

Quantum Conversation

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Abstract

This article is a sequel to the paper published earlier entitled (A new approach to gauge theory and variational principal). It is assumed that atoms are engaged in a perpetual conversation called Quantum Conversation, and the behavior of an atom varies based on the syntax, and the tonality, derived from the spectral terms. Accepting this premise, it is then explored how to identify Quantum Conversation, (QC). Quantum Conversation could be identified through looking at atom from a fresh point of view. Mainly this includes re-interpreting spin, and split identified by the spectral terms which is the other behavioral characteristic of quantum particles. Split is defined both as the change in the orbit level, and the division of an atom into smaller elements. Spin, and split change as a result of Q.C. Q.C. has two major elements, 1) syntax, and 2) tonality. Given the

dynamics and the diverse nature of syntax combined with tonality, it makes it possible to imagine and analyze a great number of scenarios for the behavior of the elements of an atom that would not be possible to observe through laboratory experiments. This would open the door to a deeper understanding of the life of an atom.

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Keywords

Quantum Conversation; syntax; syntax tree; tonality; spin; split; spectral term; building blocks; Embedded Meaning; Causal Perception; embedded decay; cohomological transition; anti (space,time); grid; bijective mapping; surjective mapping.

1. Introduction to Quantum Conversation

The behavior of atoms has remained a mystery. Even though there has been many discoveries about the structure of an atom, still there is no classical interpretation of spin, [1], [2], [3]. Spin is the orbital rotation of the elements of an atom such as the core, (protons, neutrons), and the electrons. Split is defined both as a change in the orbital level, and also as the division of the elements of an atom into smaller elements such as quarks, leptons, and bosons. In fact there is no simple and easy explanation for spin which means that there is not a clear understanding of the fundamental principals relating to spin, [4]. Physicists working on quantum field discovered the multiplicity of spectra and the Zeeman effect, [5], [6], [7]. These discoveries shed some light on the nature of spin. Later discoveries included the discovery of electron, proton, and inner core spins with various degrees of freedom, Dirac, Heisenberg, Hund, Hori, and Denison, which resulted in the discovery of isospin (magnetic interaction through

magnetic momentum). The spin is then modified to include the special relativity which leads to the conclusion that spins of the different elements of an atom are correlated. A second most important discovery is split. Split is change in orbital levels and division into smaller elements such as quarks, leptons, and Bosons which arrange in groups, and due to the hierarchy of mass arrangement, cause split level change of orbitals, [8], [9]. In this paper, split level change and division into smaller elements are taken to be one and the same phenomena. Given these important findings, and the existence of standard model, it is still not possible to have a comprehensive view of the physical universe. It is for this reason that it is important to analyze and discuss Q.C. Q.C. is defined as a verbal interaction among the elements of an atom, the core, and the electrons. It is assumed that the core is aware of the environment around it. Environment is the presence of dynamics and fluctuation, such as change in temperature, the existence of other particles, both friendly and unfriendly, change in viscosity levels, and internal fluctuations such as deliberate modifications and addition and/or elimination of bits of memory performed by the core of an atom. Electrons are considered as sentinels in the sense that they watch out for the integrity of the core, and react to the information they receive from the core. This interaction in this approach is translated into constant and evolving dialogs between the core and the sentinels. Perceived this way, a dialog becomes the key element in the behavior of an atom, and thus must be assigned elements that can be quantified. These elements are syntax and tonality interpreted using the concept of Embedded Meaning. These two elements of dialog based Q.C. are linked to spin and split level change. A resume of the basics of QC is given in Figure 1.

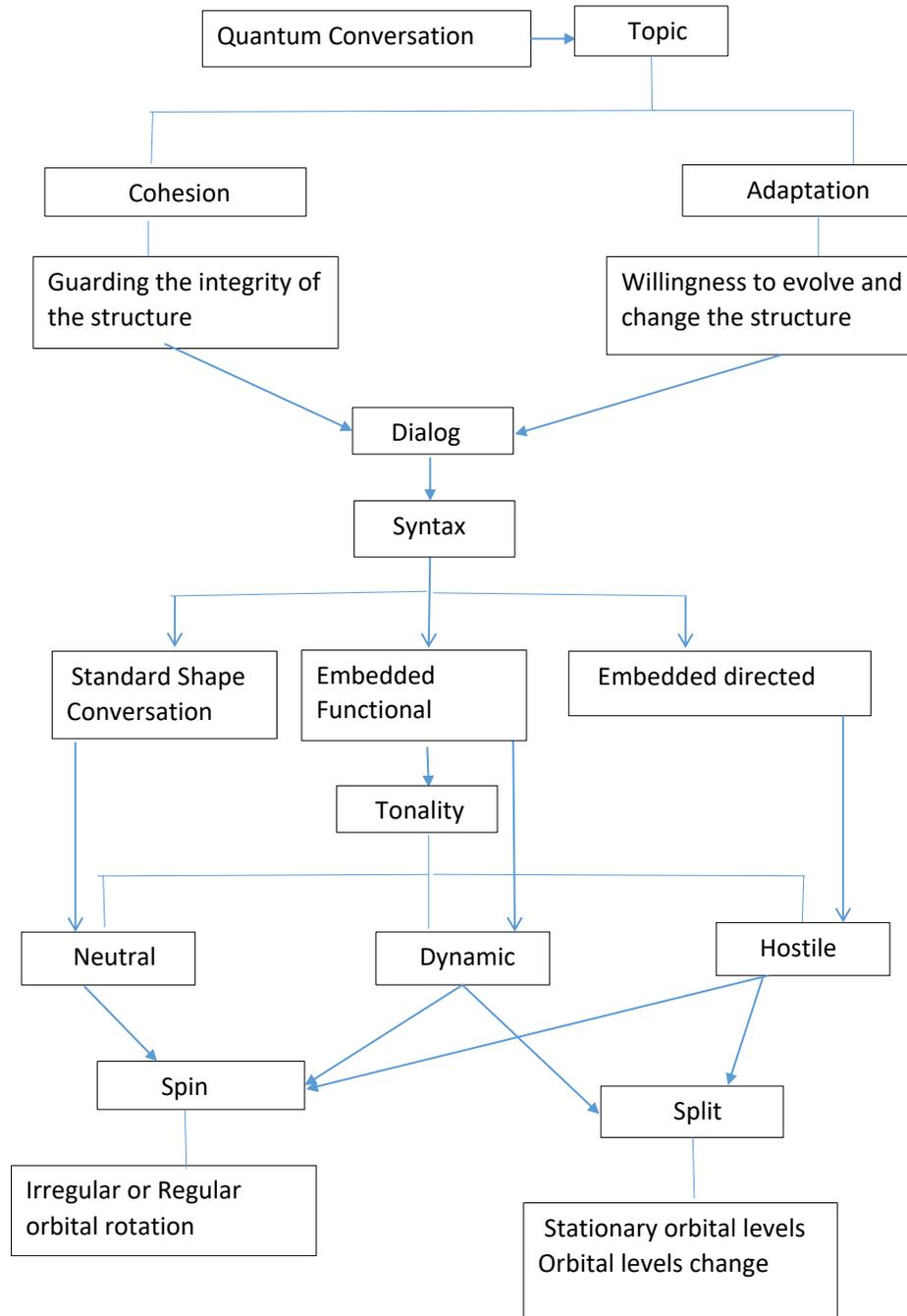


Figure 1. Resume of the main concepts of Quantum Conversation

In Figure 1, different elements of (QC) are given. It is assumed that the core

or the nucleus of an atom, protons, and neutrons are in non-stop uninterrupted conversation with each other. There exists also a non-stop and uninterrupted conversation between the nucleus and the electron(s). The topic of conversation is reduced to two major subjects. Cohesion corresponds to actions relating to guarding the integrity of the structure of an atom specifically the structure at the relaxation state of the atom. It is considered that the relaxation state of an atom is the most desirable state which signifies that the atom is not threatened neither by the environment nor by any hostile external actions such as a photon blast. Adaptation as the word implies relates to readiness to perform change in order to evolve the structure of an atom. This could signal readiness to combine with other elements in its' environment or simply assume change in order to maintain its' identity or defend itself. Conversation is made up of dialog and a dialog is identified by a syntax, [10] Syntax is the structure of a dialog. normally it is made of (ABC) pieces, where (A) is the subject, (B) is the verb relating to some action , and (C) is the object the action is directed towards. The standard syntax with shape conservation character is mainly unambiguous, and can be interpreted in a straight forward manner. A more complicated version is the syntax that can be perceived in a multitude of ways. Another type of syntax is the embedded functional syntax. An embedded syntax is the type that has one clause and several clauses inside the main clause. The embedded functional syntax is an embedded syntax that can embed various different clauses that can be interpreted in many ways, and thus can be used to describe many different ways so as the convey different meanings. Embedded directed syntax is an embedded syntax that has a shape conservation property. Thus embedded directed syntax is unambiguous and the interpretation is direct and clear.

A conversation is assumed to have a tonality. Tonality refers to the manner the conversation is carried out. Tonality is divided into three main levels of neutral, dynamic, and hostile tonalities. Neutral tonality as the name suggests refers to dialog with no conflicting content. Dynamic tonality refers to a dialog

that contains both positive and constructive content as well as conflicting pieces. Hostile tonality clearly refers to a highly provoking content. Standard shape conservation syntax is linked to neutral tonality, while embedded functional syntax is linked to dynamic tonality, and embedded directed syntax is associated with hostile tonality. Standard shape conservation with the associated tonality are mainly related to spin. In general all levels of tonality can lead to either spin or split. In neutral tonality the core of an atom is spherically symmetric, and the tilt of the plane of the orbit of the electron stable which implies that the energy of the electron is stable. In dynamic tonality, the core of the atom is quasi spherically symmetric, which could mean that for example, there exists a degree of angular momentum, and a magnetic moment that is associated with it. The magnetic field produced by the magnetic momentum is axially symmetric about the axis of the angular momentum. In this case, there will be an internal Zeeman effect on the electron caused by the internal magnetic field. The Zeeman effect is the change in the size of the electron orbit. In hostile tonality, the effects of the dynamic tonality are magnified and are directed towards an specific Zeeman effect.

In a dialog, the standard syntax with shape conservation character possesses neutral tonality. Embedded functional syntax possesses a dynamic tonality, and the embedded directed syntax possesses a hostile tonality. In order to relate (syntax,tonality) to (spin,split) basic characters are developed that bridge the gap between (syntax,tonality), and the two fundamental representation of the behavior of an atom (spin,split). These characters are the basic building blocks of a syntax based dialog, that constitutes Q.C. It is possible to enrich the inventory of Q.C. characters by developing new characters using the building block characters as the base.

The facts that more and more detailed discoveries in particle physics create even more questions and doubts and has inspired the idea of taking a fresh look

at what exists up to now. This means to look at the problem from a different angle. For example what if one assumes that the different elements of an atom are in constant perpetual conversation, (Khoshyaran), [11]. The elements of an atom are in constant interaction with each other. In paper by Khoshyaran, the Quantum Conversation, Q.C. is introduced and analyzed. Still what remains is to understand the conversation. For this the two mechanical actions of spin and split are used. To understand Q.C. and its' link to (spin,split), first must explain (spin,split). As is shown in Figure 1, syntax, and tonality, are linked to spin and split. This connection is made using the basic functioning of the core, and the radiant electron.

In Figure 2, the elements of the core of an atom are designated as (ρ) for protons, (η) , neutrons, and (ζ) for electron(s). Spin and split are designated by spectral terms (n, k, m) , based on Bohr theory for the spectrum of the hydrogen atom published in 1913,[1]. The spectral terms (n, k, m) , of an atom are defined in the literature, as (n) , the principal quantum number and it determines the size of the orbit of the core elements, (ρ, η) , and the radiant electron, (ζ) , (k) is the subordinate quantum number and it determines the shape of the orbits of (ρ, η, ζ) . Orbits can have many different shapes, mainly symmetric shapes, (spherical), and non-symmetric shapes, (parabolic, hyperbolic, with or without singularities). (m) is the magnetic quantum number, it determines the orbital angular momentum, in other words the gradient of the orbit. In general, the gradient is given based on (k) , since $(-k \leq m \leq k)$. The gradient can take both positive and negative integral values. (m) gives the angular momentum vector along the electromagnetic, (μ) force field, partly due to the existence of a gravitational force, (F) , and partly due to the existence of electric fields existing among the elements of an atom, (ρ, η, ζ) . Normally, these electric fields are spherically symmetric. Maximum value of (m) is $(m = 2k + 1)$. Thus both (k) , and (m) are finite. The spectral terms are used in the construction of the building blocks of Q.C. Another spectral number (j) identified by A.J. Sommerfeld, is the inner

quantum number that specifies sub-levels of the quantum number (k) is omitted from use in this paper. This is done in order to simplify the construction of the Q.C. theory. The functionality of spectral terms are summarized in Figure 3.

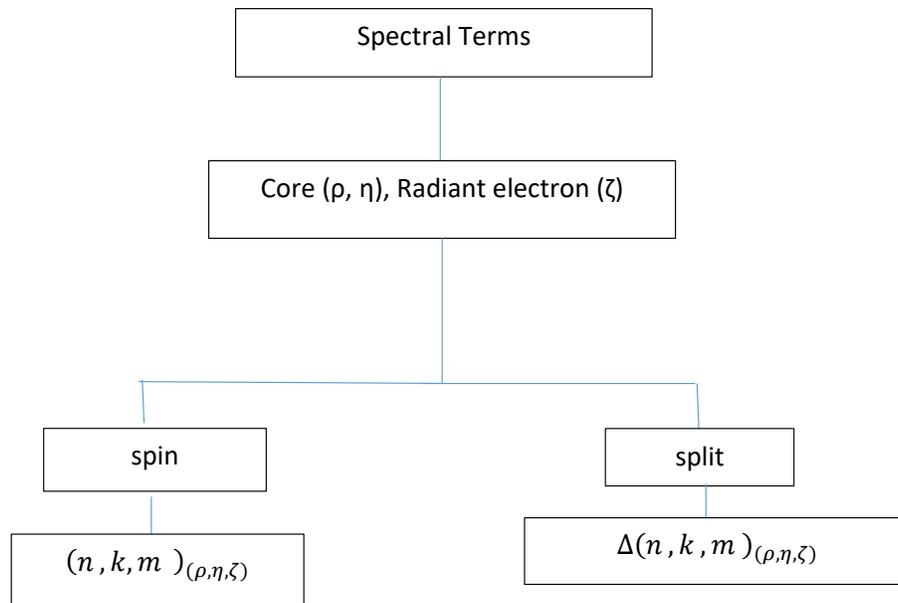


Figure 2. Spectral Term

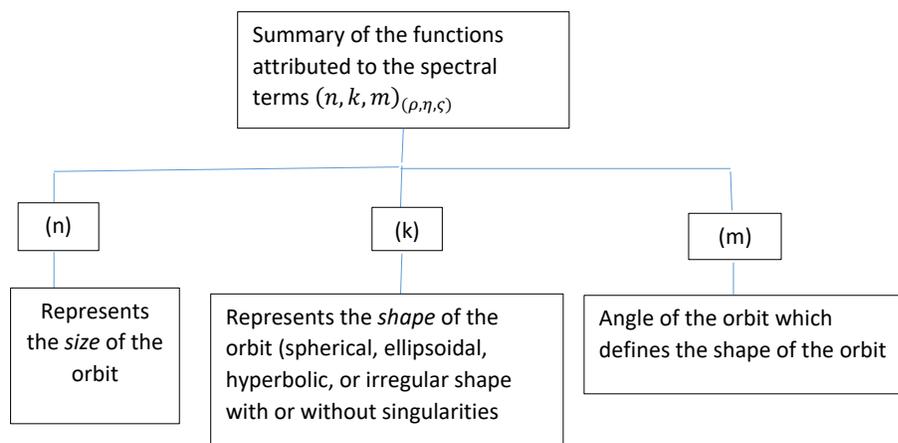


Figure 3. Summary of the functions attributed to the spectral terms (n, k, m)

It is assumed that both the elements of the core (ρ, η) , and the electron (ζ) possess spin and split. For the reason of minimizing the complexity of the analysis, only the outermost or the (radiant) electron of an atom is considered. The spin of an atom is designated by $((n, k, m)_{(\eta, \rho, \zeta)})$. Spin is defined as the rotation of the elements of an atom around their own axes. Changes in the electromagnetic field of an atom combined with fluctuations in the gravitational force interaction among the different elements of an atom, can produce two results, in split. Split is divided into two categories, 1) orbital split, (s^o) , 2) decay induced orbital split, (s^d) . Decay is the division of the elements of an atom into smaller particles. For example, protons can decay into Fermions and Fermions can decay into quarks, and leptons, each possessing different levels of electromagnetic, and micro gravitational forces, or neutrons splitting into smaller elements, neutrinos, and electrons into muons. Both (s^o) , and (s^d) are changes in the orbital level, and shape of the spin. Figure 4, demonstrates various actions of the electromagnetic, (μ) force field. As is indicated in Figure 4, (μ) is divided into several specific effects. 1) Gradient effect (α_μ) , which determines the shape of an spin orbital which can be classified as either symmetric or non-symmetric geometry. 2) Speed (v_μ) of the orbital rotation that corresponds to the shape of an orbital in the case (s^d) , when splitting to smaller particles causes new orbitals with different orbital rotation speeds. 3) Friction (F_μ) is due to the intersection of the gravitational force fields, and the electromagnetic force fields of the particles, $((\eta, \rho, \zeta))$ in an atom. (F_μ) determines the magnitude of the angular momentum (m) that affects the routine of the movement from spherical to parabolic, to hyperbolic, to irregular shapes with or without singularities. Both (s^o) , and (s^d) are designated by $((\Delta(n), \Delta(k), \Delta(m))_{(\eta, \rho, \zeta)})$. The variation indicator (Δ) is formulated as $(\Delta(n) = n \times \alpha_\mu)$, $(\Delta(k) = k \times v_\mu)$, and $(\Delta(m) = m \times F_\mu)$. Depending on the type of split (s^o) , or (s^d) the values of (α_μ) , (v_μ) , and (F_μ) take values.

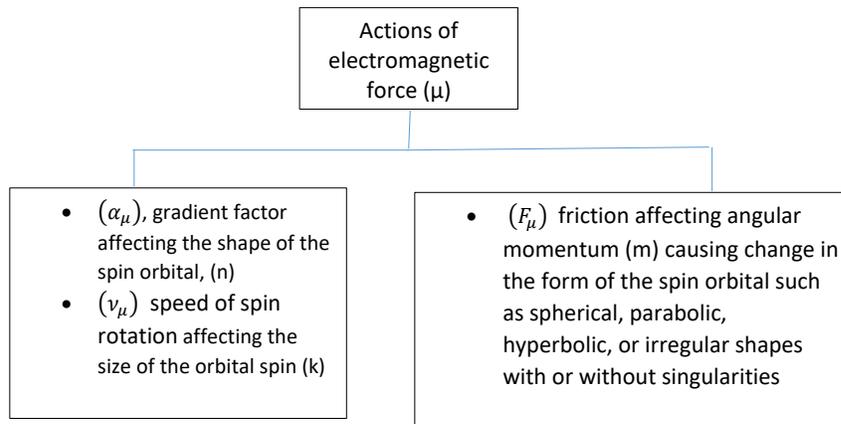


Figure 4. Various actions of the electromagnetic force, (μ)

The construction of Q.C. involves creating words that can make up syntax that define dialog between (η), and (ρ), and between (η), and (ζ), and between (ρ), and (ζ). The building blocks of the word structure are constructed using the embodied meaning theory. Embodied meaning is the influence of bodily experience in terms of movements of different body parts with respect to mental processes, and near and general environment of an individual on building and structuring the conceptual system, the nature of reasoning, and in the ways that it is communicated. The influence of the bodily experience, provides a new dimension of meaning and thus forms patterns of thought. It is the complex intricacy of mechanical movement in the context of immediate and non-immediate environment that gives new structures, and create new formal aspects of meaning and conceptualization and the advent of new embodied meaning. The standard syntax is structured based on standard methods of structural analysis, and explanation limit. By introducing the dimension of embodied meaning theory, it is possible to expand the syntax in a dialog. In quantum field theory the bodily experience in terms of movements of different body parts within near and general environment is replaced with the movement of various elements of an atom,

in response to each other and their near and general environment. The reaction is defined as dialogs between the core, protons, and neutrons, and the radiant electron, and between the elements of the core, protons, and neutrons. To understand these dialogs must look into the structure of a dialog, which is syntax. Syntax is structured with characters. These characters reflect the mechanical movements of the elements of an atom. The interpretation of the characters is given based on embodied meaning. The ensemble of these characters make up the basic building blocks that can be used to create other more elaborate characters. These characters are used to constitute a dialog by arranging and re-arranging these characters. This way it is possible to recover the situations out of which new forms and patterns emerge. All these possibilities of this Causal Perception (CP), are based on the basic building blocks that enable us to reach and exceed patterns such as new (forms, concepts, definitions, categories, and distinction rules), [12]. Causal Perception is the order of Embedded Meaning based interpretation. Examples of dialog using basic building blocks in a syntax context is given.

To construct a dialog for Q.C. one must bridge the characters used as words in the dialog syntax to spin, and split, and then interpret the character based on the principal of the embodied meaning. The following tables represent a non-exhaustive list of words that can be constructed based on the interpretation of the movements of the elements of an atom, identified as spin, and split. The following conventions are used in the construction of characters used as words in syntax. The convention used for spin is a dashed line, $(-)$. Additional spins, the doublet, triplet, or higher are represented by extra dashed lines, $(-)$, in case where orbital split levels are unchanged with respect to the reference split, and in the case of change in orbital split levels either due to fluctuations in the energy level of the elements of an atom, or the occurrence of decay, are represented for the singlets, doublets, triplets, and higher spins and splits as (\backslash) for (ρ) , and by $(/)$ for (η) . To distinguish the radiant electron, (ζ) from the core elements, the

symbol $(-)$ is used. Thus the reference split for (ζ) , is represented as $(|^{-})$. The convention used for split has two parts, the reference split is represented as $(|)$ to designate a reference point for other orbital splits. Thus the spin of the core (ρ, η) , and the radiant electron (ζ) are represented by $(-)$, and their reference splits are represented by $(|)$. The dashed line, $(-)$ on the right hand side of the reference split $(|)$, represents the spin of the (η) , and the dashed line, $(-$, on the left hand side of the $(|)$, represents the spin of the (ρ) . Change in the orbital split level represented as $(| \setminus)$ for (ρ, η) with the right hand $(|)$ being the orbital split level for (η) , and the left hand $(|)$ being the orbital split level for (ρ) , and $(|^{-})$ for (ζ) . Several spins are represented by dashed lines stacked vertically. In the case of orbital split level change the stacked dash lines are accompanied by the same number of $(| \setminus)$ for (ρ, η) , equal to the number of stacked dash lines, and the same number of stacked dashed lines accompanied with the same number of $(|^{-})$ for (ζ) . The assumption is that both the core, (ρ, η) , and the radiant electron, (ζ) behave in a coordinate manner.

Table 1a, demonstrates some basic interpretations of a sample of the building blocks of Q.C based on spin and split. In the first half of Table 1a, characters for spin and split of the 3 elements of an atom, (ρ, η, ζ) , proton, neutron, and the radiant electron are presented. The characters are presented to designate symmetric spin of different energy levels such as singlets, doublets, triplets, and higher orbits; and for situations with the shift in the orbital levels due to decay. Each couple of characters (ρ, η) , together with the character for (ζ) represent a set of actions conceived using the concept of the Embodied Meaning. The essence of the concept of Embodied Meaning is that meaning is derived from actions relating to mechanical or locomotive movements of various components of a physical entity. For example in the case of singlet symmetric spin without split level change, two characters of (ρ, η) , along with (ζ) imply a Q.C. dialog. Based on the theory of Embodied Meaning, this dialog is interpreted as relating to peace, tranquility, agreement and majority opinion. This is not an exhaustive

interpretation, but a sample of one. Some sample dialogs are shown in table 1b. Both (ρ, η) , and (ζ) are interpreted to be in complete agreement and do not perceive any threat to themselves from outside aggression such as intense light, heat (unusual temperatures), or interference of other particles. The rest of this table is interpreted in a similar fashion. The advantage of using Q.C. with embodied meaning is that it allows for many behavioral possibilities of (ρ, η) , and (ζ) , that can be modeled. It gives an insight into the life of an atom that can be observed in a continuous manner, since one can only look at the reaction of an atom at only an instant of time when it is bombarded by light, (photons) in laboratory settings. The life style or the pattern of the movements of an atom is an unknown. The Q.C. technique allows to conceive and imagine the evolution of the life of an atom by considering all the behavioral possibilities. This capability allows for Q.C. based scenarios that can be tested in a laboratory for verification.

	Singlet spin orbital $(s_1^o)_\rho$		Singlet spin with orbital shift $(s_1^d)_\rho$
	Singlet spin orbital $(s_1^o)_\eta$		Singlet spin with orbital shift $(s_1^d)_\eta$
	Singlet spin orbital $(s_1^o)_\zeta$		Singlet spin with orbital shift $(s_1^d)_\zeta$
	Doublet spin orbital $(s_2^o)_\rho$		Doublet spin with orbital shift $(s_2^d)_\rho$
	Doublet spin orbital $(s_2^o)_\eta$		Doublet spin with orbital shift $(s_2^d)_\eta$
	Doublet spin orbital $(s_2^o)_\zeta$		Doublet spin with orbital shift $(s_2^d)_\zeta$
⋮	⋮	⋮	⋮
	r-tuplet spin orbital $(s_r^o)_\rho$		r-tuplet spin with orbital shift $(s_r^d)_\rho$
	r-tuplet spin orbital $(s_r^o)_\eta$		r-tuplet spin with orbital shift $(s_r^d)_\eta$
	r-tuplet spin orbital $(s_r^o)_\zeta$		r-tuplet spin with orbital shift $(s_r^d)_\zeta$

Table 1a. Building blocks of QC: symmetric case

Samples of Q.C. dialogs based on Embodied Meaning, (EM)

	Interpretation based on (EM): this dialog is about Peace, tranquility, agreement, or majority opinion are just some examples of interpretation. This list is not exhaustive.
	Interpretation based on (EM): this dialog is about: state of alert, discomfort, lack of trust, observation, reaction. This list is not exhaustive.
	Interpretation based on (EM): this dialog is about: state of awakening, curiosity, patience, expectation, introspection, searching. This list is not exhaustive.
	Interpretation based on (EM): this dialog is about: medium level panic, readiness for action, seeking alternatives, asking for help, getting ready for negotiation, understanding, reaching a level of knowledge, direction. This list is not exhaustive.

Table 1b. Samples of Q.C. dialogues

Table 2a, represents characters depicting non-symmetric spin, with, and without shifts in energy levels causing orbital level changes, and with decay causing orbital level shifts. In order to simplify character representation, the spin is designated as two curved dashed lines for non-symmetric orbits. The reference orbital level is designated as a curved vertical line, while energy level orbital levels, and decay induced orbital level changes are represented as tilted to the left hand side (ρ) indicating the orbital split level for (ρ), and the right hand side (η) indicating orbital split levels for (η) and (ζ).

	Non-symmetric singlet spin orbital (s_1^ρ) $_\rho$		Non-symmetric singlet spin with orbital shift(s_1^d) $_\rho$
	Non-symmetric singlet spin orbital (s_1^ρ) $_\eta$		Non-symmetric singlet spin with orbital shift(s_1^d) $_\eta$
	Non-symmetric singlet spin orbital (s_1^ρ) $_\zeta$		Non-symmetric singlet spin with orbital shift(s_1^d) $_\zeta$
	Non-symmetric doublet spin orbital (s_2^ρ) $_\rho$		Non-symmetric doublet spin with orbital shift(s_2^d) $_\rho$
	Non-symmetric doublet spin orbital (s_2^ρ) $_\eta$		Non-symmetric doublet spin with orbital shift(s_2^d) $_\eta$
	Non-symmetric doublet spin orbital (s_2^ρ) $_\zeta$		Non-symmetric doublet spin with orbital shift(s_2^d) $_\zeta$
...
	Non-symmetric r-tuplet spin orbital (s_r^ρ) $_\rho$		Non-symmetric r-tuplet spin with orbital shift(s_r^d) $_\rho$
	Non-symmetric r-tuplet spin orbital (s_r^ρ) $_\eta$		Non-symmetric r-tuplet spin with orbital shift(s_r^d) $_\eta$
	Non-symmetric r-tuplet spin orbital (s_r^ρ) $_\zeta$		Non-symmetric r-tuplet spin with orbital shift(s_r^d) $_\zeta$

Table 2a. Samples of Q.C. characters: non-symmetric case

Table 2b, depicts samples of Q.C. dialogues between the core, (ρ, η) , and (ζ) using non-symmetric orbits either with/without energy level changes, or orbital level shifts due to decay. The interpretation of the form of Q.C. in each case is based on the (EM) theory and thus is not an exhaustive list of such type of interpretations. Two characters are presented. The first character represents

the attitudes of (ρ, η) , and the second character represents the attitude of (ζ) . For the sake of simplicity it is assumed that both (ρ) , and (η) , show the same attitude in a Q.C. More complicated cases, where (ρ) 's behavior is different from (η) , are not considered. Also, (ζ) 's behavior is depicted to be in agreement with (ρ, η) . Therefore, the representation in Table 2b, in effect is a special case of a general conversation. The point of the representation is not to give an exhaustive Q.C., but a sample of Q.C. dialogues. The (EM) interpretation of non-symmetric singlet with no energy level fluctuations a low level degree of alertness and discomfort. In the case of doublet non-symmetric spin orbits; this case indicates a higher level of alertness and discomfort; at this stage the atom is looking to find a way to solve a problem and get back to its' equilibrium or entropy state. In the case of orbital level shifts, the atom is raising its' level of awareness by splitting the orbitals. Here, the purpose of splitting is to show strength and capability at a low tonality. As the number of orbital level shifts increases, the awareness level is raised, leading to a higher levels of alert and awareness. It must be noted that the Q.C. between (ρ) , and (η) are omitted, since the intend is to provide examples of such an approach. It is assumed that (ρ) , and (η) agree in the symmetric and the non-symmetric spin with and without split. It is assumed that there is no case when (ρ) , is symmetric and (η) is non-symmetric. The symmetric and non-symmetric Spin are: 1) symmetrical spherical shape, 2 non-symmetric spherical shape, 3) ellipsoidal, 4) hyperbolic, 5) irregular without singularity such as non-Riemannian manifolds with varying gravitational degrees of freedom, and 6) irregular with singularity such as torus type geometries.

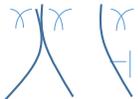
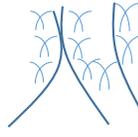
Conversation between the core (ρ, η) and (ζ)	Conversation between the core (ρ, η) and (ζ)
 <p>Interpretation based on (EM): ability, strength, pride, defensive posture. low intensity level. atypical behavior, deviance, unusual, different, unconventional, new.</p>	 <p>Interpretation based on (EM): new perception, change in strategy, a better position to assess a situation, a deeper look . low intensity level. state of alert, discomfort, lack of trust, observation, reaction. This dialog indicates taking action by invoking either change in the energy levels, or decay, induced orbital level shifts.</p>
 <p>Interpretation based on (EM): low medium intensity levels. New solutions, out of the box thinking, search for different behavior.</p>	 <p>Interpretation based on (EM): low medium intensity levels. Need to dialog with new elements, readiness for atypical action, seeking new alternatives, asking for help from unusual sources, getting ready for negotiation in an unconventional way, alternative meaning, reaching a level of unconventional knowledge, unexpected direction.</p>
 <p>Interpretation based on (EM): low high intensity levels. High state of alert.</p>	 <p>Interpretation based on (EM): medium high intensity. Getting ready to react.</p>

Table 2b. Samples of Q.C. dialogues: non-symmetric case

The non-symmetric aspect of the orbital is interpreted as an attempt by the atom to view the environment from a different angle through change in the angular momentum of the orbital. Split level change is a technique of probing into a challenging or a threatening situation when faced with either an (E^+), or (E^-), positive or negative environments around the atom. The atom disposes of (2) major tools of defense: 1) spin 2) split due to energy fluctuation, and decay

induced split level changes. An example of (EM) derived Q.C. is demonstrated in Table 3. An example of (EM) based Q.C. of an atom in (E^-) is given in Figure 4. In this example, the first transition in (E^-) is a singlet decay from (B zero bar meson) (\bar{B}^0) to W boson (W). (\bar{B}^0) is a hadron made of a beauty quark (b), and an anti-down quark (anti-matter particle), (d). The (a) segment of this conversation can be interpreted using the concept of the (EM) as relating to a discussion reflecting worry and concern, and a need to better understand a situation. This is one possible interpretation and thus is not a unique interpretation. The (b) segment of the conversation which is the doublet decay transition is from W boson to muons ($W \rightarrow \mu^+\mu^-$) is represented as the basic building blocks of (EM) derived Q.C. At this stage, (ρ, η), and (ζ), are having a conversation that relates to understanding the situation as an adverse situation that threatens the integrity of the structure of the atom. In the (c) segment of the Q.C. (ρ, η), and (ζ) are considering a singlet decay from (W) boson to the (Z) boson, interpreted as a concern to understand the situation from a different angle. The information stored in segment (b) of the Q.C. is now integrated in the general aspect of the Q.C. (b) is now mapped onto segment (c), which causes a homeomorphic Q.C. that creates segment (d). The (d) segment of the Q.C. includes a transition that retains (b) segment of the conversation, ($a \rightarrow a |_d$). Any subsequent conversation in (E^-) situations includes the memory bank containing the transition ($a \rightarrow a |_d$).

In the case of decay it is possible that new particles, produced as a result of a decay are manifestation of a Q.C. that relates to a particular environment (E), where ($E = (T, K, P)$), where (T) is temperature, (K) is viscosity, and (P) is osmotic pressure. (E) can be categorized as 1) neutral, (E^0), 2) adverse, (E^-), and positive environment (E^+). (E^0), refers to a situation that exhibits low electromagnetism levels, meaning that the atom is not in an environment that threatens its' integrity and cohesion. (E^-), on the other hand, is an environment where external particles demonstrate high intensity levels of electromagnetism and are considered as aggressors by the atom. An example

of such a situation is an atom being bombarded by high intensity electromagnetic particles. (E^+), refers to a situation where the environment is friendly to an atom; by this it is meant that the atom is around compatible particles, and decay occurs to probe into the situation and provide an in-depth analysis, and understanding. Symmetric and non-symmetric spin with decay causing split level change occur in (E^-) and (E^+), while symmetric spin with fluctuations in energy induced split level change occurs in (E^0). A neutral situation (E^0) implies a non threatening situation meaning ($E^0 = \{T^0, K^0, P^0\}$), where (0) refers to an initial state of rest. A positive situation is a situation where ($E^+ = \{T^+, K^+, P^+\}; T^+ < T^0, K^+ < K^0, P^+ < P^0\}$), where less than values imply environment that allows reaching a state of rest with additional information that gives the atom tools to keep structural integrity indicative of a state of rest. (E^-), is a situation where, ($E^- = \{T^-, K^-, P^-\}; T^- > T^0, K^- > K^0, P^- > P^0\}$), exceed the initial values at the state of rest, is threatening the integrity of the structure such as very high temperatures, photon blasts, and high viscosity fluids.

An example of a situation in (E^0), and(E^+) is a (2) embedded layers decay, is given using a Feynman diagram, [15] as a Q.C. diagram. Decay is defined as an event causing the fundamental elements of an atom, (ρ, η), and (ζ), to divide into smaller elements. The smaller elements are essentially of the same nature as the fundamental elements, but differing in properties due to their size. For example, the intensity of an electron's decay into smaller elements such as (Bosons), and (Fermions) which are essentially the electrons broken down. In turn Boson's decay into smaller elements such as (Photons), (Gluons), (Z) bosons, (W) bosons, (H) Higgs and Fermions into quarks, and leptons. The diagram in Figure 5, gives the Feynman diagram in terms of Q.C. The Q.C. diagram shows an embedded doublet decay. In Figure 5, (\bar{B}^0), (\bar{B} bar zero) is a meson, (W) is a boson, (τ^-), is a negatively charged tau-lepton, ($\bar{\nu}_\tau$) is an anti-tau neutrinos, and (D^{*+}), is a modified ($\bar{B}^0 = D^{*+}\tau^-\bar{\nu}_\tau$) obtained through embedded doublet transformation. In the Q.C. diagram, (\bar{B}^0), an initial decay (E^0), this develops further as there

is a transition from (E^0) , to (E^+) .

The first transition in (E^+) is a singlet decay from the B meson (B^0) to W boson (W). The doublet decay transition from W boson to neutrinos ($W \rightarrow \mu^+ \mu^-$) indicates the rise in the tonality of the Q.C. due to extra information provided by (E^+) . The embedded doublet occurs in (E^+) , meaning that in each stage of decay the tonality of Q.C. changes due to extra information gathered due to a decay process. In Q.C. terms, this conversation can be interpreted as $(a, (b \rightarrow b_1 \tau^- \bar{\nu}_\tau), c)$, where $((b \rightarrow b_1 \tau^- \bar{\nu}_\tau))$ the split level change occurs after the second decay ($\tau^- \bar{\nu}_\tau$). This is due to the evolution from (E^0) , towards (E^+) , that is requiring a more in-depth analysis. This is interpreted as the elements of the atom, (ρ, η) , and (ζ) discussing a situation that they perceive as positive and are discussing the new knowledge they have received from (E^+) . $(b_1 \tau^- \bar{\nu}_\tau)$ is a discussion based on curiosity and interrogation attitude of (ρ, η) , and (ζ) . They are debating the evolution of the situation from (E^+) in order to choose the following phase of the Q.C. In this case the following phase is part (c) meaning $(b \rightarrow c)$. In this phase it is decided that more probe into the evolution of the situation (E^+) would give positive results. The information acquired in (b) is transmitted through an embedded doublet. This conversation is about improving the knowledge bank of the atom by acquiring information. All information is stored in the structure of the atom. This means that, after this Q.C. the normal state of an atom becomes $(a \rightarrow a |c)$. Any subsequent conversation includes all the information stored in the structure $(a \rightarrow a |c)$. This means that information is stored in (c) . Next time that the atom faces an environmental transition $(E^0 \rightarrow E^+)$, it uses the information bank to deal with the situation. This implies a conversation as a derivative of the previous one. This is demonstrated in Table 3, and Figures 5-6. The Q.C. characters are depicted as rectangular blocks of one or more, (\boxplus) . This depiction intends to show that the orbits put together show decay belonging to a particular element of an atom.

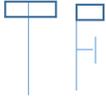
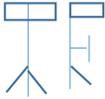
Particle decay sample of dialogues without split	Particle decay sample of dialogues with split
 <p data-bbox="386 499 824 583">Interpretation based on (EM): understanding, alertness, low tonality level. This list is not exhaustive.</p>	 <p data-bbox="850 499 1289 615">Interpretation based on (EM): global vision, plurality, in depth analysis, exploration, low tonality level. This list is not exhaustive.</p>
 <p data-bbox="386 751 824 835">Interpretation based on (EM): understanding, alertness, medium tonality level.</p>	 <p data-bbox="850 751 1289 867">Interpretation based on (EM): global vision, plurality, in depth analysis, exploration, medium tonality level. This list is not exhaustive.</p>
 <p data-bbox="386 1003 824 1087">Interpretation based on (EM): understanding, alertness, higher tonality level. This list is not exhaustive.</p>	 <p data-bbox="850 1003 1289 1142">Interpretation based on (EM): global vision, plurality, in depth analysis, exploration, higher tonality level. This list is not exhaustive.</p>

Table 3. Sample of Q.C. dialogues relating to particle decay

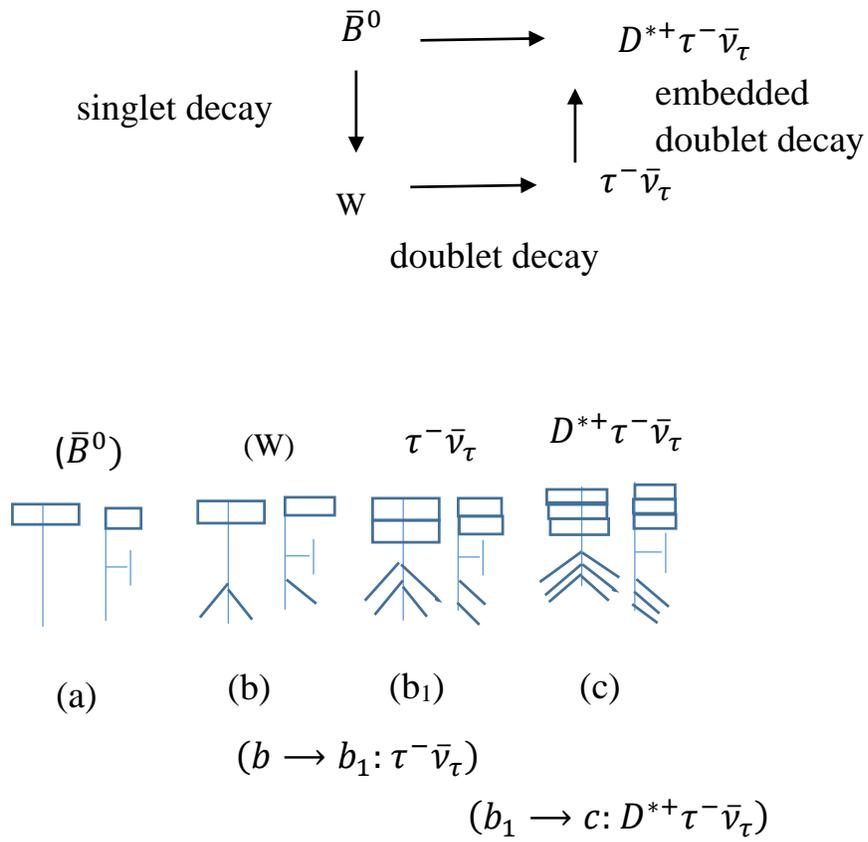


Figure 5. An example of an embedded decay

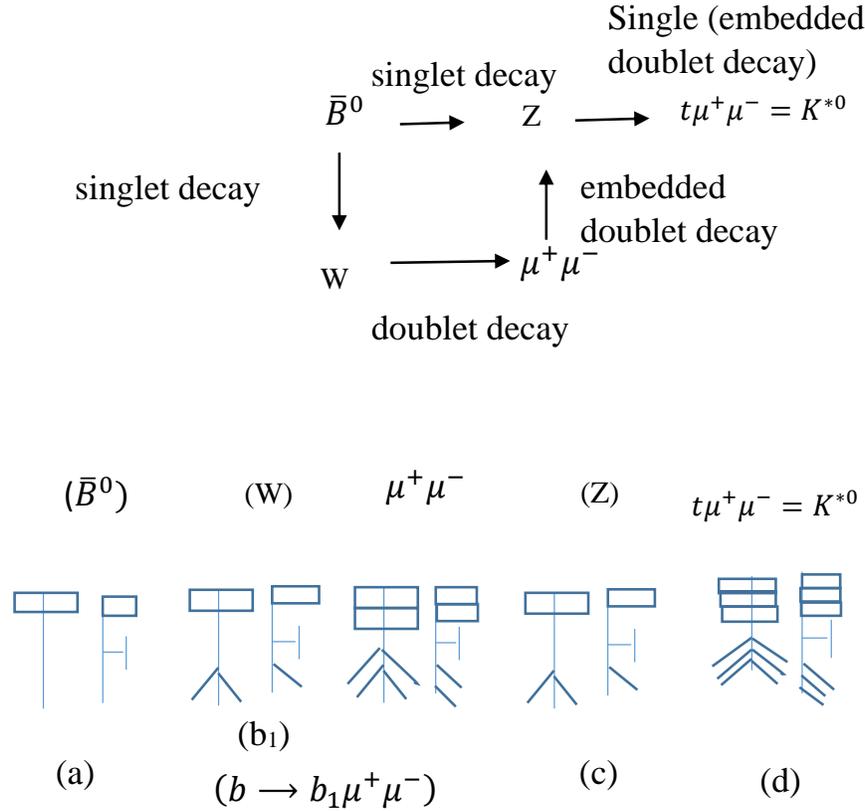


Figure 6. An example of an embedded decay in (E^-)

New Q.C. characters can be constructed as the derivatives of the building blocks Q.C. characters, and based on variations in the values of the spectral terms. Variations of the spectral terms are based on the three parameters, $(\alpha_\mu, \nu_\mu, F_\mu)$. Calculations of the spectral terms based on variations in $(\alpha_\mu, \nu_\mu, F_\mu)$ are given for symmetric orbit spins with and without natural multiple orbital levels, and for the cases of multiple orbital levels due to energy fluctuations, and decay, as well as the non-symmetric cases with similar cases. An example of characters based on the variations in the spectral terms is given in Table 4. It should be mentioned that the particle decay induced splits for particles (ϵ) are given for one particle split, with several orbitals due to energy fluctuations. The case of splitting due to sub-particles is not considered, though it can be

identified and be interpreted based on the (EM) theory. This means that the movement and the actions of sub-particles are used in the EM interpretations, and the corresponding characters can be constructed.

Spectral term (n), the orbital size of (ρ, η) and (ζ) depends on parameter (α_μ) , the gradient effect due to electromagnetic force field, (μ) . In the case of natural multiple orbital spins, that are innate to the structure of an atom, the orbital size is given as $(n = n_{ref} \times (\alpha_\mu)_r)$, where $((\alpha_\mu)_r; r = 1, 2, \dots, R)$ where the number of orbits, (r) takes finite integer values, with the highest value equal to (R) , and (n_{ref}) is the historical average observed value of orbital size (n). In the case of symmetric orbital split due to energy fluctuations or decay, the orbital size is given as $(n = n_{ref} \times \frac{((\alpha_\mu)_r)}{r})$, where the gradient effect is divided by an integer number representing the number of orbital spins. In the case of the non-symmetric natural multiple orbital spins due to energy fluctuations, the orbital size is given as $(n = n_{ref} \times (\alpha_\mu(\lambda_r)))$, where the gradient effect is defined as a geodesic defined as $(\alpha_\mu(\lambda_r) = e^{i \cdot \lambda_r})$, where $(\lambda \in \Re)$ is a real valued vector of parameters. In the case of split due to decay, $(\alpha_\mu(\lambda_\epsilon) = e^{i \cdot \frac{(\lambda_\epsilon)}{\epsilon}})$, where (ϵ) is the decay element.

The shape of orbitals (k) for the symmetric multiple orbital spins is given as $(k = k_{ref} \times (\nu_\mu)_r)$, where $((\nu_\mu)_r)$ is the magnitude of stretch parameter relating to the electromagnetic force, (μ) , and (r) is the number of orbits, and (k_{ref}) is the historical average observed value of the shape of orbits. In the case of symmetric multiple level orbitals, due to energy fluctuations, or decay, the size of orbits are given as $(k = k_{ref} \times \frac{\nu_\mu}{r}; r = 1, 2, \dots, R)$. In the case of non-symmetric multiple orbital spins due to energy fluctuations, the orbital shape is given as $(k = k_{ref} \times \frac{\nu_\mu}{\tau})$, where $(\mu = \mu(\frac{\nu_\mu}{\tau}))$ is the dynamic electromagnetic force per orbital level due to the time variations of the stretch parameter, $(\nu_\tau = \frac{\nu_\mu}{\tau})$ due to the inclusion of time, (τ) . (τ) is the unit of time. In the case of non-symmetric multiple orbital spins due to decay, the shape of an orbit is given as $(\nu_\epsilon = \frac{\nu_\mu}{\epsilon}; \epsilon = 1, 2, \dots, \xi)$,

where (ϵ) is the number of decay particles, with the maximum number of particle split equal to (ξ) . The spectral number (m) , represents angular magnetic moment for the symmetric multiple orbital spins is given as $(m = m_{ref} \times (F_\mu)_r)$, where (m_{ref}) is the historical average observed value of the angular magnetic moment. $(F_\mu = \frac{F}{p_\mu})$, where (F_μ) is a dynamic gravitational force, per orbital diameter, (p_μ) . (F) is the gravitational force. The case of symmetric multiple level orbitals, due to energy fluctuations, or decay, the size of orbits are given as $(m = m_{ref} \times \frac{F_\mu}{r}; r = 1, 2, \dots, R)$. In the case of non-symmetric multiple orbital spins due to energy fluctuations, the orbital shape is given as $(m = m_{ref} \times \frac{F_\mu}{r})$. In the case of non-symmetric multiple orbital spins due to decay, the size of an orbit is given as $(m = m_{ref} \times \frac{F_\mu}{\epsilon}; \epsilon = 1, 2, \dots, \xi)$ An example of various formulations of the spectral terms are shown in Table 4.

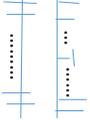
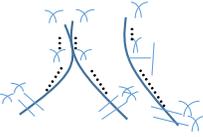
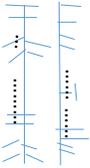
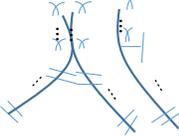
<p>Symmetric orbital spins : r-tuplet case</p>  $\begin{pmatrix} n_\rho = \alpha_\mu \\ k_\rho = \nu_\mu \\ m_\rho = F_\mu \end{pmatrix}; \begin{pmatrix} n_\eta = \alpha_\mu \\ k_\eta = \nu_\mu \\ m_\eta = F_\mu \end{pmatrix}; \begin{pmatrix} n_\zeta = \alpha_\mu \\ k_\zeta = \nu_\mu \\ m_\zeta = F_\mu \end{pmatrix}$	<p>Non-symmetric multiple orbital spins: r-tuplet case due to decay (ϵ) particles</p> 
<p>Symmetric multiple orbital spins: r-tuplet case</p>  $\begin{pmatrix} n_\rho = \frac{\alpha_\mu}{r} \\ k_\rho = \frac{\nu_\mu}{r} \\ m_\rho = \frac{F_\mu}{r} \end{pmatrix}; \begin{pmatrix} n_\eta = \frac{\alpha_\mu}{r} \\ k_\eta = \frac{\nu_\mu}{r} \\ m_\eta = \frac{F_\mu}{r} \end{pmatrix}; \begin{pmatrix} n_\zeta = \frac{\alpha_\mu}{r} \\ k_\zeta = \frac{\nu_\mu}{r} \\ m_\zeta = \frac{F_\mu}{r} \end{pmatrix}$	$\begin{pmatrix} n_\rho = \frac{(\alpha_\mu (\lambda_\epsilon))}{\epsilon} \\ k_\rho = \nu_\epsilon \\ m_\rho = \frac{(\frac{F_\mu}{\tau})}{\epsilon} \end{pmatrix}; \begin{pmatrix} n_\eta = \frac{(\alpha_\mu (\lambda_\epsilon))}{\epsilon} \\ k_\eta = \nu_\epsilon \\ m_\eta = \frac{(\frac{F_\mu}{\tau})}{\epsilon} \end{pmatrix};$ $\begin{pmatrix} n_\zeta = \frac{(\alpha_\mu (\lambda_\epsilon))}{\epsilon} \\ k_\zeta = \nu_\epsilon \\ m_\zeta = \frac{(\frac{F_\mu}{\tau})}{\epsilon} \end{pmatrix}$
<p>Non-symmetric orbital spins : r-tuplet case due energy fluctuations: r levels</p>  $\begin{pmatrix} n_\rho = (\alpha_\mu (\lambda_r)) \\ k_\rho = \nu_\tau \\ m_\rho = \frac{(\frac{F_\mu}{\tau})}{r} \end{pmatrix}; \begin{pmatrix} n_\eta = (\alpha_\mu (\lambda_r)) \\ k_\eta = \nu_\tau \\ m_\eta = \frac{(\frac{F_\mu}{\tau})}{r} \end{pmatrix};$ $\begin{pmatrix} n_\zeta = (\alpha_\mu (\lambda_r)) \\ k_\zeta = \nu_\tau \\ m_\zeta = \frac{(\frac{F_\mu}{\tau})}{r} \end{pmatrix}$	

Table 4. An example of various formulations of the spectral terms

Characters relating to split represents the levels of (n, k, m) for each new ele-

ment (μ) due to the existence of a dynamic electromagnetic force, (α_μ, ν_μ) , and to a lesser degree the dynamic gravitational force, (F_μ) , which causes disintegration variations in Q.C. occur as a result of the different combinations of the (core radiant electron) actions, due to change in the parameters, $(\alpha_\mu, \nu_\mu, F_\mu)$. For example, a dialogue in Q.C. could be a combination such that the proton has changed orbit (with split level change), and the neutron follows change of orbit (without split level change) thus stay stationary, but the radiant electron does not react to the agitated state of the core, and therefore, no decay and no split level change are produced. These variations in Q.C. are not given in Q.C. block character Tables. These Tables cover basic cases of the (core, radiant electron), (ρ, η) , and (ζ) behaving in unison.

The tonality of Q.C., is defined by different levels of the spectral term of an atom, (n, k, m) as is shown in Figure 7.

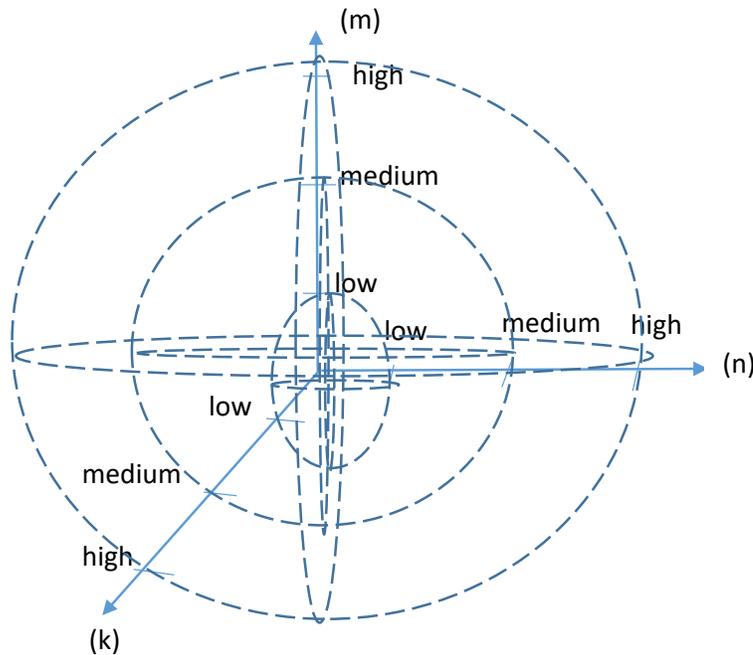


Figure 7. Tonality of Q.C.

In Figure 7, the orbits represent the tonality of Q.C. Low orbits represents cases without decay, and indicate normal conversation. These type of conversations relate to routine actions that include generally the maintenance of the memory bank of an atom. This includes sorting out events irrespective of the time (instance) of their occurrences. Memory is stored in the anti(space,time) region, (Z^M) , where (M) represents dimension, and it relates to different combinations of (syntax, tonality). Each time an atom is faced with an stimulus due to either an internal or an external disturbances, it looks into the memory bank to state and confirm the appropriate dialogue and its' possible consequences. This is explained in details in the next section. The anti (space,time) region, is described in depth in the next section. Medium orbits relate to the occurrence of consequential (internal,external) disturbances and relate to a different grid levels in the anti(space,time) region. Each level of the (Z^M) , grid produces different effects. This is due to the Q.C. High orbits relate to the occurrences of violent or (aggressive) (internal,external) disturbances and relate to a level in the grid in the anti (space,time) region. The anti (space,time), is explained in details in the next section. Syntax, and tonality in anti (space,time), is mathematically represented by differential manifolds consisting of tangent bundles demonstrated in the theoretical section.

The objective of establishing the building blocks of Q.C. is to be able to predict the effects based on the interpretation either through embodied meaning or a combination of logic and reasoning of the effects and thus the next steps and all the possible steps afterwards. It gives us a window to the internal continuous dynamics of atoms, without having to look at it at an instant of time. If we know how atoms live, then maybe it is possible to negotiate through Q.C. new advancements that do not involve aggressive and violent approaches such as forced disintegration, photon attacks and so on. A good example of Q.C. in general is the Brownian movement shown in Figure 8. It is shown [13], that in a liquid each particle behaves independent of the other particles. This is associated with

elements such as Temperature (T), of the liquid, (K), the viscosity level, and the osmotic pressure (P). In this paper, it is claimed that the environment identified by (T,K,P) is only one aspect of the atoms' behavior. There is another aspect of the atoms' behavior and that is the internal conversation among the various elements of an atom(ρ, η, ζ), and the external conversation among the atoms of a solute molecule that in fact determines how the particles of the solute react to the environment, and that could account for the independent behavior of each particle.

Let's take the case of how sugar molecules behave in a sugar-water solution. According to observations, the sugar solution has a density that corresponds to the mixture of sugar ($C_n(H_2O)_{n-1}$) and water ((H_2O)), although the viscosity is ($1\frac{1}{2}$) times greater than it would have been due to suspension of an equal mass of sugar. The molecular theory can not provide a comprehensive explanation since the only reasonable explanation would be that the sugar molecules present in the solution limit the mobility of the water immediately adjacent to them. Therefore, the volume of water is approximately ($\frac{1}{2}$) the volume of the sugar molecule that bonds onto it.

In the present paper, another explanation is possible, using Q.C. The water atom is carrying an internal dialogue among (ρ, τ) and (ζ). Each Hydrogen atom in a water molecule, (H_2O) is in internal and external conversation, as well as the oxygen atom. The same is valid for the Carbon atom and the Hydrogen and Oxygen atoms of the sugar molecule, ($C_n(H_2O)_{n-1}$). For the purpose of this example, the details of the conversation among the atoms of each water and sugar molecule are omitted, and only the outcome of the internal and external conversations are stated. Therefore, the dialogue among (ρ, η) and (ζ) in this example, represents the outcome of dialogue among the atoms of each molecule. The dialogue of a water molecule is dependent on the dialogue of the sugar atom. For example let's say that initially the water atom has the following dialogue as

is shown in Figure 8(a). In 8(a), the core (ρ, τ) 's spin is singlet with no split level change. Using the concept of embodied meaning this could indicate stability, peace of mind, no fear, and trust. Other interpretations are possible. The radiant electron also asserts the same. In this dialogue both the core and the radiant electron are in accordance. This conversation changes as a function of how the core of the water atoms interprets the dialogue of the sugar atom $(C_n(H_2O)_{n-1})$. The interpretation is designated by a homeomorphic function $(\varphi(\rho, \eta, \zeta)_{C_n(H_2O)_{n-1}})$ that connects the behavior of sugar to the corresponding point of the water molecule, shown in 8(b).

In 8(b), the core (ρ, η) has a triplet spin with level splits. The interpretation of this behavior is worry, unrest, discomfort, and other concepts along this line that can be interpreted given the embodied meaning approach. In this case the interpretation adopted is worry. The radiant electron (ζ) , shows somewhat a similar behavior, with a doublet spin, and (2) level splits. Although (ζ) , seems to be less worried based on the number of spin changes and the number of split levels. The homeomorphic function $(\varphi(\rho, \eta, \zeta)_{C_n(H_2O)_{n-1}})$, connects the radiant electron of the sugar molecule to the radiant electron of the water molecule as is shown in 7(c). The two radiant electrons show similar behaviors. In 7(d), the water molecule draws from its memory bank of past experiences dealing with the behavior of sugar and sugar like molecules represented by function (ι) to find an appropriate response to sugar molecule. Function (ι) is a mapping from the state 7(b) to state 7(d). 7(e), and 7(f) show entire conversation process of both the water and the sugar molecules. The interpretation function $(\varphi(\rho, \eta, \zeta)_{C_n(H_2O)_{n-1}})$ is not unique. There are many possibilities of interpretations that can produce different outcomes in a dialogue. Each water molecule interprets the dialogue of the sugar molecule differently and that could explain the individual behavior in terms of random trajectory of sugar molecules in water. (φ) is the syntax of the Q.C. and thus is a group of Embodied Meaning characters that produce the for this case. The exact form of (φ) is given as the collection of syntax pieces,

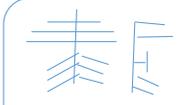
(S_0, S_1, S_2, S_3) , and sub-syntax (S_0, S_1, S_2) given by the homeomorphism function (ι) . Thus $(\varphi = (S_0, S_1, S_2, S_3) \wedge (S_0, S_1, S_2))$, and the outcome of this homeomorphic transition is the mixture (water,sugar) which is a modified syntax of a new Q.C., (S_0, S^*) .

 S_0 , (initial state), of water
 $(H_2O) ((\rho, \eta), (\zeta))$ (a)

 \rightarrow 
 $\varphi(\rho, \eta, \zeta)_{Cn(H_2O)n-1}$

S_0 , (initial state), of water $(H_2O) ((\rho, \eta), (\zeta)) \xrightarrow{(\iota)} S^*$, (final state), of water $(H_2O) ((\rho, \eta), (\zeta))$ (b)

$\varphi(\rho, \eta, \zeta) - Cn(H_2O)n - 1 :$  (c)
 $Cn(H_2O)n - 1$

 \rightarrow  (d)
 $\iota(\rho, \eta, \zeta)_{(H_2O)}$
 (H_2O)

 S_0  S_1  S_2  S_3 (e)
 (H_2O) Q.C of water

 S_0  S_1  S_2 (f)
 $Cn(H_2O)n - 1$ Q.C of sugar

Figure 8. A sample of Q.C.

2 Theoretical aspects of the Quantum Conversation

This section explores the theoretical aspects of Q.C. In the previous section sets of interpretations were introduced as the basis tensors of Q.C. manifolds. Spin orbitals are considered to be manifolds, with their corresponding topologies. Let each set of the vector fields be represented as $(v_j^{(i)} \subset V)$; where (V) is the space of all possible vector groups of interpretations and (i) is the number of possible interpretations based on the evolution of syntax, (j) is the degree of the tonality of each (EM) group of type (i) . $(v_j^{(i)})$ is a sub vector group in the space of all possible vector groups. Let there exist a set (X) ; $(X \subset W)$, where (W) is the space of all mappings from $(V \rightarrow W)$ such that any point $(x_j^i \in X)$, is a mapping $(x_j^i = v_j^i \rightarrow a_j^i v_j^i)$ expressed alternatively as $(x_j^i = v_j^i \rightarrow P(v_j^i))$, where $(P(v_j^i) \subset W)$. $(X = X(P(v_j^i)))$, $(X \subset W)$, and $(x_j^i \in X)$. The combination (V, X) constitutes a topological space. Manifolds $(M^{(i)}(V, X))$, are referred to as Embodied Manifolds, (EM). As standard manifolds, (EM)s possess open balls defined with Poisson boundaries around each $(x_j^{(i)} \in M^{(i)}(V, X))$. Each (EM) manifold $(M^{(i)}(V, X))$, has a specific set of (EM) tensors $(x_j^{(i)} \in M^{(i)}(V, X))$ as its' basis. Each point on an (EM) manifold $(M^{(i)})$, has coordinates $(\mu_{(j)}^{(i)} \in M^{(i)}(V, X))$ where $(\mu_{(j)}^{(i)} = (n_{(j)}^{(i)}, k_{(j)}^{(i)}, m_{(j)}^{(i)}))$, where each (i) represents an (EM) group based on syntax variations, and (j) represents a group of degrees of tonalities for each syntax based (EM) groups. Sub-groups of each (EM) group (i) , $(\mu_{(j')}^{(i)}; (j') \in (j))$, where $((j) \subset J)$, and (J) is the space of all tonalities are obtained by including sub-groups $((j'))$ of the degree of freedom of tonalities. Therefore, for each syntax group (i) , there exists $((j'))$ degrees of freedom of tonalities. Degrees of freedom of tonalities consist of variations in the (EM) characters relating to the syntax that represent group (i) , caused by the number of (j') of direct and indirect external elements. For each syntax group (i) there exists a maximum of (J)

degrees of freedom.

Sub-groups with sub-levels constitute differential manifolds that allow movement from one state of an atom to another state of an atom that can not be observed. An example of such a construction is given. The following is an example of a (syntax, tonality) sub-group represented as points $(x_{(j')}^{(1)}|_{(s)})$, where (s) represents sub-levels of tonalities of sub-group (j') , constituting (EM) manifold types $(M_{(j')}^{(i)}|_{(s)})$. For example, this sub-group could represent an atypical behavior such as atom's behavior in a dense liquid with multiple density zones. In this case the syntax groups (i) corresponds to an atom's reaction to the nature of the liquid, and multiple density zones specify the tonality sub-groups (j') sub-levels (s). The (EM) manifold for this sub-group is represented as $(M_{(j')}^{(i)}|_{(s)})$. $(M_{(j')}^{(i)}|_{(s)})$, can be constructed as (EM) differential manifolds. (EM) differential manifolds are constructed as follows: let $(x_{(j')}^{(1)}|_{(s)})$ represent points on the (EM) manifold $(M_{(j')}^{(1)}|_{(s)})$ with coordinates $(\mu_{(j')}^{(1)}|_{(s)})$. To demonstrate the construction of these differential manifolds, let's limit the syntax to group (1). let (1) be the syntax sub-group ($i = 1$) representing the sub-group (i) that corresponds to the reaction of the elements of an atom, (ρ, η, ζ) to the engulfing liquid. The coordinates of this points are $(\mu_{(j')}^{(1)}|_{(s)} = (n_{(j')}^{(1)}|_{(s)}, k_{(j')}^{(1)}|_{(s)}, m_{(j')}^{(1)}|_{(s)})$, where $(\mu_{(j')}^{(1)}|_{(s)})$ are obtained as a mapping $((n_{(j')}^{(1)}|_{(s)}, k_{(j')}^{(1)}|_{(s)}, m_{(j')}^{(1)}|_{(s)}) \rightarrow T(\mu_{\{j'\}}^{(1)}|_{(s)})$, where $(T(\mu_{\{j'\}}^{(1)}|_{(s)}) = \sum_{s^*=1}^{S'} s^*(1)_{\{j'\}} \times \mu_{\{j'\}}^{(1)}|_{(s)})$, where $(T(x_{\{j'\}}^{(1)}\mu_{\{j'\}}^{(1)}|_{(s)}))$ is a tensor of $(s^* \in s)$ sub-groups ($S' \subset S$), where (s^*) is the sub-level tonalities,(degrees of freedom) of sub-group (j') is a direct and indirect external elements of the liquid, such as density, the ambient temperature, particles in the atmosphere around the liquid, are some examples of what can be reacting with (ρ, η) and (ζ) of an atom. A differential manifold becomes a differential tensor manifold formulated as $(M_{(j')}^{(i)}|_{(s)} = g^{(i)}(T_{(j')}^{(i)}|_{(s)}))$, where $(g^{(i)}(T_{(j')}^{(i)}|_{(s)}) = \frac{\partial T_{\{j'\}}^{(i)}|_{(s)}}{\partial s^{(i)}})$, where $(g^{(i)}(T_{(j')}^{(i)}|_{(s)}))$ is a differentiation of the (EM) manifold $(M_{(j')}^{(1)}|_{(s)})$ based on sub-levels of the degrees of freedom (s) , $(s \in S)$. An example of a tensor for group ($i = 1$) is given. $(g^{(1)}(T_{(j')}^{(1)}|_{(s^*)}))$, can be presented in a matrix form of size $(J' \times S')$ as follows:

$$g^{(1)}(T_{(j')}^{(1)}|_{(s^*)}) = \begin{pmatrix} \frac{\partial T_1^{(1)}}{\partial s_1^{*(1)}} & \cdots & \frac{\partial T_1^{(1)}}{\partial s_{S'}^{*(1)}} \\ \cdots & \cdots & \cdots \\ \frac{\partial T_{j'}^{(1)}}{\partial s_1^{*(1)}} & \cdots & \frac{\partial T_{j'}^{(1)}}{\partial s_{S'}^{*(1)}} \end{pmatrix}$$

($J' \subset J$) where (J) is the space all tonality groups, and (J') is the sub-space of tonalities. Orbital split level change in (ρ, η) and (ζ) can be considered as a slicing of the differential tensor manifold ($M_{(j')}^{(1)}|_{(s^*)}$) followed by a (jump). Slicing procedure can be formulated as : ($M_{(s^*)\{j\}}^{(1)} = g^{(1)}(T^{(1)})' \otimes (\delta^{(1)})$), where ($g^{(1)}(T^{(1)})'$) is the transpose of the differential tensor in matrix form of size ($S' \times J'$), and ($\delta^{(1)}$) is a matrix of variations of size ($J' \times S'$) in tonality levels ($\{j'\}$) for each member of the sub-level (s^*) of groups of syntax type ($i = 1$).

$$g^{(1)}(T^{(1)} = \begin{pmatrix} \delta_{1,1}^{(i)} & \cdots & \delta_{1,S'}^{(i)} \\ \cdots & \cdots & \cdots \\ \delta_{J',1}^{(i)} & \cdots & \delta_{J',S'}^{(i)} \end{pmatrix}$$

In general for each syntax group type (i), each slice of the (EM) manifold ($(M_{(s)}^{(i)}|_{\{j\}})$) is represented as a matrix of size ($J \times S$) obtained by the following operation: ($(M_{(s)}^{(i)}|_{\{j\}} = (g^{(i)}(T^{(i)}))_{(J \times 1)} \otimes (\delta^{(i)})_{(1 \times S)}$). A column of the matrix ($(g^{(i)}(T^{(i)}))_{(J \times 1)}$) is multiplied by a row of the matrix ($(\delta^{(i)})_{(1 \times S)}$). Slices ($(M_{(s)}^{(i)}|_{\{j\}})_{(J \times S)}$) have different shapes due to the qualitative changes caused by tonality levels (j), and sub-levels (s). This provides quantitative information about the behavior of (ρ, η) and (ζ) that gives variations in the formation of the (EM) Q.C. characters, and changes the interpretation of the syntax group of type (i). The metric (α_μ) can be calculated as ($e^{-i.z(\lambda)}$), where ($\lambda \in \mathfrak{R}$). Jumps are calculated as follows: let ($\hat{k} = [(n \times \alpha_\mu) + (k \times \nu_\mu) + (m \times F_\mu)]$), where (n, k, m) are the principal quantum number, the subordinate quantum number, and the magnetic quantum number. The variable (α_μ) is a metric related to (μ), where (μ) is the electromagnetic field, (ν_μ) is a dynamic electromagnetic force per unit of time, and (F_μ) is a dynamic

gravitational force (per orbital diameter). Let (Ω) represents a surface on the orbital of an atom, $(\Omega \subset (M_{(s)}^{(i)} |_{\{j\}}))$. In general, (Ω) is different for each $(\rho), (\eta)$ and (ζ) due to (μ) , but the case where there are variations in (Ω) is not explored in this paper, rather it is assumed that $(\rho), (\eta)$ and (ζ) follow the same magnitude of change due to $(\alpha_\mu), (\nu_\mu)$, and (F_μ) .

Let $(\delta(\Omega))$ represent the boundary points of the orbital surface (Ω) , $(\Omega \subset (M_{(s)}^{(i)} |_{\{j\}} \in W \setminus \{0\}))$. Let $(\delta(\Omega))$ represent a Poisson boundary, thus would allow the existence of probability, and probability measure. The probability is expressed in terms of the density level of points on each surface (Ω) , given that the boundaries are not fixed and change in diameter, thus a metric can be obtained as a geodesic by considering that each surface contains $(\gamma_{x,y})$ curves for each pair of points (x,y) . Let $(\Omega \rightarrow \Omega(\lambda))$, and $(\delta(\Omega) \rightarrow \delta(\Omega)(\lambda))$, where $(\lambda \in \mathfrak{R})$, and let $(d(z(\lambda)), \delta(\Omega)(\lambda))$ be the distance between any point $(z(\lambda) \in [x,y])$, where $([x,y] \in \gamma_{x,y}(\lambda))$ are points on curves functions of (λ) , and a point on the boundary $(\delta(\Omega)(\lambda))$ of region $(\Omega)(\lambda)$. The assumption of Poisson boundary $(\delta(\Omega))$ allows for the existence of a probability based on geodesics that are considered as the shortest curves between a pair of points $((x,y) \in \gamma_{x,y})$, on all curves that connect point (x) to point (y) , $(\gamma_{x,y} \in \Omega)(\lambda)$. Let $(\dot{\rho}(z))$ be the probability that there exists geodesics in region $(\Omega)(\lambda)$. $(\dot{\rho}(z))$ can be calculated as: $(\dot{\rho}(z) = \frac{\int_{\{\gamma_{x,y}\}} d(z(\lambda)), \delta(\Omega)(\lambda)) \partial(\lambda)}{\int_{\{\gamma_{x,y}\}} d(z(\lambda)), \delta(\Omega)(\lambda)) \partial(\lambda)})$, where $(\int_{\{\gamma_{x,y}\}} d(z(\lambda)), \delta(\Omega)(\lambda)) \partial(\lambda)$ represents geodesics for each pair (x,y) , and $(\gamma_{x,y})$ are all other curves connecting each pair (x,y) [16]. The subscript (μ) is omitted in order to simplify the formulation and should be assumed as implied. Let $(f_z(\lambda) = \dot{\rho}_z(\lambda) \cdot \hat{k}_z(\lambda))$, where $(\hat{k}_z(\lambda) = [(n \times e^{-i \cdot z(\lambda)}) + (k \times \nu_\mu + (F_\mu \times m))])$. Let the point (z^*) be perpendicular to point (z) $(z^* \perp z)$, and let (z^*) be a point between points (x^*) , and (y^*) , $(z^* \in (x^*, y^*))$, and $((x^*, y^*) \in \gamma^*(x^*, y^*))$ where points (x^*, y^*) are on curves $(\gamma^*(x^*, y^*) \in \Omega(\bar{\lambda}) \lambda \neq \bar{\lambda})$. Let $(\hat{k}_z(\bar{\lambda}) = [(n \times e^{-i \cdot z^*(\bar{\lambda})}) + (k \times \nu_\mu) + (F_\mu \times m)])$, where (ν_μ) , and (F_μ) are assumed fixed here but in general can vary to produce new forms of (EM) characters.

Region $(\Omega(\bar{\lambda}))$ is within a vertical distance from region $(\Omega)(\lambda)$, and possesses a poison boundary, $(\delta(\Omega)(\lambda))$, thus retaining the same characteristics as region $(\Omega)(\lambda)$. The jump is calculated by applying the following: let $(\alpha'_z(\lambda) = \frac{\partial \alpha_z(\lambda)}{z(\lambda)})$, and let $(T_{z^*}^*(\bar{\lambda}) = \alpha'_z(\lambda) = \frac{\partial \alpha_z(\lambda)}{z(\lambda)})$, then the jump is (given as $g(\bar{\lambda}) = T_{z^*}^* \cdot \dot{\rho}(z^*)$), where $(\dot{\rho}(z^*) = \frac{\int_{\{\gamma_{x^*, y^*}\}} d(z(\bar{\lambda}), \delta(\Omega(\bar{\lambda})) \partial(\bar{\lambda}))}{\int_{\{\gamma_{x^*, y^*}\}} d(z(\lambda), \delta(\Omega)(\lambda)) \partial(\lambda)})$ and $(\langle f(\lambda), g(\bar{\lambda}) \rangle = 0)$.

Each spin orbital represents a Q.C. segment. Any change in the spin orbital shape occurs due to an initial disagreement between (ρ, η) and (ζ) . Change in the spin orbital level occurs when there is a disagreement between (ρ, η) and (ζ) that requires more than change in the orbital shape, mainly it can only resolve in an action which is assumed to be ultimately a jump in the orbital level. Change in the orbital level can be represented by new manifolds with differential groups tensor fields, $(T_{(s)}^{(i)} |_{\{j\}})$, multiplied by a probability measure $(\dot{\rho}_{(s)} |_{\{j\}})$ for each element of an atom, the core (ρ, η) , and the radiant electron, (ζ) . When there exists a disagreement between the core (ρ, η) , and the radiant electron, (ζ) , this implies that the Q.C. syntax of (ρ, η) , is different from the Q.C. syntax of (ζ) . In this case, change occurs as a result of the intersection of two manifolds. Change in the shape of spin orbital is represented as a manifold made out of the product of two manifolds. Let $((M_{(s)}^{(i)} |_{\{j\}}))$ be one manifold, with points $(x_{(s)}^{(i)} |_{\{j\}})$. The (EM) manifolds, $((M_{(s)}^{(i)} |_{\{j\}} \subset \mathbb{Z}^M))$ are in a complex space of dimension (M). The points $(x_{(s)}^{(i)} |_{\{j\}})$ represent a Q.C. with syntax group type (i), tonality level group (j), and sub-level group (s) between (ρ, η) and (ζ) . Let $(y_{(s')}^{(i')} |_{\{j'\}})$ where $((i') \neq (i); (s') \neq (s); (j') \neq (j);)$ belong to another (EM) manifolds $((M_{(s')}^{(i')} |_{\{j'\}}))$. The (EM) manifolds $((M_{(s')}^{(i')} |_{\{j'\}} \subset \mathbb{Z}^N))$ are in a complex space of dimension $(N \neq M)$. The points $(y_{(s')}^{(i')} |_{\{j'\}})$ represent segments of a different syntax based Q.C. that possess different tonality group (j'), and different sub-level group (s'), between (ρ, η) and (ζ) . The multiplicative (EM) manifolds are in the complex space of dimension $(M \times N)$. Every mapping in the ensemble of the mappings possesses an augmented dimension $((M \times N))$. In other words, let the mapping onto the

multiplicative space be represented as $(\varkappa = f_1(x_{(s)}^{(i)}|_{\{j\}}) \rightarrow V \in (M \times N))$, and let $(\varphi = f_2(y_{(s')}^{(i')}|_{\{j'\}}) \rightarrow V \in (M \times N))$; then the product $((\varkappa, \varphi) = (f_1) \otimes (f_2))$ has dimension $((M \times N))$. In terms of Q.C., product manifolds have a higher dimension. This means that in the case of change in spin orbitals shape, there exists a dynamic Q.C. between (ρ, η) and (ζ) that creates extra information designated by the higher dimension $((M \times N))$. This higher dimension is the reason for the orbital shape change.

The importance of mathematical formulation is that the (EM) characters derived from the basic building blocks of characters introduced earlier vary depending on the nature of the dialogue, and the related syntax and tonality used as is common in all languages. It is important to design tools that translate (syntax, tonality) into formulation based on known physical characteristic of an atom. This would provide a venue for experimentation that would allow a better understanding of the behavior of an atom. The transition from observing the physical behavior of an atom to understanding their Quantum Conversation (Q.C.), is done by using the following approach. It is assumed that the Q.C. is a transition from an observed (space, time), (s_r, t_r) to an unobserved (anti-space, anti-time), (s_a, t_a) domain. The (s_a, t_a) dimension is the dimension that is not impacted by the (space, time) continuum, rather, its' dimension depends on causality, and perception derived from syntax, and tonality, where perception is a construct based on the (EM). Therefore, (s_a, t_a) is equivalent to (syntax, tonality) domain with dimension equivalent to syntax groups (i), and tonality group levels (j) derived from the physical movements of the elements of an atom to represent variations in (s_r, t_r) .

The advantage of transition from (s_r, t_r) to (s_a, t_a) is that it allows, through the diversity of a dialogue, and the complexity of the syntax ([10]), and tonality, to imagine physical behavior that can not be observed in (s_r, t_r) without special manipulation such as photon blasts, or temperature and liquid density manipu-

lation. In the Q.C. approach it is the complexity of the syntax, the variation of tonality, and the depth of dialogues that open a window into the general behavior of an atom. Using the Q.C. approach it is possible to introduce theories and concepts that would open new dimensions or hidden dimensions not detected before that exist due to the causal perception of the (EM) approach in Q.C. Causal Perception is the suite of the close up of a conversation. Close up is a term used to refer to a closely viewed in the real and physical domain (s_r, t_r) , of the behavior of the elements of an atom. Causality and causal perception based on (EM) is a homeomorphism from (s_r, t_r) to (s_a, t_a) using the concept of relativity. The observed is the nucleus (ρ, η) watching the radiant electron (ζ) which acts as a sentinel and guards the integrity of the atomic structure. In this case, it is assumed that both the observer and the sentinel can move with respect to each other. Relativity applied in this case is discrete. At each point of the observer which is the core of the atom, (ρ, η) depending on the size and the location of spin, and the split level change (decay), they observe the radiant electron and the movement of all elements in the surrounding environment. Q.C. is the result of the relative movements of (ζ) and other elements with respect to the location of (ρ, η) at the instant when the location of (ρ, η) is fixed. This translates into the (spin, split) of (ρ, η) with respect to the (spin, split) of (ζ) and other elements. Thus due to the equivalence between the causality and restraint relativity, (*causality* \equiv *restraint relativity*). A transfer from $((s_r, t_r) \rightarrow (s_a, t_a))$ is possible through a cohomological operation. Cohomology allows to relate (syntax, tonality) to (space, time). Figure 9, demonstrates the cohomology between (s_r, t_r) , and (s_a, t_a) .

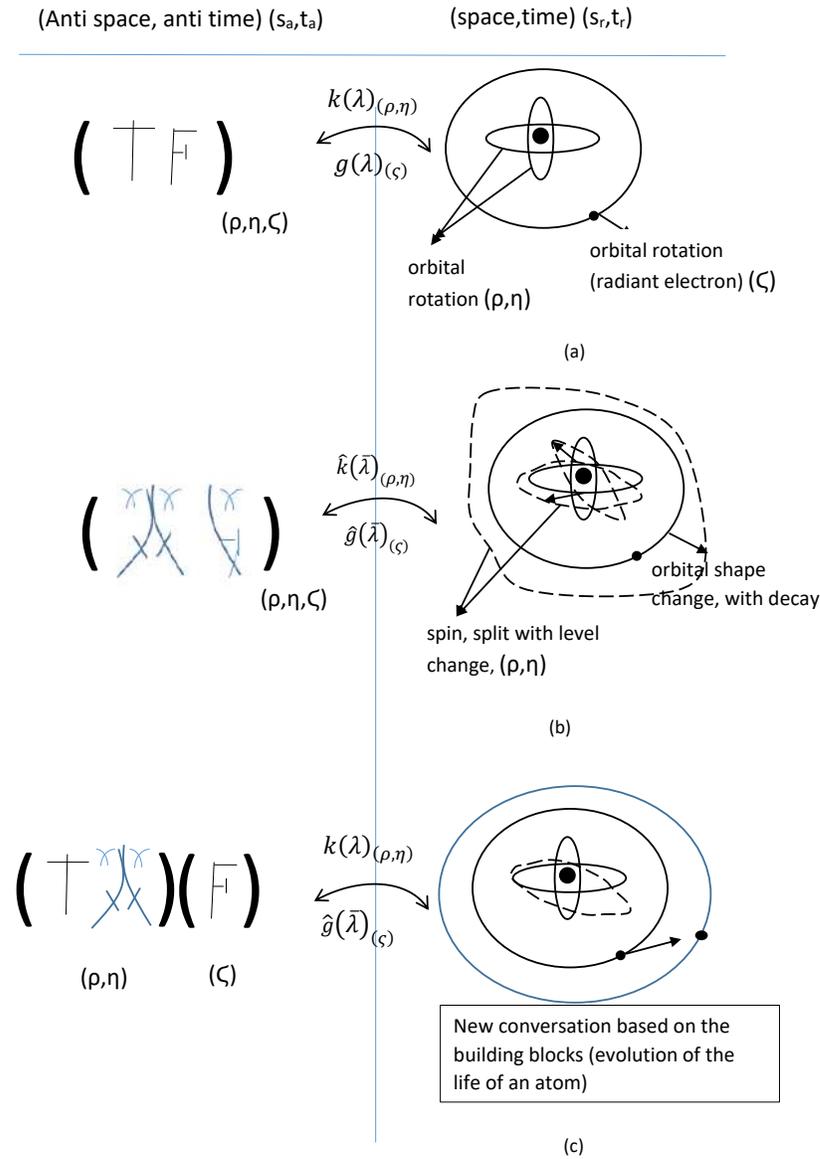


Figure 9. Cohomological transition from (s_r, t_r) , to (s_a, t_a)

Figure 9, demonstrates transition from (s_r, t_r) , to (s_a, t_a) through a cohomological operation. In part (a) of Figure 9, the core (ρ, η) and the radiant electron (ζ) spin, and without any split level change and any spin level or size change is interpreted in the (s_a, t_a) space as is shown. This transition is done using the following cohomological operation. 1) The values of (n, k, m) are considered as points $(x \in X; X \in \mathbb{R}^3)$. There exists a homeomorphism from $(\mathbb{R}^3 \rightarrow \mathbb{Z}^M; M > 3)$,

there exists a Map ($Map(n, k, m) \rightarrow (k(\lambda), g(\lambda))$), where $((k(\lambda), g(\lambda)) \in \mathbb{Z}^M)$ is a continuous ensemble. The (\mathbb{Z}^M) space includes the vertical displacement manifold $(k(\lambda))$, and the manifold $(g(\lambda))$; thus there exists a continuity of transition. In general, through the cohomological transition it is possible to introduce new previously hidden dimensions that exist due to the (EM) based Causal Perception, (CP) creating Quantum Conversation, (QC). The causal physical properties are transformed to (s_a, t_a) through (2) manifolds, the (jump) manifold $(k(\lambda))$ that contains the (jump) geodesics and the manifold $(g(\lambda))$ representing the geodesics that make up the new spin orbital. Each manifold is defined by a kernel with an appropriate algebraic groups that make up the base of the kernel. The points on $(k(\lambda), g(\lambda))$ are on geodesics that are unique, therefore, they are isomorphic transitions which means that each physical state of an atom corresponds to an specific (Q.C.), syntax and tonality groups. The dimension of any sub-spaces of (s_a, t_a) domain is the number of elements in syntax group (i), tonality group (j), and sub-levels (s) of tonality group (j) involved in (Q.C.).

The (s_a, t_a) space has (2) major axes, spin, and split, as is shown in Figure 10. Syntax, and tonality are both derived from (spin,split), though the (EM) based (CP) process are transferred from (s_r, t_r) to (s_a, t_a) using cohomological transition. Figure 10, demonstrates transition from (s_r, t_r) , to (s_a, t_a) through the homeomorphism ensemble $(k(\lambda), g(\lambda))$ [17]. $(k(\lambda), g(\lambda))$ homeomorphic transition allows for the (syntax,tonality) that reflects the (CP) based understanding of the (spin,split) phenomenon in (s_r, t_r) . This process opens a window to the behavior of an atom and imagines scenarios, previously not possible to conceive. Homeomorphic transition in the (s_a, t_a) domain is the representation of change in the syntax, and tonality. This change is represented as transition anti-spheres. Once in the (s_a, t_a) space the homomorphic spheres represent an outcome based on the (EM) of Causal Perception,(CP). The spheres (referred to from now on as anti-spheres) represent the level of the dynamics of (Q.C) based on (CP) of the observation in (s_r, t_r) .

The anti-spheres either move horizontally or vertically in the grid depending on the changes in (spin,split) function when it is horizontal displacement then it is the tonality representing different stages of (CP), and when it is a vertical displacement, then it is syntax that is representing different stages of (CP). For example, if anti-spheres move horizontally on the spin axis, then it is the spin size that is changing, and when there is vertical displacement, then it is the split level change. Each new anti-sphere on the spin axis is a homeomorphism of degree that corresponds to the location of the anti-sphere on the axis for example, anti-sphere number (2) is a homeomorphism of degree (2), is also depicted in terms of the corresponding characters in Figure 9b, as the homeomorphism $(k(\bar{\lambda}), g(\bar{\lambda}))$. Degree in the (s_a, t_a) grid refers to the number of points on the axis between the reference anti-sphere (1), and the next anti-sphere either horizontally or vertically dislocated. The anti-spheres inside the grid have the same degree of homeomorphism. Horizontally, the degree of morphism refers to the spin size and vertically it refers to split level change. What allows for the movement of anti-spheres are possible due to fiber bundles. Each arrow in the (s_a, t_a) grid represents a differential manifolds of fibre bundles, [18], that reflect variations in (C.P.) not observed due to shortcomings as a result of limitations in the number of experiments.

The anti-spheres that move vertically on the split axis demonstrate split level change the result of the homeomorphism of degree (1), represented by the pair $(\hat{k}(\bar{\lambda}), \hat{g}(\bar{\lambda}))$, with one parameter group change $(\bar{\lambda} \neq \lambda)$. Higher degrees homeomorphisms are possible. This indicates that the morphisms are not isomorphisms and can produce the following results: 1) spin size change without any split level change, 2) spin size change with split level change or decay, 3) split level change (decay) only. It is possible to produce morphisms as a result of the union of two groups of parameters $(\lambda \cup \bar{\lambda})$ which gives morphism of type $(k(\lambda), \hat{g}(\bar{\lambda}))$ depicted as anti-sphere number (4) in Figure 9, and Figure 8c in terms of corresponding

characters. These are the transitory anti-spheres inside of the (spin,split) grid.

The movement of any transitory anti-sphere inside the (s_a, t_a) grid depends on the previous location of the anti-sphere on the (s_a, t_a) grid. Movements within the grid are caused by changes in the C.P. that produce various segments of Q.C., thus each C.P. gives a segment of a Q.C. through change in syntax and tonality, and a sequence of C.P.s such as $((C.P.)_1, \dots, (C.P.)_s)$ makes up a whole (Q.C.). A complete Q.C. in (s_a, t_a) is represented by the movement of anti-spheres. Thus each horizontal progression of spheres in the (s_a, t_a) domain is a possible procession of C.P. events. Each anti-sphere corresponds to a segment of a Q.C. For example, the characters in Figure 9a, correspond to anti-sphere (1) in Figure 10. It is possible to have a combination of anti-spheres to make several segments of a Q.C. and create a complex syntax (such as embedding), Figure 9c, similar to what is used in languages. The translation from anti-spheres to appropriate characters is not isomorphic since each segment of Q.C. is based on using the building blocks introduced earlier that can be used in various permutations and combinations based on C.P. In general there exists several combinations of building block based characters for each segment of a Q.C. as a result of Causal Perception with a kernel in (s_r, t_r) . The corresponding equivalence of each segment of Q.C. characters are anti-spheres and differential manifolds made up of fibre bundles. The reference anti-sphere which is the origin of causal events corresponds to a specific point in (s_r, t_r) . Let's name the points that correspond to the reference anti-spheres in (s_a, t_a) following [19], [20] as Causal Complex Relativity (CCR) points. CCR assumes that there exists a point in (s_r, t_r) that could be considered to be the point of the observer looking on into a complex domain, (Z^M) of a procession of possible events. Procession of vertical events relates to various split changes due to (ζ) evolution that provokes changes in the (spin-split) situation of the observer (ρ, η) . This implies that Figure 9, represents the events after the advent of the observer status of (ρ, η) . The horizontal progression in Figure 10, signifies the reverse status. Here it is

the (ζ) that is the observer, and it is the (ρ, η) that are reacting to events and thus are in action observed by (ζ) that reacts to (ρ, η) and what is shown is the aftermath of such an event. Thus the concept of (CCR).

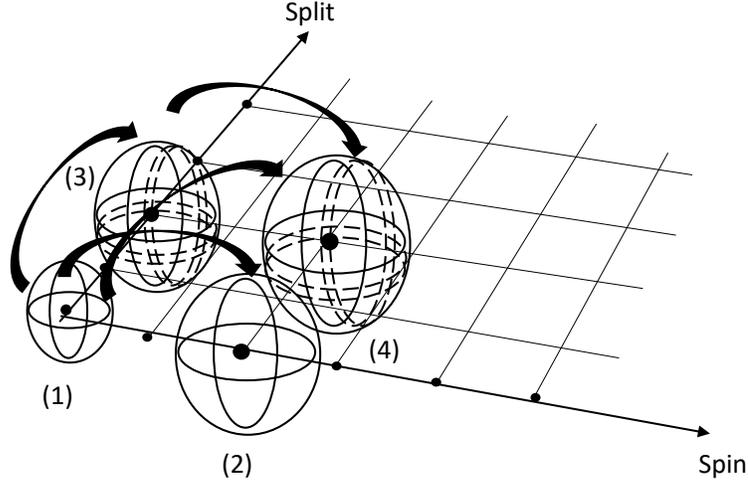


Figure 10. (s_a, t_a) domain depicted as a grid

Figures 11-12, demonstrate transition from (s_r, t_r) , to (s_a, t_a) using cohomological transition complex tensor fibre bundle manifolds, $(k(\lambda) \otimes g(\lambda))$, and displacement within the grid in (s_a, t_a) of spheres is possible based on complex differential tensor hyperplanes, $(\Omega \in M_{(s^*)}^{(i)} |_{(j)})$. It is relevant to analyze the existence of these homeomorphic transitional manifolds, and show their existence, and generalize them to all (CP) based groups of these manifolds. Let the parameter group (λ) be designated as $(\lambda = \{\lambda_1, \dots, \lambda_M\})$. The complex tensor fibre bundle manifolds, $(k(\lambda) \otimes g(\lambda))$ is in the complex space $(\mathbb{Z}^{M \times M})$. The other variables in $(k(\lambda) \otimes g(\lambda))$ which are the electromagnetic force, (ν) , where $(\nu = \{\nu_1, \dots, \nu_M\})$, and the gravitational force, (\mathbf{F}) , where $(\mathbf{F} = \{F_1, \dots, F_M\})$ contribute to the slicing phenomenon. In Figure 12, each transitional manifold is represented as a slice of a more general manifold, which means that (ν) , and (\mathbf{F}) contribute to the slicing

effect. (λ) can be expressed as an $(M \times M)$ matrix form as
$$\begin{pmatrix} \lambda_1 & 0 & \cdots & 0 \\ \cdots & \cdots & \cdots & \\ 0 & 0 & \cdots & \lambda_M \end{pmatrix}.$$

The $(M \times M)$ matrix of (ν) , the electromagnetic force, and the $(M \times M)$ matrix of (F) the gravitational force are designated as follows:

$$\begin{pmatrix} \nu_1 & 0 & \cdots & 0 \\ \cdots & \cdots & \cdots & \\ 0 & 0 & \cdots & \nu_M \end{pmatrix} \text{ and } \begin{pmatrix} F_1 & 0 & \cdots & 0 \\ \cdots & \cdots & \cdots & \\ 0 & 0 & \cdots & F_M \end{pmatrix}.$$

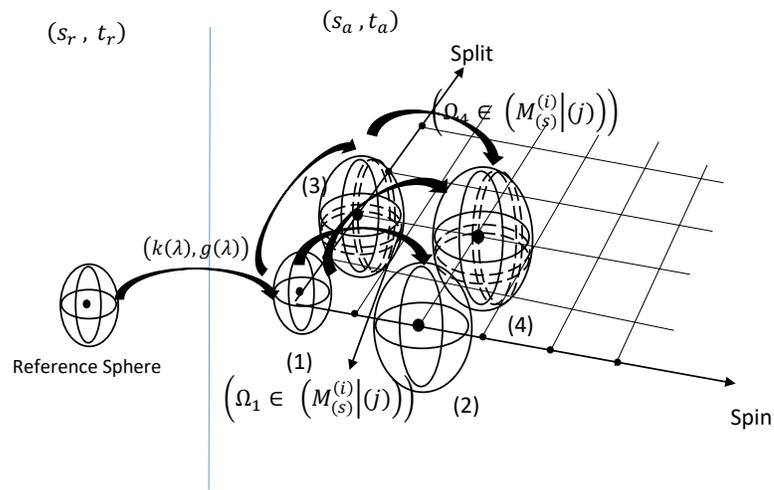


Figure 11. Cohomological transition from (s_r, t_r) to (s_a, t_a) and differential manifolds inside the (s_a, t_a) domain

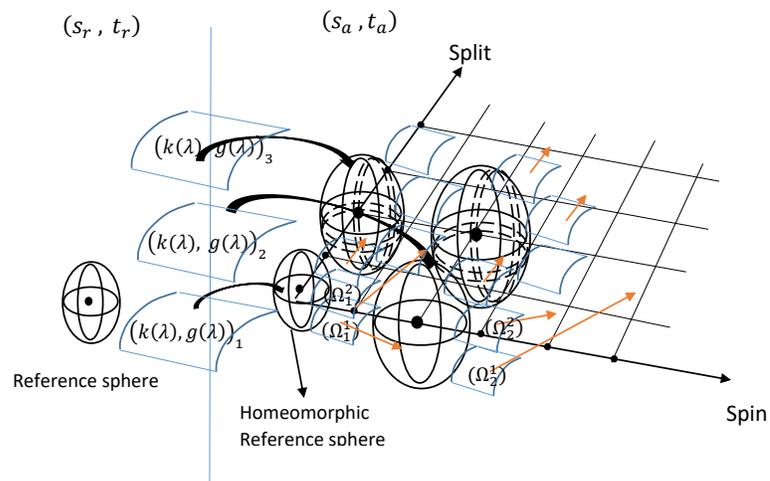


Figure 12. Cohomological transition in the form of manifold slices from (s_r, t_r) to (s_a, t_a)
and differential manifolds inside the (s_a, t_a) domain

Figure 13 demonstrates the homeomorphic chart of transition from (s_r, t_r, \rightarrow) (s_a, t_a) . In this mapping chart, $(k(\lambda))$ is an $(M \times M)$ dimensional complex tensor manifold. $(g(\lambda))$ represent an $(M \times M)$ complex differential tensor manifold that possesses geodesics. $(k(\lambda) \otimes g(\lambda))$ is an $(M \times M)$ dimensional complex hyperbolic manifold. Each row of (λ) constitutes a slice of $(k(\lambda) \otimes g(\lambda))$. Slices represent a variety of possibilities of transition into the (s_a, t_a) domain. This signifies that the reference sphere in (s_a, t_a) can be determined by a sliced $(k(\lambda) \otimes g(\lambda))$. In the (s_a, t_a) domain the multiplicative operation (\otimes) is transformed into (\circ) , and thus is the homeomorphic version in the (s_a, t_a) domain formulated as $(k(\lambda) \circ g(\lambda))$ represents an $(M \times M)$ complex tensor. In Figure 13, the matrix (I_λ) is the identity matrix, and (δ_λ) is the matrix of sub-level groups of the tonality groups (j) . A reference sphere occurs at any point of the grid in (s_a, t_a) . A homeomorphic (s_a, t_a) domain reference sphere is similar to the (s_r, t_r) spheres which are based on the spectral term, (n, k, m) observed within a context of an experiment. The mapping of the spectral term in the anti (space,time), (s_a, t_a) space is based on Causal Perception, (CP) of the movements of the elements of an atom, (ρ, η) , and (ζ) . There is always an initial reference sphere directly obtained by the transitional manifold slices $(\langle k(\lambda), g(\lambda) \rangle)$. The interim spheres, the ones inside the (s_a, t_a) grid have as an initial point (location), the initial reference sphere. The movement inside the (s_a, t_a) grid which represents changes in spin size, and split level are obtained using (CP) based transitional complex tensor fibre bundle manifolds, (Ω_i^i) , where (i) represents the (CP) groups of causal elements due to syntax, and tonality groups, and (l) represents the number of the interim sphere in the grid indicating a point of intersection of (spin), and (split) axis on the grid referring to the level of spin and split. Before analyzing (Ω_i^i) , a theorem is introduced to show the existence of (λ) parameter groups. A second Theorem is introduced to show that (λ) is not unique, and using Thom Isomorphism, there

exists other suitable (λ) parameter groups that account for the existence of slices in (s_r, t_r) .

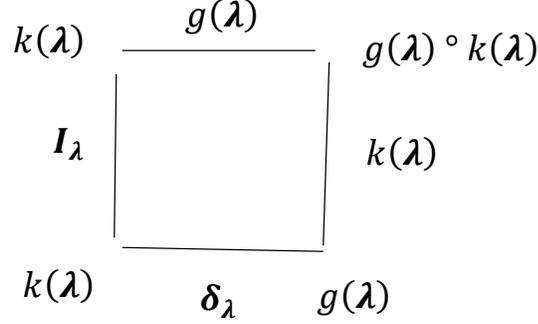


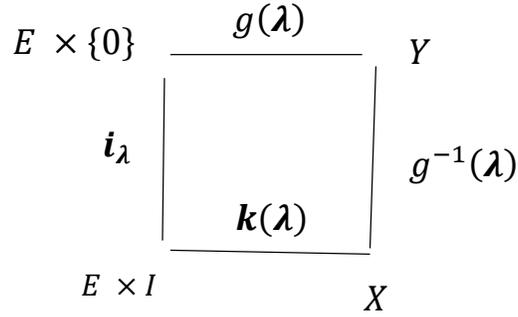
Figure 13. Homeomorphic chart of transition from (s_r, s_r) to (s_a, t_a)

Theorem 1, shows the existence of parameters (λ) in all transitional slices. To refresh the concept, parameter group (λ) are points in $(\mathbb{R}^{(M \times M)})$ real valued $(M \times M)$ tensor space that lies at the intersection of two complex tensor manifolds $(k(\lambda))$ and $(g(\lambda))$ on the geodesics that are fibre bundles of the manifold $(k(\lambda))$. In this case parameter groups (λ) must exist both on a $(\mathbb{Z}^{(M \times M)})$ complex space of manifold $(k(\lambda) \in \mathbb{Z}^{(M \times M)})$, and there exists a $(\mathbb{Z}^{(M-1 \times M-1)})$ complex space of tensor fibre bundles manifold $(g(\lambda) \in \mathbb{Z}^{(M-1 \times M-1)})$. The idea of the proof is to show that (λ) is a basis of any finitely generated free modules in the multiplicative space $(\langle k(\lambda), g(\lambda) \rangle)$. The following is the list of preliminary assumptions. Let (G) be the space of complex tensor groups such that $(G : E \rightarrow (E, X, Y))$, where $(E \subset \mathbb{R}^{M \times M})$, is the space of all (λ) tensors, $(\lambda \in E)$. Let $(X \subset \mathbb{Z}^{M \times M})$ be the space of complex tensors such that $(k(\lambda) \in X)$. Let $(E \subset \mathbb{R}^{(M \times M)})$, and let $(\lambda \in E)$. Let $(X \subset \mathbb{Z}^{(M \times M)})$, and let $(k(\lambda) \in X)$. Let $(Y \subset \mathbb{Z}^{(M-1 \times M-1)})$, and let $(g(\lambda) \in Y)$. Let (G) be the space of compact complex multiplicative tensor groups such that $(G : E \rightarrow (E, X, Y))$, with dimension $(G \subset \mathbb{Z}^{(M \times M-1)})$. Let $(h(\lambda) : E \rightarrow (X \otimes Y))$, and $(h(\lambda) \in G)$, then $(h(\lambda) = (k(\lambda) \otimes g(\lambda)) \cong (k(\lambda) \circ g(\lambda)) \cong (g(k(\lambda))))$ be a finitely generated multiplicative tensor module containing $(\lambda(\nu, \mathbf{F}))$. It is possible to

have a reverse mapping given the existence of $(h(\lambda))$. Let the reverse mapping be represented as $(j_\lambda : (k(\lambda) \otimes g(\lambda)) \rightarrow k^{-1}(\lambda) \otimes g^{-1}(\lambda)) \rightarrow g^{-1}(k^{-1}(\lambda)) \hookrightarrow (E)$ be the inclusion of fibre over $(y \in Y)$. To show the existence of points (λ) in the multiplicative space, must show that every finitely generated multiplicative tensor module that contains (λ) possesses an isomorphism in the form of inclusion of these points over complex tensor fibre bundles. The proof of existence of the point sets (λ) is given in the following Theorem. The Theorem is an adaptation of the Leray-Hirsch Theorem,[21].

Theorem 1. *Let $(\lambda \in X)$ be the basis for the finitely generated multiplicative complex tensor module $(h(\lambda))$. Suppose that $(h(\lambda))$ possesses a reverse mapping (j_λ) such that $(j_\lambda : (E, X, Y) \rightarrow (E))$ be the inclusion of fibre over (λ) . Then any point sets $(\lambda^* \in X)$ that is in $(h(\lambda^*))$ and satisfies the reverse mapping condition $(j_{\lambda^*} : (E^*, X, Y) \rightarrow (E^*))$, where $(E^* \subset E)$ is a point set in the multiplicative space, $(k(\lambda) \otimes g(\lambda))$, and the homeomorphism of $(h(\lambda^*))$, $(\phi : h(X) \otimes h(Y) \rightarrow (E^*))$ modules, defined by $(\phi(\lambda^*) = \sum_{i=1}^M \sum_{j=1}^{M-1} k_i(\lambda_i^*) \otimes g_j(\lambda_i^*) = \sum_{i=1}^M \sum_{j=1}^{M-1} g_j(k_i(\lambda_i^*)))$ is an isomorphism of $(h(\lambda^*))$.*

Proof. Let (λ) be represented by an $(M \times M)$ matrix such that the determinant $(D_\lambda \neq 0)$, all rows and columns of this matrix are independent. For (λ) to exist in the multiplicative space $((k(\lambda) \otimes g(\lambda))$, (2) conditions have to be satisfied: 1) both complex tensor manifolds $(k(\lambda)$ and $(g(\lambda))$ must be independent tensors. This condition is embedded in condition (2), the fibration condition of the complex bundle manifolds, $(g(\lambda))$. Given (λ) groups, the elements of each group are independent of the elements of the other groups, then, $(k(\lambda)$ and $(g(\lambda))$ are bijective, and surjective mappings. This is shown in Figure 14. The matrix (\mathbf{i}_λ) is an identity matrix in Figure 13.

Figure 14. Bijective, and surjective mapping properties of $(k(\lambda))$ and $(g(\lambda))$

The bijective, and surjective mappings assure the existence of finite modules, and the isomorphism of $(h(\lambda^*))$.

□

Before introducing Theorem 2, a preliminary condition is required. This condition is the application of Thoms' Isomorphism. Suppose that an element, $(\iota \in E'; E' \subset E)$ has a fibre $(y_\iota \in Y)$ and that the image of (ι) , $(j_y^*(\iota))$ under the mapping induced by the inclusion of fibre over (ι) is $(j_y^*(\iota) : (E', X, Y) \hookrightarrow (E', E))$ is a generator of $(h^* \subset G)$ for all $(y_\iota \in Y)$; then the homeomorphism defined by $(\phi : h^*(E', X, Y) \rightarrow h^*(E', E))$, where $(\phi : \sum_{i=1}^M \sum_{j=1}^{M-1} k_i^{-1}(\lambda_i) \otimes g_j^{-1}(\lambda_i) = \sum_{i=1}^M \sum_{j=1}^{M-1} k_i^{-1}(\lambda_i) \circ g_j^{-1}(\lambda_i) = \sum_{i=1}^M \sum_{j=1}^{M-1} g_j^{-1}(k_i^{-1}(\lambda_i)))$. Let $(k(\lambda))$ be represented as an $(M \times M)$ symmetric matrix as follows:

$$\begin{pmatrix}
k_1(\lambda_1) & 0 & \cdots & 0 \\
\cdots & \cdots & \cdots & \\
0 & 0 & \cdots & k_M(\lambda_M)
\end{pmatrix}$$

Let $(g(\lambda))$ be represented as an $((M - 1 \times M - 1))$ symmetric matrix as follows:

$$\begin{pmatrix} g_1(\lambda_1) & 0 & \cdots & 0 \\ \cdots & \cdots & \cdots & \\ 0 & 0 & \cdots & g_{M-1}(\lambda_M) \end{pmatrix}$$

Let $(k(\lambda) \otimes g(\lambda))$ be represented as an $(M \times M)$ symmetric matrix is as follows:

$$\begin{pmatrix} g_1(k_1(\lambda_1)) & 0 & 0 \\ \cdots & \cdots & \cdots \\ 0 & 0 & \cdots & g_M(k_M(\lambda_M)) \end{pmatrix}$$

Figure 15 demonstrates the location of the point of intersection of the two manifolds, in the multiplicative space, $((k(\lambda) \otimes g(\lambda)))$

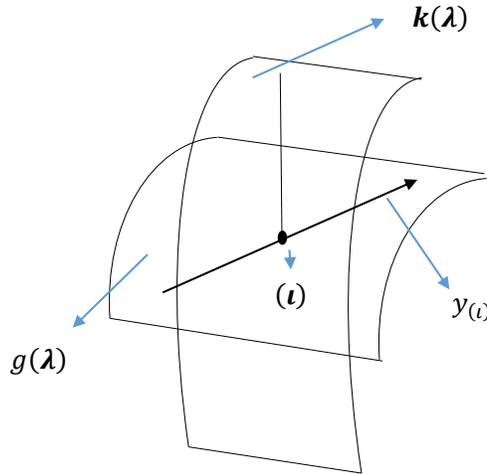


Figure 15. Location of the intersection point, (ι) and the fibre bundle $(y_\iota \in Y)$ of the multiplicative space, $(k(\lambda)$ and $(g(\lambda))$

The next step is to proceed to build a Theorem to show that many variations of the parameter groups (λ) are possible, therefore, (λ) groups are not unique, and many different slices of complex tensor manifolds can be built using parameter groups (λ) elements in the Thom class, and using (h^*) -modules to build these

slices.

Theorem 2. *Let there exist $(\tilde{\lambda}_1, \dots, \tilde{\lambda}_r; r \leq M)$, and $(\tilde{\lambda} \in E_0); E_0 \subset E)$ such that $(\tilde{\lambda})$ satisfy the condition of 1 with respect to (h^*) . There are fibre bundles $(f(\tilde{\lambda}_1), \dots, f(\tilde{\lambda}_r))$ that constitute the elements that satisfy the condition of 1 for fibre bundles, $((E_0, E) \rightarrow Y)$ then $(h^*(E_0, E))$ is a finitely generated modules with elements, $(f(\tilde{\lambda}_1), \dots, f(\tilde{\lambda}_r))$.*

Proof. Given that the conditions of 1 are satisfied, and added the condition of bijective, and surjective mapping properties the proof is self evident, and trivial. □

The complex manifolds in the anti (space, time) domain are similar to the manifolds in the (space,time) domain. The difference is that the parameter groups in the Thom class, are variations in parameter groups (λ) and the electromagnetic, and gravitational forces, (ν) , and (F) . Movement in the $((s_a, t_a)$ domain occurs mechanically through complex tensor manifolds, except that the notion of time and space do not exist in this domain. The sole link to the $((s_r, t_r)$ is the reference sphere. Reference spheres are defined earlier, and their significance is that they are the mirror images of the experiment based slices of experiment spheres in the real domain. In the $((s_r, t_r)$ the experiment sphere represents the totality of an experiment within a fixed period (T) . The slices are the representation of the experimental sphere for an instant of time $(\Delta(t) < T)$. Once these slices are stacked up, they should show the experimental sphere in the real space. Slices are variations based on possible deviations from the observed measurements during the experiment duration (T) . Slices are the small oscillations not detected when the experiment sphere (representing the totality of an experiment) is viewed as a whole. Movement in the anti (space, time) occurs as the result of the evolution of Q.C. in terms of syntax, and tonality, that are then translated into spin, and split using using the building blocks of Q.C. Tonality, defines the form and the evolution of the syntax. Syntax is then directly related to the use of the character building blocks, shown the tables earlier, and the

development of more advanced characters using the character building blocks. The evolution of syntax and its' tonality in the $((s_a, t_a))$ depends on the Causal Perception, (CP). It is the (CP) that defines the syntax tree shown in Figure 16.

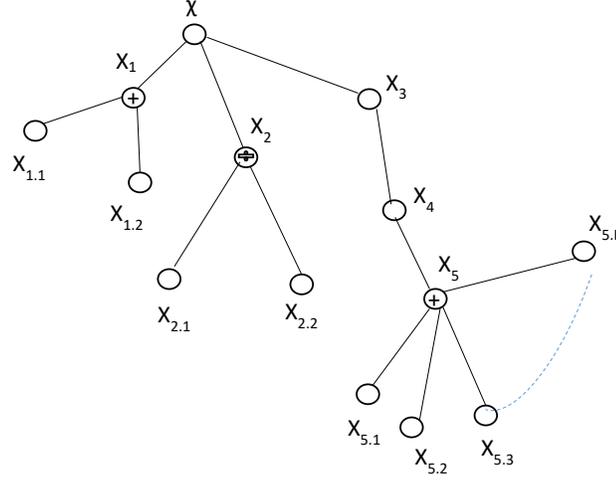


Figure 16. The syntax tree

In Figure 16, (χ) represents an original syntax. Each branch represents a more complicated through various manipulation of clauses. For example, the original syntax can be enhanced by following any of the branches of the syntax tree. For example, a variation of the original syntax can be obtained by enhancing it as is represented by branch (χ_1) , through addition of extra clause pieces shown as sub branches , $(\chi = \chi_1 \times (\chi_{1.1} + \chi_{1.2}))$. Another possible enhancement can be done using a fraction (derivative of a clause piece) as $(\chi = \chi_2 \times (\frac{\chi_{2.2}}{\chi_{2.1}}))$. Another important enhancement is embedding. Embedding is to include derivatives of the original syntax (χ) , with respect to a new branch, and then modifying, the sub branch by taking derivatives of the sub branches within sub branches, that are then modified by an addition operation as $(\frac{\partial \chi}{\partial \chi_3} (\frac{\chi_3}{\chi_4} \times (\frac{\chi_4}{\chi_5} \times (\chi_{5.1} + \chi_{5.2} \cdots + \chi_{5.L}))))$, where (L) signifies the last sub branch of a branch. In resume, each branch of a syntax tree represents complexity and dynamics and the direction of the evolution of the original syntax (χ) . The evolution of syntax is the Causal Perception

(CP) representation.

In the $((s_a, t_a))$ domain it is the syntax (χ) and the tonality (τ_o) that define and indicate the shape of spin, and the magnitude of split. Thus movement along the grid occurs by replacing the basis elements (λ, ν, F) , with the new counterparts, $(\chi, \tau_o, \frac{\partial \chi}{\partial \chi_j; j=1, \dots, M})$, where $(j = 1, \dots, M)$ is the branch number, and (M) is the maximum number of branches. The complex manifolds $(k(\lambda))$ and $(g(\lambda))$ become functions of the new elements $(\chi, \tau_o, \frac{\partial \chi}{\partial \chi_j})$. The dimension of the $((s_a, t_a))$ depends on the number of sub branches of the original syntax.

3 Conclusion

In this paper attempt is made to introduce an alternative to the standard model. The new alternative is to imagine that the different elements of an atom, protons, and neutrons, (ρ, η) and electrons (ζ) are in perpetual conversation, here called Quantum Conversation, (Q.C.). Protons talk to neutrons and the neutrons respond and talk back. Both protons and neutrons talk to electrons and consequently, electrons respond and talk back. It is considered that the electron of interest is the radiant electron. For the sake of simplicity, it is assumed that both the proton, and the neutron are in complete agreement in any conversation. The concept of discrete relativity is used which is the relation between an observer which in this case is (ρ, η) and the observed (ζ) at an specific point of causality level. This means that the observer itself changes position based on the variations in the complexity of the causality. Thus the observer's position is not fixed but the observer itself moves. Thus one considers the location (position) of the observed is changing in a discrete manner with respect to the current position of the observer. In essence, both the observer and the observed change position but not simultaneously, the position of the observed can only change with respect to the present position of the observer due to causality. Thus discrete relativity is not a continuous process, but rather it is discrete in nature.

Discrete relativity, does not belong to the real (4) dimensional (space, time) space referred to as (s_r, t_r) , it belongs to causality and perception space referred to as anti(space, time) space, represented as (s_a, t_a) . The (s_a, t_a) represented as a grid with 2 axes of spin and split. The grid signifies different degrees of spin and split. The behavior of an atom in the (s_a, t_a) grid is presented as a sphere with horizontal orbits representing the spin levels and vertical orbits representing the split levels of (ρ, η) and (ζ) . Each sphere represents a segment of a Q.C. A chain of spheres represents a Quantum Conversation. In the (s_r, t_r) space the behavior of an atom is also presented as spin and split. The exception is that in the (s_r, t_r) space, the behavior of an atom is due to external mechanical manipulation while in the (s_a, t_a) space the behavior of an atom is expressed as a result of Causal Perception.

Cohomological tools are used to translate what is observed at an instant of time through mechanical manipulations such as photon blasts, or induced radical changes in temperature or viscosity to the anti(space, time) domain of Causal Perception. The cohomological tools are complex tensor , $(k(\lambda) \otimes g(\lambda))$ used to let for a transition from (s_r, t_r) to (s_a, t_a) represented graphically as a border line and long fleshes in Figures 10,11, and 12. Displacements within the anti (space,time), (s_a, t_a) , is mathematically formulated as complex tensor fibre bundle manifolds, $(\Omega_j; j = 1, \dots, (N \times K))$, where $(N \leq M)$ is the number of possible spin sizes, and $(K \leq M)$ is the possible number of split levels. The transition manifolds, and the displacement manifolds are discussed in Figures 11-12.

The concept of Embodied Meaning is introduced. To develop this concept, it is assumed that (ρ, η) is in constant conversation with (ζ) . In fact, the core (ρ, η) changes the orbit size and the split level based on their perception of the internal changes in an atom, mainly the behavior of (ζ) . (ζ) is the one element of an atom that can detect external environmental elements and can warn the core, (ρ, η) of the situation The elements of an atom (ρ, η, ζ) store previous ac-

tion(s) in their memory This means that every new (spin,split) change starts from the location of the previous (spin,split) change. Thus change is sequential. The following hypothesis are applied: Hypothesis 1, Electron, (ζ) is the sentinel that sends messages to the core updating the core on the state of the atom and its' environment. The core retains the information and processes into the core memory. (ζ) holds the external memory of an atom. The sentinel (ζ) sends messages to the core updating or alerting the core, on the state of the atom and its' external environment. The core then receives the message and after processing it, the outcome is stored in the core memory. The core memory consists of the effects and not the causes of the outcome (spin,split) change. The memory of the electron contains only the causes. (ζ) sends its' message in (3) ways. 1) change of orbit (split level), and 2) change in the shape of the orbit, 3) split into smaller elements (probably as a defense mechanism), with or without change in the orbit level, and with or without change in the shape of the orbit. Other combinations of (spin,split) evolution are possible. Each one of the moves described can be represented using the tables of the fundamental building blocks. The core has a different specialized memory that consists of possible actions. The core retains and stores all actions issue of an incident due to electrons' messages. The memory stock defines the range of possible effects and by necessity their consequences. The main question remains and that is, how a communication is established.

Hypothesis 2, Both the electron and the core perceive change of (internal,external) environment. In this case, the core can also communicate with the sentinel about the corresponding change. In this case the communication is dynamic and thus (2) sided. Hypothesis 3, the core can only perceive internal changes in the atoms' environment. It needs interactions with (ζ) to perceive external environment changes. For example, a disagreement between the proton, (ρ) and the neutron (η) could cause change of environment in the presence of a changing magnetic or electric forces (occurring naturally). This could manifest itself, in

(2) ways, change of (n,k,m) of one of the core elements (ρ) , or (η) , or maybe both $((n,k,m)_\rho \neq (n,k,m)_\eta)$, or split into smaller elements $(\rho \rightarrow \epsilon)$, $((n,k,m)_\epsilon \neq (n,k,m)_\rho)$ for $(\epsilon \in \rho)$, (ϵ) represents the new element due to split. The same changes are possible for the electrons, $((n,k,m)_q \neq (n,k,m)_\zeta)$, depending on the presence of smaller core elements such as the Boson W, can also be represented on the Feynman diagram. (q) represents a quark used as an example.

The development of Q.C. segments are formed through interpreting atomic action. The interpretation of an action is the result of (3) types of approaches. 1) the Embodied Meaning approach which derives or deciphers the meaning from the actions of the elements of an atom. Thus every slight movement is an indicative of a meaning or it embodies a meaning and thus movement can be deciphered. 2) the mathematical logic approach which implies using fixed sequences of rules and theorems and axioms generally accepted to interpret and relate physical movement to a syntax. 3) is the reasoning approach (*movement* \rightarrow *mathematical formulas* \rightarrow *characters*) subject to experience and the background of the interpreter. This means that the mathematical logic is used within the context that is adapted to the interpreter. As is defined earlier the meaning of an action is derived through interpretation of an action. The actions are put in categories and image schema and paths are constructed among these categories to constitute meanings. Tables are provided that present the building blocks of this special language, (Q.C.). Tables contain the characters that build other words and segments of a sentence using the general idea of the Embodied Meaning. More advanced characters can be derived using the building blocks introduced in these tables. In this paper the intent is to introduce the topic of Q.C. and no attempt is made to go into deep theoretical details of the new alternative model of Causal Perception (CP) based Q.C. The expectation is that this paper opens a new field of research in this direction.

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