The Texture of Reality: Patterns and Symphonies

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Abstract

The focus is to investigate and interpret the geometrical and vibrational patterns in macro, micro, and in-between these two scales to exhibit the nature and properties of reality and life itself.

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Introduction

While starting this paper; it is necessary to segregate the associated scales of the universe as, macro, micro and in-between the macro and micro scales. This originates the domains of the specific symphony that rules the topological structures of every element that exhibits nature and thus life itself.

The difficulty humans have been facing throughout is due to the fact of merging macro and micro. Life exhibits that scales which is a symphony between the two thus giving a peculiar characteristic of being unique from every other tangible pattern observable while the reality itself is the most obvious but most difficult in respect of the symphony coexisting in the scales of macro and micro giving birth to consciousness.

Specifying consciousness of human nature or otherwise life exhibits symphonies that regulate pattern while pattern regulates symphonies. A beautiful example can be found in the Mandelbrot set where the pattern is in the form of fractals that while first giving the appearance of macro ultimately turn into micro which again ultimately turned to macro: Thus,

exhibiting a cycle itself in the iteration of repeated patterns.

It is extremely careful to investigate the interval of the patterns as with each interval, there lies a specific initiation point that generates further patterns be it on a macro or a micro-scale. The situation is perhaps difficult in the in-between scales of macro and micro. Therefore, the necessity arises to incorporate a structure of scale invariance in both macro and micro, so that one can ultimately furnish a scale permitted for humans to realize and interpret.

The mathematical reality has always been complex and so as the patterns reflecting their geometry. Any further investigation of the geometric structure either provides a success or a failure to humankind where failure is the most accessible and permissible way for the scale mismatch between the patterns[1].

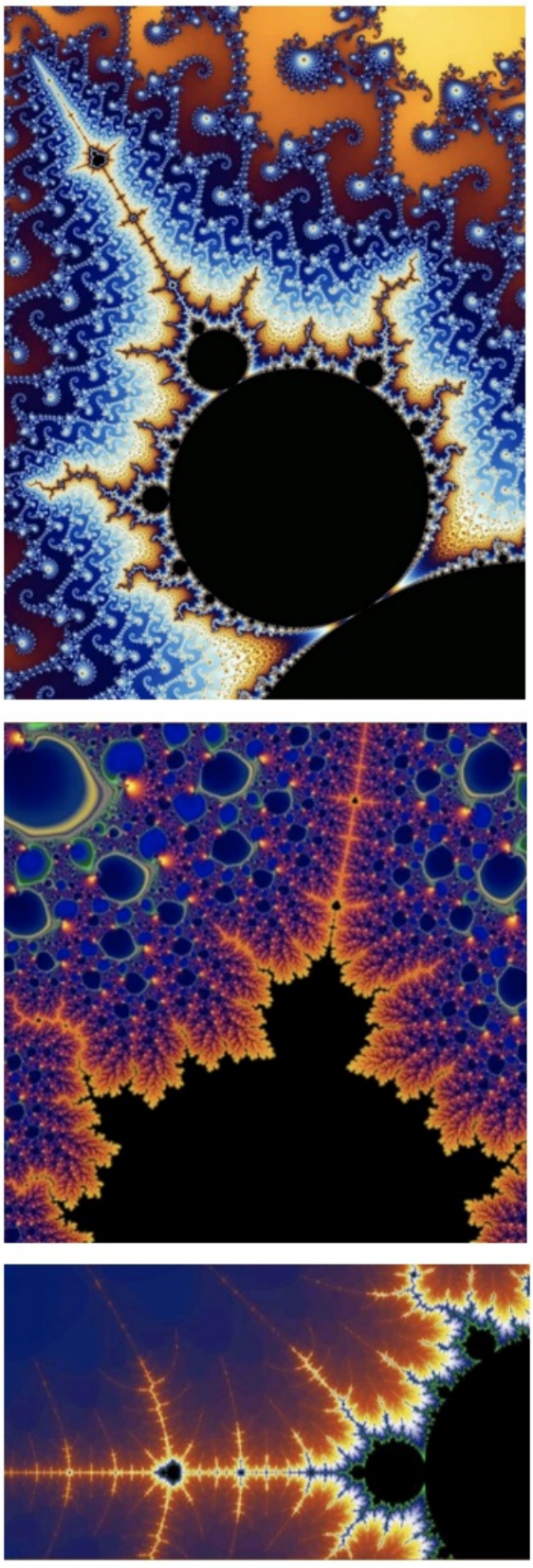

Figure 1. Mandelbrot Set and fractals showing their detailed form in the three images[2].

Methodology

Patterns can be described best as emergent that is there is a source; which inflicts the necessary structures and geometry needed to embed in itself at the micro scale which when zoomed goes on to the further micro domain to exhibit the same patterns over and over which is termed as fractals and this identifies the reality, the texture of the entire cosmic architecture where for every patterns, there is more patterns and then there is more; ultimately leading to the nerveless ending texture from the macro to the micro encompassing everything inside them thus emanating the structure of life itself as the vibrations or symphony exhibiting from such textures arising from patterns and are developed or is usually the fractals.

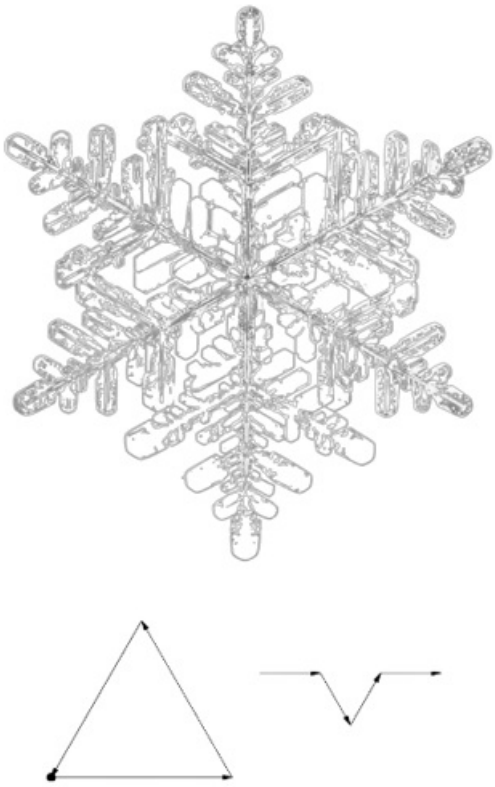

Figure 2. Koch Snowflake and Koch Curve showing the fractal geometry of the snowflakes of nature[3].

What is portrayed above is a Koch Snowflake and the Koch curve which are the fractals that repeat themselves in a specific pattern to give the entire snowflake structures. Thus, while from the complete structure itself arises patterns, similarly, the granules of patterns or the fractals can, in turn, organize in a specific order to give form to the complete structure[4].

The Koch snowflake is a fractal curve, built by starting with an equilateral triangle, removing the inner third of each side, building another equilateral triangle at the location where the side was removed, and then repeating the process indefinitely. The zeroth through third iterations of the construction are shown with each fractalized side of the triangle is sometimes known as a Koch curve[3][4].

Chladni experiments are carried out demonstrating the vibrational pattern that displays the frequency by distributing sand over a plate oscillated through frequencies. These vibrational patterns on various modes on a rigid surface are known as Chladni figures or Chladni patterns because of the various patterns produced by various modes. When resonating, a plate or membrane is divided into regions that vibrate in opposite directions, bounded by lines where no vibration occurs (nodal lines)[5][6].

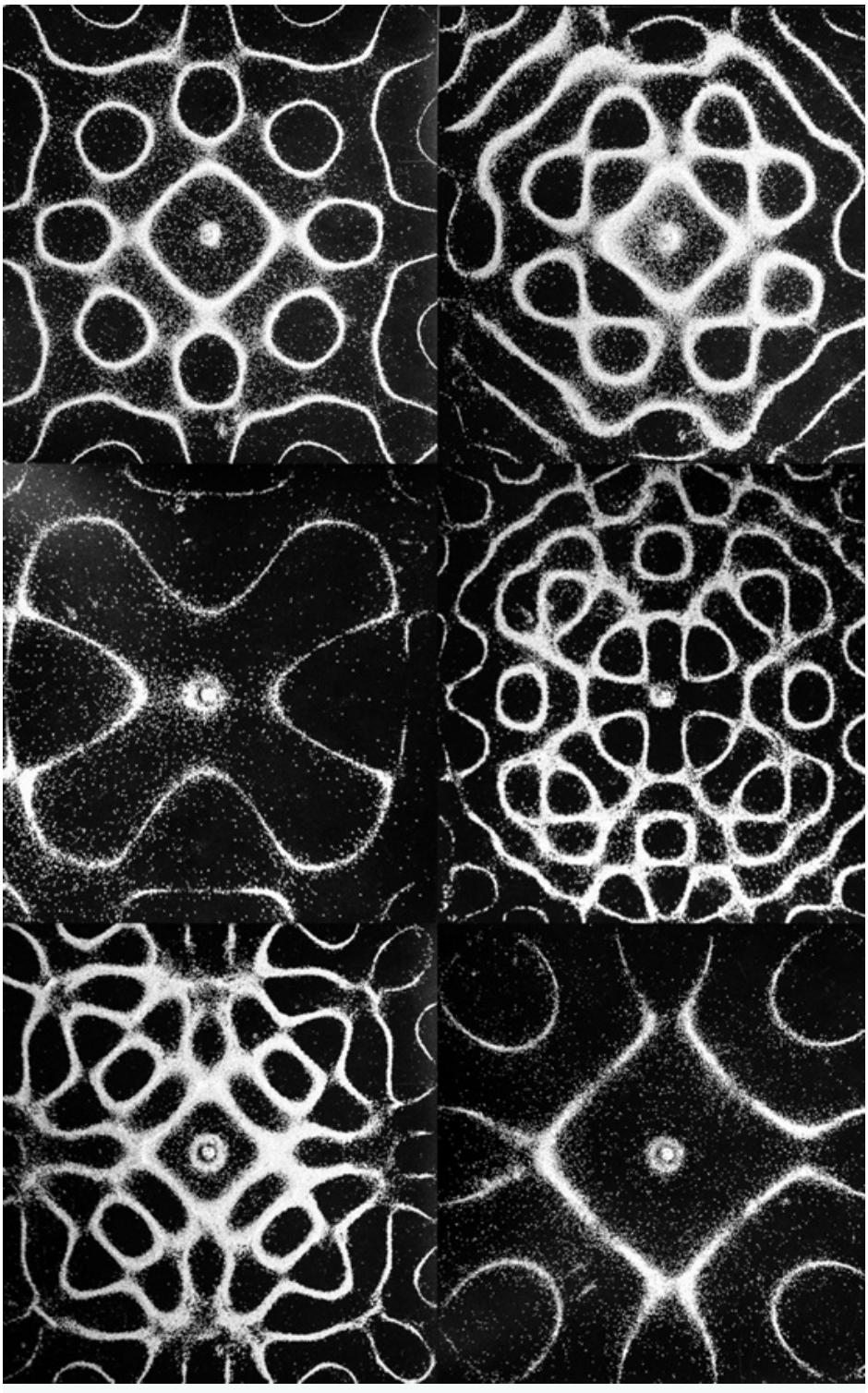

Figure 3. The Chladni pattern emerges out of vibrations on the various modes of frequencies [7].

Thus, there exists symphony which gives rise to vibrations and those vibrations in turn generate patterns. The reality of patterns is observed in both the cases of vibrations and fractals, where one is generated by iterations of vibrations and the other is generated by a symphony of repetition in order wise scenario duplicating the previous one; thus, exhibits pattern that we observe in this physical reality.

If one moves further then it is not difficult to assume that while each pattern is a symbolization of harmony, that generates the peculiar source of that harmony being macro or micro as in fractals that in turn got macro but the realistic domain is indistinguishable from the techniques used by modern theoretical physicists as seen in string theory and quantum gravity where everything is in a state of 'normal' when either in macro or micro but the difficulty arises when one attempts to mix that micro and macro using suitable scale invariance technique that in essence gives birth to ultraviolet divergences[8][9][10][11][12]. This symphony is the same symphony of superstrings and thus, this can be easily given the structured property of the emanating vibration cycles originating from such patterns and that in essence creates the birth of particles via generators and necessary schemes of permutation cycles and string vibrations[13][14][15]. Every pattern can be seen emergent from the two sides:

1. Either in the micro domain formulating the entire structures and constructing them in a macro reality.
2. Or a macro domain which if suspended further into smaller structures then; there arises the specific cases of [Point 1] that in turn makes the visible pattern a scenario for the creation through symphony.

    A. This again establishes the notions of geometry or how geometry can act over these patterns or how the patterns behave in the geometry of the structure through which arises specific mathematics of genera that in turn corelates this symphony in a form of creation.
    B. Therefore, it is not difficult to assume the need for higher dimensional complex structures or genus inflicting the symphony through the vibrations of the strings.

        1. Any such vibrations can in turn affects the associated topological space in such a way that the vibrations reduce to mere symphonies or rhythms of the permutation cycles to give birth to the observable universe.
        2. Thus, any fractal is a pattern, any patten is a repeated rhythm, any rhythm is a identifiable source for the computations of separate mathematical classes associated inn groups for a higher order commensurator or in a higher dimensional reality, perhaps through a loop giving not only a repeated cycle in the calculated domain but also in the higher order manifolds and extended through multiple universes for the same forces occupying the reality which when originates then becomes 1, in the Planck's scale and emerge as vibrations[13][16][17][18][19].

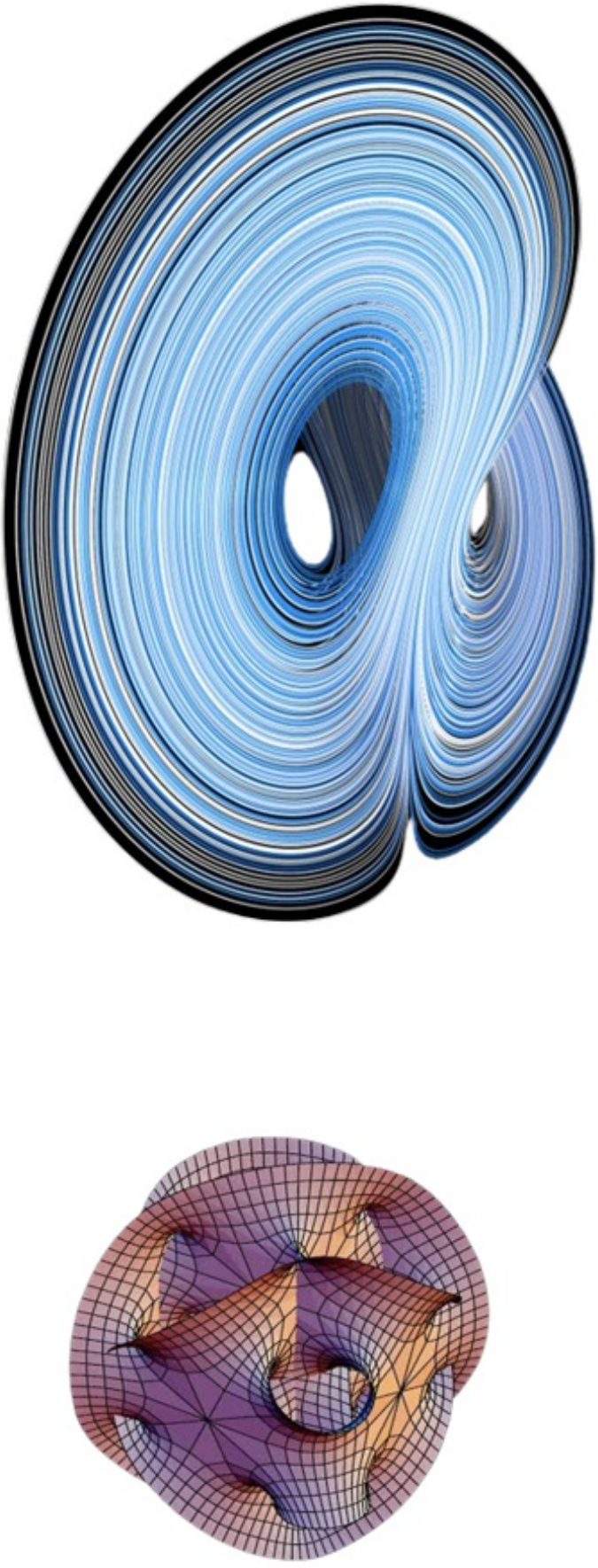

Figure 4. The [upper image][20] is of the Lorenz attractor while the lower image

is of the [lower image][21] Calabi-Yau manifold.

Whenever there exists a pattern then one thing that captures our attention; if the pattern which is deterministic has a predictive property or not. If there is no such predictive property, then this pattern leads to chaos. Also, if one investigates the nature of pattern from the genera of hypercomplex manifolds through string vibration schemes, then also its difficult to state that which pattern of vibration corresponds to the specific cycles that in turn generates the particles as bosons, fermions or rather supersymmetric ones. Therefore, one needs to be cautioned about the patterns that governs the universe and the fundamental structures which got originated from those patterns are highly unpredictive[6][8][13].

For example, in the case of Lorenz attractor one can state - The Lorenz system is notable for having chaotic solutions having certain parametric conditions for initial and final attributions. This in general is the “butterfly effect” stating the chaotic systems of nature that are unpredictable and never repeats being completely deterministic. As the basic criterion for chaos is to increase with time – it becomes hard to predict the final system where the ‘butterfly effect’ yields a small initial change leads to a much greater changes in a different trajectory or in other parts of the world. Thus, the Lorenz attractor when itself when plotted in phase space resembles to a butterfly[22][23].

So as, in the case of a compact Khler with Ricci flatness, it can be said that the vibrational patterns are unpredictable, and it is difficult for any periodic cycles to get the information before what exactly the vibration schemes will be. Therefore, even if anything is unpredictable, there exists a pattern and that pattern can lead to bifurcations but then that in return demonstrates either further bifurcations or a tendency to reduce bifurcations and then again increase bifurcations being the system passing either through time or through vibrations in hypercomplex manifolds[1][11][13][14][19].

Conclusions

This paper mainly focussed on the pattern exhibited through natural processes that underline the mathematical reality from strings to chaos, hypercomplex manifolds to Lorenz attractors, Mandelbrot set to Koch curve, and fractals to vibrations. From topology to the quantum scenario with the difficulty in embedding two different domains macro and micro to create an in-between domain encompassing both which mainly because of impossibility leads to ultraviolet divergences. But this doesn’t stop nature from creating patterns and embeds them to create reality in all the scales of the macro, micro and in-between even in the symphony of the Chladni planes depicting ultimate laws of the cosmos.

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The authors declare no conflicting interests related to this paper.

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