave function” for the cat). The “quantum ether” choir is a spectrum of a dense ordering which is reducible to a discrete integer order (see APPENDIX).

ALIF is also the first and foremost of the Mystical Letters in whose baraka all the other letters are formed. ALIF is the silent letter which refuses to yield its secrets by anything less than Allāh's Raḥmān-ir Raḥīm, His singular grace. ALIF is not an enumeration problem: the uncountably many points veiled and covered by its majestic black stroke are as *uncountable* as are the points drawn on the unit interval,  $< 0, 1 >$  of the real, straight line,  $\mathbf{R}$  (on which all real numbers live):

R: 0. \_\_\_\_\_ .1 .

(As a matter of tuning, note that extending the unit interval by one unit yields all harmonics of the fundamental (1) and their inverses (i.e., subharmonics):

R: 0. \_\_\_\_\_ 1. \_\_\_\_\_ .2 .)

Arabic philosophy distinguishes between two forms of infinities – *fan'a* and *baqa'a* – roughly corresponding to the set theoretical concepts of, respectively, potential and actual infinity. Orthodox Cantorian set theory also recognizes the notion of the “absolute infinity” which Cantor held as divinely given and exceeding every other infinity. In this original sense, *baqa'a* is closer to absolute infinity than actual infinity because Allāh's Infinity is the ultimate *baqa'a infinity*. Allāh is not part of any *fan'a* infinity because Allāh is the creator of infinities in virtue of which He is exceeding them all! (Cf. Gödel's realist view on the existence of abstract mathematical objects.)

(Digression)

The **ALIF-ALEPH HYPOTHESIS** states that there are as many points hidden in ALIF as there are ALEPHS (hidden) in the set theoretical universe,  $V$  (also known as the *cumulative hierarchy*):

$$\aleph_{\aleph} = \aleph_1$$

( $\aleph_{\aleph}, \aleph_1$ , super-singular cardinals)

The **ALIF-ALEPH HYPOTHESIS** states the converse:

$$\aleph_1 = \aleph_{\aleph}$$

(The **ALEPH HYPOTHESIS** states that every infinite cardinal (in  $V$ ) is an ALEPH. The **CONTINUUM HYPOTHESIS** states that the cardinal number of points on the real line,  $\mathbf{R}$ , is  $\aleph_1$ , the next cardinal after  $\aleph_0$ , the smallest infinite Cantorian cardinal number. See P. J. Cohen: *Set Theory and the Continuum Hypothesis*.)

(End of Digression)

## II

Like Sanskrit, classical Arabic is considered a sacred language being co-revealed with the revelation of the miraculous *Holy Qur'an*. No alphabet is or has been more venerated than the Arabic script with which Islamic culture is saturated. Each of its letters marks a sacred space, a topos or maqām, for which it is a reminder or sign to be contemplated a new and anew. Every recitation from the *Qur'an* is a rendering of the Prophet Muhammad's (SAW) reception of its revelations, of all that the Prophet (SAW) heard in those singular blessed moments when Jibril (Gabriel) showed the writ of Allāh (SWT).

Although its revelation unfolded for nineteen years, once coming to an end, all its words now exist simultaneously, spread out like an avalanche of signifiers, each one of which testifies to the miracle of the *Glorious Qur'an*. For each of their letters, there is a one-many map, which fans-out from the Center point of the BASMALA DOT under the initial occurrence of the letter BA,



targeting each word,  $\sigma$ , to which it belongs. For the Mystical Letters there are also the *monic* maps (monomorphisms) which maps each Mystical Letter to a Divine Word which may, or, may not, be known. In Indian Sufism, the monic map between the Allāh (SWT) and the Sanskrit syllable OM is of fundamental importance in the development of the Sacred Sounds of India. As shown, below, the interconvertible maps between them establish their *homotopy equivalence*:



The sound of ALIF is *not* carried by air – it is *anahata nada*, the *uncreated sound*, the Cosmic Sound Current, a primordial permanent sound to which all divine sounds are related. In Indian Sufism the interconvertibility of the Sanskrit letters for OM and the Arabic letters for ALLĀH, respectively, is considered significant as both letters point to a common root. In this connection, the letter ALIF is linked to *Prāna*, the pure soundless breath.

## III

The *Kirana Gharana* tradition of Hindustani classical music (like *Dhrupad*) is a tradition whose inspiration and spiritual guidance is rooted in Indian mystical Islam as practiced by one of its oldest Sufi Orders, the *Chistiyya*, from which the practice of *Dhikr* and *Sam'a*, or, audition, originated as a gathering for praising Allāh (SWT) in union leading to individual and collective ecstasy and spiritual intoxication. This practice was also taken up by the *Qadiriyya*, the oldest Indian Sufi Order, and, later, by several other Sufi Orders, East and West, among which the Mevlevi Order, founded in Konya, is perhaps best known by the teaching of Hz. Mevlana Rumi, its founder. (May Allāh (SWT) be protective of his ever living spirit.) This background is not always perceived when Hindustani music is transplanted to the West whose current culture is unable to accommodate its spiritual premises which are alien to a fast-paced society. To give an example: *Sam'a* is not a momentary distraction but a regular practice whose cumulative effect gradually exiles the subject from the ordinary. Indeed, Islam also means exile (from the material world) and in its most pristine form this modality of being envelops the subject as a submergence and

drowning in an alternate state of consciousness. The witnessing of this state defines the concept of 'faith' or "*iman*" in Islam. The path or "*ṭarīqah*" which is the conductor of this state passes through a station or maqām which brings its followers into a state ("*ḥāl*") of which "fan'a" is a particular case. In the exalted words of the beginning of the Qadiriyya Shaykha *Ā'isha al-Bā'ūniyah*'s poem *al-Tā'iyah al-Bā'ūniyah* (may Allāh (SWT) love her forever):

He quenched me with love's heavy wine  
before my birth  
and I delighted in my drunkenness  
prior to my being

And He placed in my heart  
the joy of a secret  
beyond the grasp  
of insight and understanding

Exalted, high above  
phenomena's embrace,  
awesome, beyond  
the understanding of man or beast!

He made me hear His call  
whose melody  
is well beyond the harmony  
of any kind of words

(from *The Emanation of Grace and the Gathering of Union*, tr. Th. Emil Homerin (w/ slight modifications))

\*

At Sam'a, musicians and audience alike both congregate for the same purpose: to praise Allāh (SWT) and experience the *Unity of Being* - *wahid-i-wujud* (lbn 'Arabi). Recitations and vocalizations of poetry coupled with instrumental responses and whirling dervishes all aim at affecting the state (*ḥāl*) of mind and the *stations of the heart* (maqāmat al-Qulub) Dhikr together with audition is a practice where each participant takes all cues from the sounds present whether they are presented as a word or as an instrumental composition or a taksim (improvisation) - or, as all of the above, mixed together often in a spontaneous way. The only visual appearance, besides audience and musicians, is the whirling dervishes who turn to the music and the singing in a dimly lit space suffused with incense and freshly cut roses the fragrances of which are carried and spread around in the air by the dervishes constant graceful circular movements. In this atmosphere, all participants are set off on an inner journey of visual displays with their eyes often closed but with their hearts and ears wide open oblivious to any other world. What



can be seen with open or closed eyes is equally far removed from “ordinary reality”.

When the listener becomes completely immersed in this experience a combined physiological and psychoacoustic biomolecular quantum *phase transition* occurs where a neurological *Bose-Einstein*-like condensation takes place triggering the on-set of an experience of the *circulation of the inner light*, or, what might be called a *state of induced sonoilluminescence*, which brings the listener to ‘*listens with the heart*’, *only*, i.e., entering into a languageless state of continuous reception. Remarkably, as has recently been discovered, not only do neurons code auditory signals but the very transmission itself is implemented as an *acoustic wave* phenomenon which may interact and couple with external sound waves as a resonance effect.

In the passage to this topos or maqām during Sam'a, the ultimate goal is to experience *fan'a*, a state of annihilation *carrying the subject fading into infinity*, a state that comes in distinct degrees and modalities all of which are accompanied by specific inner sounds (*anāhata nadā*) that arise in the course of arriving at the crossings of remembrance and oblivion. Among these sounds, in ascending order of intensity, are named; the *Intoxication Sound* (Sant-i-sarmadi), the *Sound of Heaven* (Nida-i-asmani) the *Voice of Truth* (Kalām-i-ḥaq), the *Voice of the Great Commandment* (Kalām-i-majid) and the ultimate sound - the *Voice of Allāh* (Kalām-i-Ilāhī).

#### IV

Sounds which are inter-harmonizing may be defined as an interaction between excitations of gapped spectra of specific frequencies generated by a fixed fundamental,  $f_0$ , whose value is conveniently normalized as 1. To maintain the spectral gaps of sustained standing composite sound wave forms requires energy which separates the frequency bands from each other. The control of this energy coincides with the control of its excitation. For the standing waves of brass instruments, this control is informed by the Schrödinger equation. The solutions of the latter couple with the room acoustics and become a source for a closed physical system with a prepared ground state and “protected” excitations. The orders of the interactions may vary from crystalline order (“particle-like” sounds) to the “liquid order” of a formless form of seamless spectral transitions. These orders are spectrally separated and maintain their coherence even when appearing concurrently embedded in a broader spectral structure. Solutions to the Schrödinger equation also give the frequencies for a *quantum harmonic oscillator* (QHO) which map to a *Hilbert Space* formalism which I have called the **Hilbert Space Shruti Box**. (See APPENDIX). This formalism forms part of the formalism of quantum computations and its (unobservable) sub-quantum components. It recalls a part of the currently fashionable “theory(s) of everything” though here modestly restricted to *stationary acoustic phenomena*.

Each *Eigenstate* of a QHO corresponds to an *Eigenfrequency* which I call its *harmonic state*,  $Q_{\langle n \rangle}$ , and which corresponds to a Boolean 0-1-vector in Hilbert space. The  $n$  generating frequencies of a standing composite sound wave correspond to  $n$  quantum harmonic oscillators that couple to each other as a function of their respective amplitudes and frequency ratios. The flow of the sound is determined by amplitude modulations and acoustical room resonances to which it also couples dynamically. In this way, the sound evolves from crystalline orders to its liquid harmonic states in cycles by exploring the *intermediary harmonic states* which interpolate themselves between these inter-harmonic orders. Although the spectral interactions take place between gapped spectra they sometimes evolve into a fully saturated sound which is perceived as “gapless” densities by its coupling to present room resonances. Note that any *constant* collective harmonic state evolves as a *massless object* whose origin is the state of the order of the equally massless *binary digits* (bits) 0 and 1 by which *both objects inscribe themselves in an ontology with which they co-evolve*. By replacing the binary bits by quantum *qubits* one obtains yet another novel ontology of

sound and light as emergent properties of an invisible medium; the *quantum spin liquid string net vacuum* which is a current candidate for an account of a massless origin of all matter (leptogenesis?) – with or without mass. Quantum matter covers all cosmic scales but whose origin may be derived from the superposition of a single qubit as string net condensations as suggested by Xiao-Gang Wen.

Even on the assumption that the qubit may seed a “Grand Unified Theory of Everything” (GUT) a nagging question remains, *viz.*, *who ordered the first qubit?* Although this question exceeds the competence of science it certainly is a pivotal question the answer to which everything else of matter depends. Causality is an inexact science and is a distraction when considering self-generating systems which have been initiated before cosmos’ memory of itself begun its record keeping. The epistemic abyss is monumental yet awe inspiring by its modality of inaccessibility – the very modality of universal human desire!(Lacan).

#### IV:a

My installation **Kalām-i-nūr/Qalam-i-nūr** aims at recalling the epoch of the universe at the intersection between what came before the Creation and what came after. At this *Time-Court*, where infinities blend effortlessly with other infinities of all sizes, there is no causality or time but only its initial moment which stretches unbroken into the present as an invisible dimension. *Kosmos* – the *order* of the *uni*-verse – never ceases to write itself in order to verify itself by its self-witnessing (cf. A. Wheeler’s famous drawing of the universe’s “*self-gaze*” in the 1974 London Quantum Gravity Proceedings edited by Isham, Penrose and Sciama). But its language of representations remains a mystery. We may never know from where (which language?) the first qubit originated and what its initial emanation signifies about what preceded it (if *anything*). Pre-modern Arabic and Persian philosophy side-step this issue by making the writing of cosmic the order illegible to all who cannot read the writings of the *Cosmic Pen - al-qalam* – moved by *Allāh’s* initial command: WRITE!

Since then, with the divine light as its ink, *al-qalam* has been writing incessantly recording all that is happened as the divine light of Allāh (SWT) becomes the divine light of all of His creations which signifies the light present in the Words coming out of His *Voice – kalām-i-Ilāhī*. This celestial writing defies the linear order of the ordinary signifier which cannot accommodate its dynamic and elusive form – which is why poetry and, more generally, sound and song have been the traditional channels established to access this non-geometric reality. A qubit is also *without geometry* and its low-dimensional semiotics is *topological*. *Metrics* do not figure as relevant to the interiors of these abstract spaces – *distances* are here either too far or too near, they are *without measure*. In this sense, also the single “anomalous” point, to which the dot under BA in the Basmala condenses, is in superposition with its reverse side which is unreachable except miraculously. The internal structure of this state is as unobservable as the primal qubit and may be simply indicated by the “points” ◦ and . - analogous to 0 and 1.

In the tradition of *ilm al-harūm*, the transformation of the *Basmala Dot*, ♦, under the letter BA to its *reverse side*, ◊, may be regarded as a *unitary transformation*,  $U(\bullet)$ , effected as a “back-mirror reflection” echoing the observer’s initial noema formation and noted by the dot above the letter NUN. The passage from.  $U(\bullet)$ , to ◊ through the interpretations of the letters *ALIF*, *BA* and *NUN* effects a *mental phase transition* by which an observer may pass from a visible realm to an invisible realm *within a single step* either under a first (discrete) or second order (continuous) regime. The dot ♦ encapsulates a *monistic universe* which is the “same” object as its *reverse* with which it is in superposition, one side blocking the view while the other gives a “see-through”- view by recourse to Mumford’s algebraic *mojo* for the single algebraic point,  $I$ , on which the field  $F_1$  remains in hiding. Since  $F_1$  already contains

the point  $O$ , arguably, the 0 and 1 of the primal qubit have a relation of origin with the simplest but also the most elusive of all algebraic fields. (Refer to Mumford's classic notes in the "**Red Book**" on Algebraic Geometry.) In *ilm al-haruum*, however, it is not a matter of who ordered whatever there is, but, who *commanded* it and how the command shall be understood. Since by Islam there is only one effectively causal agency whereby each cause corresponds to a divine command with which it is co-created, there is no need for calculations or any physical force – *everything is already unified* by its beginning and the fate of its course is incalculable.

*Monism* is what remains when everything has failed – it provides the cutting-edge critique of sets with more than one member. The universal failure to recognize failure remains the main impediment for the practice of monism's basic assumptions. The presence of failure is an *ethical* problem connected with choice of wrong action(s). Nature itself already presents a model of right action since it cannot do anything wrong. With the human mind it is different since it can do everything wrong and therefore needs guidance beyond what nature can offer. The ethics of monism is also its *aesthetics* because the right action is always preferred over the wrong action – what is right is beautiful. And to be beautiful is always right and to be beautiful should be everyone's right. The beauty of all the Islamic art forms is a testimony to its culture's concern with bringing right actions into everyone's consciousness as a premise for living apart from nature. To live apart from nature does not mean to live against it but, rather, not to engage in conflict with it. Although this premise is simple and almost trivial, to follow it seems for many impossible or at least non-trivial on account of the many conflicts which are indicators of wrong actions.

In my installation **Kalām-i-nūr/Qalam-i-nūr** I have chosen to juxtapose *Xiao-Gang Wen's* image of string-net condensations in the quantum ether – where each string vibrates with a definite frequency – with the single letter NUN, the first letter in the Qur'anic word for *light* – *Nūr*, the light with which the *Cosmic Pen - al-qalam* – writes the fate of each moment. These two semiotical objects cycle in-and-out of each other with a pendulum's regularity – and, hence, with a definite (constant) frequency – and with a long (recurrent) interval where the two images occur in superposition before one of them disappears and the other remains. (Cf. X-G Wen's paradigm changing text book on the quantum origin of sound and light (2004) and from which the image of the quantum string net vacuum in the video projection of the sound & light installation is borrowed.)

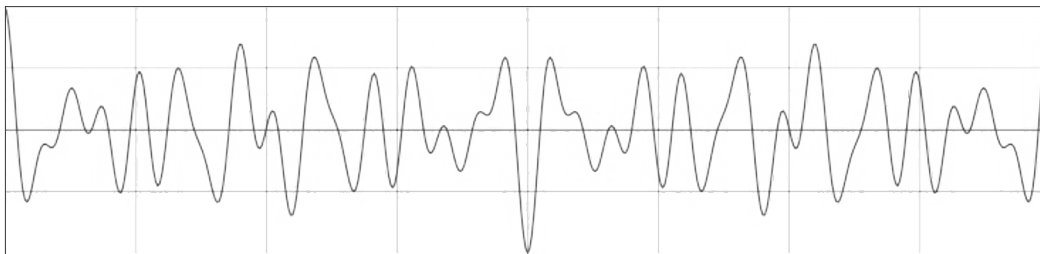
The sound is the signature ratios of the string-net vacuum's *first-born element*, Hydrogen, which form a *tetrachord* in the prime number proportions 31:23:17:13 which for a long time have been known from Eastern systems of tuning in just intonation each interval of which can variously be heard in the traditions of maqām, pentatonic blues and raga. These ratios have been continuously sustained since the beginning of cosmic time (counting from the last scattering surface or the acoustic peak) - the *oldest tetrachord* we know of - and tuning in to them and being attuned to them may carry a particular significance in their superposition as a signature signifier of nature's fundamental co-vibrations. It is noteworthy that the intervals of this tetrachord emerged in pre-modern scientifically illiterate cultures where they often occurred as emblems of divine communications. The effect, and the consequent affect, which they may give rise to are poorly documented and give rise to many open questions which only a sustained listening and cognitive interaction can resolve. The sound must therefore be allowed to evolve continuously where it may be attended to without any impediments. An important part of the sense of this sound, like the universe itself, is its *constancy*. The abstract notation and computer graphics which inform this experience may be thought of as a replacement for, if not a development of, modern concepts of literary forms which, in addition, are also intended to serve as an aid in the choice of the listener's tactics of attention. (F.ex., *fan'a* and "*address: TOPOS ONE*" are possible to describe as modalities of an underlying *unitary transformation* which, *without any detour*, transports its Subject to the target destination. By passing to an algebraic script, the listener enters into an alternative language activity where attention is focused away from ordinary denotations and their presuppositions in order to serve a clear picture of what is otherwise indescribable.)

## IV:b

The spiritual roots of the Kirana tradition of classical Hindustani music included an appreciation of the sciences already found in the sounds developed by the instrumental innovations by members of the Chistiyya Order among which the modern sitar, rudra vina and tambura, respectively, are the most prominent. In particular, the tambura has exerted the strongest influence on my concept of sound since the very first time I heard it tuned by my late Nāda Guru, Faqir Sri Pandit Pran Nath (may Allāh (SWT) always love him).

Islamic culture is defined by the sound of the Qur'an and its calligraphy and, hence, is not innovation prone since whatever is given may only be given by Allāh Ta'ala and more than is given we may never (properly) have. This understanding precludes human “cunning” as an agency in the manifestation of any acceptable innovation for which any human agency is required to have been infused with ethereal inspiration in order to be valid. In this sense, the instrumental innovations by the followers of Chistiyya in the late 19th century stand out as extraordinarily exceptional. This tradition was continued by the late Pandit Pran Nath as testified by his *custom designed concert tamburas* being one of a kind whose sound without exception leaves an indelible impression on the listener. It must also be regarded as extraordinarily exceptional that Pandit Pran Nath, in addition, found a place for a hybrid, almost electronic sound, the *Prāṇa Nāda*, created by tuning forks driven by a dc current (no doubt inspired by listening to La Monte Young's sustained, electronic sound wave forms) – a sound which is almost as pure as the sound of amplified (co-)sine waves. This instrumental innovation shows that it is possible, within certain limits, to extend the gamut of sacred sounds by electronic means in terms of which new conceptions of sound arise which embody the vibrations and intentions of *nādabrahmā*. As the first specimen of a *non-acoustic* instrument inspired by the *Pandit Pran Nath Custom Concert Tamburas* I offer the virtual instrument *Tamburium* as a contribution to the slowly, but continuously evolving traditions of sacred music. The Tamburium is a cross-over derivative of the Northern Indian tambura and the Khorasan tambur which brings the sounds of the latter instruments to a new level of precision tuning uncovering shrutis previously not available for the discerning listener. The sound of this new instrument exemplifies an *uncovering of the unseen via the not yet heard*:

***Nādam Brahmān - Kalām-i-Ilāhī.***



*The composite cosine wave form of the hydrogen tetrachord*

#1. *The Song of Hydrogen*: 31/23/17/13

From: the *Songs of the Elements*, #1- 92 (of the Periodic Table), *of the Well-Tuned Universe* (2007)



## APPENDIX

( From: Notes on the )  
HILBERT SPACE SHRUTI BOX

[...]

The harmonics,  $f_q$ , of a *quantum harmonic oscillator*, QHO, lexicographically arrange themselves neatly in a *cumulative hierarchy*,  $Q_H$ , of *quantum harmonics*,  $|n\rangle$ , provided the integer  $q$  is written in *base 2*, i.e. as a *binary numeral*, of which the first  $n$  stages may be presented as the state vectors

$$Q_{H_1} := \langle 0, 1 \rangle$$

$$Q_{H_2} := \langle 00, 01, 10, 11 \rangle$$

$$\vdots$$

$$Q_{H_n} := \langle 00\dots 0, \dots, 11\dots 1 \rangle$$

of binary (bit) strings ('numerals') in the alphabet  $\{0,1\}$  of length  $n$  the union —

$$\bigcup_{n=1}^{\infty} Q_{H_n} := Q_H$$

— of which represents the complete hierarchy  $Q_H$ .

This hierarchy is also known as the *universal binary spread* of intuitionistic continuum and to which I repeatedly have had occasion to refer to in my writings on just intonation and modal music, beginning with **BROUWER'S LATTICE**, 1976. By invoking the universal binary spread as a mapping, a correspondence (a map) will ensue between just intonation *intervals* (*shruti-s*) and intuitionistic *mathematical entities*, both concurrently constructed by the (intuitionistic) *Creating Subject* following an intuition of time evolutions.

**REMARK.** Readers familiar with computer designs will recognize the shorter strings in  $Q_H$  as the usual 'Boolean gates' while readers familiar with propositional logic will recognize the usual truth-tables, say, as given in **Tractatus Logico-Philosophicus**. Either way, an elementary observation consist in noticing that *each logical state or truth-value distribution*, in virtue of the present formalism, also corresponds to a *fixed frequency ratio*. Thus it emerges that synthesis of circuitry is in parallelism with frequency synthesis — unifying logic, computation and languages of sound (Majorana gates providing for self-programmed choice-sequences in the sense of Brouwer, cf. **ADVANCED REMARK**, below). Extending the observation to the concept of the entire universe viewed as a quantum computer, it becomes possible, if not feasible, to consider the exact frequency distribution of the present state of the universe (and, extrapolating, guessing the initial frequency ratios within some tolerance of error). (It is, possibly, an irony that the enigmatic **Tractatus**, aphorisms 4.011-4.0141 here receive a (re-)solution within its

own formalism in that frequency ratios indicated by conventional staff notation are interconvertible with the discrete (co-)sine-Fourier Transform — furnishing user-friendly digital memory registers for sound as exemplified by cd- and dvd- technology.)

ADVANCED REMARK. Notice that the(?) binary string of length zero,  $\Lambda$ , may represent the *superposition* of all the harmonics of  $Q_H$  taken at *zero* amplitude or probability. On this representation  $\Lambda$  measures the inertia of the ‘sound vacuum’ whose frequencies escape into non-zero amplitudes by various tunneling mechanisms (degeneracy of the ‘ground state’). This would be an example of a (very) *free choice-sequence*. (The number of zeros in the string 00...0 can be taken as a measure of the energy-density of the zero-state vectors  $|00...0\rangle$  of this imaginary vacuum (see Section 3, below). The concept becomes more tangible if amplitudes are taken to be inverse to the frequency.) Remark that, phenomenologically, this comes close to the *spontaneous* oto-acoustical emission of the inner ear, a stationary, multi-sine wave-like sound that might be taken as a sonic analog of ‘hacking into the vacuum’.

2.2 Each level,  $Q_{H_m}$ , of  $Q_H$  may be regarded as a *vector* which is created by the  $m$ th division of the octave interval  $2:1$ ,  $m = 1, 2, 3, \dots$ , which enumerates the first  $2^m-1$  harmonics in their ‘natural’ order including the fundamental frequency. Physically, these vectors represent a set of  $2^m-1$  *oscillators* or *strings*,  $|n_q\rangle$ ,  $q = 1, \dots, 2^m - 1$ , vibrating without overtones, each of which outputs a fixed *Eigenfrequency* as an integer multiple of the fundamental frequency (and as an integer multiple of the corresponding Eigenstate). To illustrate the concept by the chosen standard of sound, a ‘resting’ or unplucked *tambura* may be conceived as holding in superposition some  $2^k - 1$  distinct harmonics for  $k < 16$ , say — which only ‘escape’ into reality as the instrument is picked-up and precisely tuned. More abstractly, the exponential constant  $k$  may be considered without any precise least upper bound — a lack of precision which confers on the ‘ideal’ *tambura* an *unlimited set of harmonics* or resonances ( $k$  goes to ‘infinity’), as when imagined played by the Goddess *Saraswati*. (This case should be contrasted with the more ancient Chinese tradition of pentatonic tunings which limits the value of  $k$  at 6,  $2^6 = 64$ , 64 being the number of hexagrams in the **I-Ching**, the earliest known base-2 notation for whole number, yielding 63 distinct pitches from the cycle of fifths. However, later the cycle of 5<sup>th</sup>s were continued up to 25 524 distinct pitches furnishing a basic microtonal interval measuring .0021174 savarts ( $2/1 = 301$  savarts). The measure is comparable to the most fine-grained Indian *shruti*-scale although here it will not be further mentioned.)

3. [...]

3.1 A state of  $n$  *qubits* is defined by the following *unit vector* in  $2^n$ -dimensional complex Hilbert space  $C^2$ :

$$C^2 \otimes C^2 \otimes \dots \otimes C^2 \quad \text{— } n \text{ times.}$$

The *basis* of this space corresponds to  $2^n$  classical strings of length  $n$ :

$$|0\rangle \otimes |0\rangle \otimes \dots \otimes |0\rangle = |00\dots0\rangle$$

$$|0\rangle \otimes |0\rangle \otimes \dots \otimes |1\rangle = |00\dots1\rangle$$

$$\vdots$$

$$|1\rangle \otimes |1\rangle \otimes \dots \otimes |1\rangle = |11\dots1\rangle$$

each string having the form of a vector.



This is the general basis structure of the *Hilbert shruti space*. For example, for  $n = 2$ , the basis vectors are the strings

$$|0\rangle \otimes |0\rangle = |00\rangle$$

$$|0\rangle \otimes |1\rangle = |01\rangle$$

$$|1\rangle \otimes |0\rangle = |10\rangle$$

$$|1\rangle \otimes |1\rangle = |11\rangle$$

corresponding to the (only) two harmonics,  $|10\rangle$ ,  $|11\rangle$ , of the second level,  $Q_{H_2}$ , of  $Q_{H_m}$ ,  $|00\rangle$  denotes a non-vibrating string, i.e., a string vibrating at 0 Hz, while  $|01\rangle$  denotes the fundamental, here considered to be a (normed) vibration of 1 Hz. The configuration of frequencies in this example corresponds to one of the basic tunings of the *tambura*, viz., the *Pa*-tuning. Thus (with a scaling factor of  $2^8$ ),

$|01\rangle$  is *shruti chhandovati*,

$|10\rangle$  is *shruti shadja* — and

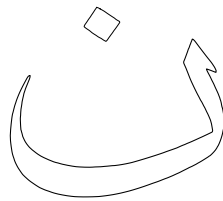
$|11\rangle$  is *shruti panchama*.

3.2 All other *shruti-s* emanating from this tuning ‘live’ higher up in the  $Q_H$ -hierarchy and seem to arise in an ‘inflationary’ manner at the very instant the above three *shruti-s* are initiated by the *tambura player*.

For each  $n$ , there are  $2^n - 1$  distinct *shruti-s* contained in the corresponding basis for the  $n$ -dimensional *Hilbert shruti space*,  $n = 1, 2, 3, \dots$ . Thus, even for ‘small’ values of  $n$ , say 100 or 1000, the population of *shruti-s* living in this ‘*shruti-box*’ is ‘super-inflationary’ and largely unknown from phenomenological experiences (and not necessarily accessible in its totality by identifiably observables since some may escape intrinsic thresholds of discrimination.)

3.3 For each  $n$ , there are  $m$ -tone scales for any  $m > 2$ . For example, a 5-tone scale is contained in the basis for  $n = 3$  — which contains seven vibrating strings of length three. For providing a 7- or 12-tone scale it suffices to chose  $n = 4$ . In fact, since the unit distance of a *classical* Hilbert space is  $\sqrt{2}$ , it is trivial to change its norm to  $\sqrt[12]{2}$  — which is the unit measure of distance by equal temperament — the classical 12-tone formalism can be found as subspaces already of classical Hilbert space, thus conferring on the latter a certain sense of ‘universality’ in modeling all known scale structures. Remark that the latter subspaces have *arbitrary close* (discrete) *approximations* by letting the exponent,  $n$ , go to infinity in *Hilbert shruti space*, making the borderline between ‘just intonation’ and ‘equal temperament’ fuzzy, if not moot. For an exemplary demonstration of this point, refer to Henry Flynt’s model of the monochord, historically, perhaps, the first ‘*mathematical instrument*’. On the other hand, modal scales may be constructed by a top-down scheme starting from a set of quantum harmonic oscillators ‘prepared to’ equal temperament but subsequently subjected to the actions of some ‘deformation operators’ by which the equal temperament structure deforms to particular modal scales (the majority of which is still to be heard).

[...]



SONOILLUMINESCENCES  
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