

# String Theory as a Source of Superposition in Dimensional Designs

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## **Introduction:**

Nature is one of the most important sources from which the artist draws his ideas and topics, in the past and present. Elements and vocabulary are being organized in formulas that can be traced, and repeated according to structural engineering systems visible or hidden to the eye, so that nature becomes clear in the formula of the impermeable model (Patrine Pattern), and in engineering formulas ( the module, which is a reciprocal and repetitive system in fixed proportions, and the fractal, which is a formula that represents a fixed fractional geometric repetitive system, from which artists drew their structural systems and their schools, trends and theories that influenced the field of plastic art, which differed from the artist's vision. The contemporary concept and how it deals with nature and quotes it in a way that differs greatly from what was previously mentioned. The concept of studying those living organisms present in nature has changed according to recent scientific changes and the discovery of many theories and trends, as well as the emergence of technology that affected all fields, and had a large and influential role, especially in the fields of arts. Hence the contemporary artistic research for those theories and laws related to the growth processes in nature, whether in botany, animals, birds, etc. and what they contain in terms of structural and formal systems in their internal and external structures, and what they contain from infinite components to become an important source from which the artist can be inspired in his artistic creativity, it results in many formative relationships that enrich the field of decorative designs, formulas, theories and systems in which these vocabularies are formulated, and these theories are related to their presence in nature and the growth and reproduction processes they constitute in living organisms, or scientific theories related to flat or stereoscopic repetitive systems. The universe is "a group of forces that interact, grow and expel, coalesce and struggle through a continuous movement. The shapes and colors that beings and natural materials take on are nothing but an expression of the forces inherent in them, the energy they contain, and the movement driving them down to the concept of the internal architecture of nature" (1) P. 193).

System that has developed in nature has a springboard through which it grows, forming a set of plastic relationships that the trained artist can reveal "(2-p.50). Tracing those shapes and elements, whether with the naked eye or under the microscope, show many aesthetic values such as diversity, unity, balance, rhythm and proportionality, resulting in design processes such as repetition and congruence, miniaturization and enlargement, transparency and superposition. Many contemporary scientific theories have emerged and influenced the various scientific, intellectual and artistic fields. From here came the research that seeks to link art with scientific achievements and technology and their applications in the field of artistic creativity, as many artists have benefited from these scientific theories in the field of art, especially decorative designs in the production of artistic works. Based on the different concepts of each theory,

through the technical vocabulary and the design structure, and the possibility of employing it in the field of three-dimensional decorative designs, by addressing one of the important design processes, which is superposition, and tracking how to achieve it through one of these contemporary scientific theories, which is string theory, which is a set of contemporary ideas about the structure of the universe based on mathematical equations, these ideas state that Matter is composed of annular strings open or closed and infinitely small, and that the basic structural units that make up the elements from electrons, protons, neutrons and quarks are toroidal strings of energy that keep them in a state of permanent instability, and that these strings fluctuate and unite according to the nature and characteristics of the larger particles, such as electrons and protons, and the most important thing in this theory is that it takes into account all the forces of nature (gravity, electromagnetism, and nuclear forces) and unites them in one total force called the super theory (M. theory) (19).

Precisely since this theory is related to order and movement in the universe, and from here this theory can give new design solutions and approaches to treat superposition, which gives various results in the field of three-dimensional decorative designs, through manual and computer experimental work in which the superposition design is achieved through the real and delusional third dimension.

#### **Research problem: -**

Plastic treatments in the field of design that deal with superimposed formulas provided a variety of plastic solutions. String theory provided a new concept in the treatment of superposition, which prompted the desire to take advantage of these new perceptions to apply them in three-dimensional design. The research problem is how to benefit from the outputs of string theory in producing a set of decorative designs, using plastic techniques and treatments appropriate to the design field. The research problem is determined by the following question: How can superposition be used as one of the design processes in achieving new design solutions in the field of 3D decorative designs?

#### **Research aims: -**

1- Study of superposition processes in string theory. 2- Making use of the superposition resulting from string theory in producing a group of three-dimensional decorative designs.

#### **Research hypotheses: -**

1- The structural formulas for superposition processes in string theory can be achieved in contemporary artistic theories. 2- Access to new designs and clarify the superposition relationship in light of string theory to enrich the three-dimensional decorative designs.

#### **Research importance: -**

1- The formulas of “superposition” in “string theory” are considered in contemporary scientific trends and theories as a rich source that can be used in plastic arts and art education. 2- (Superposition) in (String Theory) provides an opportunity to learn about multiple design processes. 3- The resulting superposition (string theory) enriches the field of 3D decorative designs. Research methodology: analytical method and experimental method. Search terms: - Superposition: The unit is repeated by superposition, when one of the units included in the formation hides part of another unit that lies behind it "(3-p.152), in this case this formative

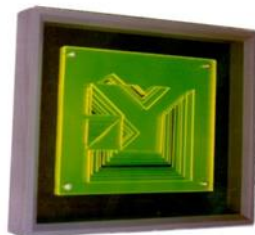
relationship is called superposition, which means the disappearance of parts of the distant elements in the formation as a result of other elements in front of it," it is A phenomenon that combines two visual units to strengthen the relationship between them. It is also considered one of the visual indications of a sense of the third dimension, but it is one of the general methods of grouping "(4-55). The superposition may occur either between two or more units, similar or not alike, and it may also be a partial superposition or a complete superposition, as it is a process that preserves the unity of formation. String theory or strings theory "The theory (String) constitutes a group of contemporary ideas about the structure of the universe based on mathematical equations. These ideas state that matter is composed of ring strings open or closed infinitely small, and that the basic structural units that make up the elements of electrons, protons, neutrons and quarks are toroidal strings. Of energy makes it in a state of permanent instability, and that these strings oscillate and unite according to the nature and characteristics of the larger particles, such as the electron and proton, and the most important thing in this theory is that it takes into account all the forces of nature (gravity, electromagnetism, and nuclear forces) and unites them in one total force called "The Superstory" (M. theory) (19). Theoretical framework :- String theory, which is a set of contemporary ideas about the structure of the universe based on mathematical equations, and that the superposition does not occur in nature entirely, but occurs partially or outwardly and not in the internal structure, but it occurs in engineering systems Figure (1, 2) and in the arts, partial and complete superposition or you combine both together as a result of operations (repetition, congruence, zooming in and out, and transparency) Fig. (3, 4, 5, 6).



**Figure (1) represents an overlay of tree branches in nature**



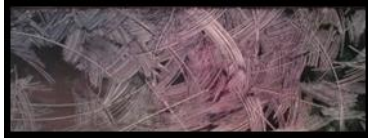
**Figure (2) represents an overlay of flower leaves in nature**



**Figure (3) a work by the artist (Saeed Syed Hussain) representing a group of slides superimposed on top of each other with a gradual cavity in a fixed system that fuses at times with the adjacent cavities and separates at other times.**



**Figure (4) a work by the artist (Saeed Syed Hussain) representing a group of slices superimposed on top of each other with the ends similar to waves.**



**Fig. (5) The harmonic vibrational energy movement of the line using the superposition and linear interlocking of the artist Ehab Bismarck. (On the Artist Exhibition, Horus Gallery, College of Art Education, 2008 AD).**



**Figure (6) "The Creative Mind" The braiding processes of curved lines form a conical lattice structure wrapped in the real space of the artist "Janet Ashillman". (<http://bigbenonline.net>)**

Hence, the superposition works on assembling the design vocabulary and achieves a kind of unity and coherence between the design elements, and there are many forms of expression of this term, as some saw it as a mere meaning, and some saw it as a basis for the assembly of elements in a space, and some saw it as a process of drafting processes (3-p.2). The superposition, whether as a phenomenon in nature or as a formative relationship in the field of art, it takes every time a new manifestation of a starting point loaded with aesthetic and construction foundations, which are considered "a factor that increases the perception of unity and interconnectedness between the elements, and changes the perception of the discretionary movement of forms, as it arises from it." A distinct movement that combines the movement of elements on the surface with another clear movement in the direction of the estimated depth strengthens the sense of the existence of depth, and the transformation of the floor surface into a void is characterized by a slight depth (depending on the extent of the overlap). (4-p.178)

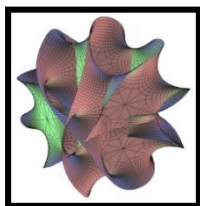


figure (7) is a form of (Calabi - Yao) spaces, which depicts wrinkled dimensions that are consistent with the logic of the six additional dimensions assumed by string theory, and it is evident that the superposition processes are realized. (<http://www.universaltheory.org>)

"The movement between the overlaying plastic vocabulary is related to the organizing foundations of these vocabulary in organizing the artistic work, such as zooming in, zooming out,

repetition, texture, color, transparency, or other foundations organizing these overlaying vocabulary and implicitly related to the concept of achieving discretionary movement, so it expressed the concept of movement and the suggestion of depth." (5-p.94) One of the most important functions of superposition is that it works on "grouping in space, which is one of the foundations of organizing the elements of the form. The superposition helps to understand the formative vocabulary in a single composition, a single sentence like the characteristic of similarity and symmetry. The elements tend to form perceptual groups according to their positions in the place." The elements closest to the assembly are easier to assemble, and the superposition would give a sense of the visible depth of space. If the superposition was real, the perspective would be real, and likewise in the case of illusory superposition. Therefore, the superposition is strongly related to an important and basic foundation that helps to form the technical unit in the technical work in general and in the field of design in particular, which is the vacuum tension, because superposition is one of the qualifications of the assembly in a vacuum. Superposition is considered an important way to create the strongest vacuum tension of the sum of any image. It is not required that the realization of depth at that time be a

translation of this method. However, superposition at the same time can be a strong indication of space, and the purpose of the superposition is to regulate the depth when it is related to the achievement of contrast and gradation in size. ” (18) "Grouping in a vacuum as a basis for organizing the elements of the figure, in which gravity interacts between the forming vocabulary superimposed in any form with the way of organizing that vocabulary, and in this case these forces of gravity have their effect as if they cover the different parts of the figure as a charge of different degrees of dynamic tension and we benefited by compare that to what happens in a magnetic field. " (7-p.30)



Fig. (8) Visualize the shape of the chord within parts of the material  
Greene, Brian: "The Elegant Universe – Super String Theory hidden dimensions", WGBH, 2006, P.30.

Many artists have been interested in revealing the essence of the compositional formations and producing artworks that depend in their formulation on the compositional composition of the vocabulary, whether this is the superposition between the disparate elements, color levels, formal surfaces, or stereoscopic volumes. "The appearances of superposition and its uses in ancient arts have varied in contemporary arts, and the goals of employing them differ from one period to another, and from one art to another, so the aesthetics arising from such employment varied according to the variation of goals and the required achievement of design aesthetics in different ways. (3-12) There are also many Arab and foreign artists who have relied on building their artworks on “superposition” as a formative relationship, such as (Abd al-Rahman al-Nashar, Ahmad Nawar, Mohiuddin Tarabay, Asher - Esher, Robert Delaunay - Delaunay Robert, Vasarely Victor, Piet Mondrian. Bit Mondrian). String theory appeared in the late eighties, combining the concepts of relativity, quantum and the forces of gravity and interpreting time and space with a new vision, "and it states that the world has much more dimensions than the eye can see, which are the dimensions that are braided strongly in the folded fabric of the universe." (8-p.20)

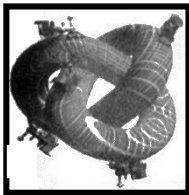


Figure (9) a visualization of the intertwining of time and space from the perspective of string theory in the form of a three-dimensional coiled cylinder. (Barrett Krome: "Logic & Design in Art, Science and Mathematics", Herbert, London, 1980, p. 260).

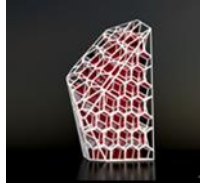
String theory has shown many important and surprising things in the nature of space, time and matter, and most importantly, it tried to solve many intractable problems between the theory of general relativity and the theory of quantum mechanics. String theory succeeded in creating a kind of compatibility between the two theories, and also related to these. The theory has the most fundamental and strong components of nature, “It has been found that in string theory there are many features of nature that may appear to be considered technical details - such as the number of distinct basic components of particles and the properties of each one - but they have arise from fundamental and tangible aspects in the geometry of the universe, where string theory assumes. The microscopic texture of our world is a multidimensional maze, twisted

profusely, vibrating and twisting within it the strings of the world infinitely, and in a harmonious rhythm that spells the laws of the universe, far from being arbitrary details, the properties of the basic building blocks of nature are deeply intertwined with the fabric of space and time. (8) -P. 20) "The difference between the particle and the string is that the particle is dimensionless OD b, while the unidimensional chord of 1-D dimension describes a path in space-time in a three-dimensional virtual world, which is either open or closed needs and goes out through space-time in a virtual world that creates multiple structures, when it interacts. " (17) "This string is the basic component of everything at the smallest microscopic levels in the form of strings that oscillate in different ways according to the different natural properties of the material, creating resonant vibrational patterns similar to the melodies produced by the violin strings, for each of these strings has a huge number of different vibrational patterns called resonance. (9-40) From the foregoing it is clear that string theory provides many three-dimensional structural systems, as well as providing other multi-dimensional space wrinkled networks of the hypothetical structure of string theory, and other processes that occur to the tendon during its vibration such as transformation, fission and superposition processes that can be invested in their potentials in a way that can provide Many design solutions, especially in designs emerging in space and subjected to discretionary motion.



Figure (10) Overlays of closed strings and patterns resulting from transparent chromatic effects, creating rhythmic systems that achieve the harmony value (blog.michaelkcooke.com).

This is what invited the researcher to try to benefit from that theory (strings) that presented many ideas and phenomena that affected all scientific fields, whether at the level of physics or mathematics, and also thus affected the field of art, as the world and art both affect and are affected by each other , "Design is balance and composition, or it is the sport of the artistic form, as engineering networks are one of the measuring tools or an aspect of measurement because they are an engineering system. Therefore, they can be relied upon in reaching many design formulas based on their unity and balance on the aesthetic engineering proportion." (10) -80) Hence, the researcher found that there is a close relationship between the theory of (strings) and the process of (superposition), as strings during their vibrations conduct many processes, which lead to changing their patterns, creating vocabulary that differs with the change of the effect of the gravitational network on it, where the triple network of (superposition) processes arise. The dimensions resulted from the accumulation of the layers of the moving wrinkled geometric network arising in the void, which results in total or partial irregular superposition of the primary lines forming the network, resulting in rhythmic systems that are determined by changing the directions of the grid lines and the spatial relationships arising between them that express the depth of space.

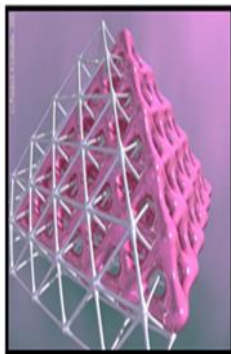


**Figure (12) Interference and lattice superposition of a regular hexagonal network in an irregular geometric shape. (<http://forum.jotero.com>)**



**(11) illustrates the three-dimensional lattice superposition arising from the superposition of the lines forming the triple lattice with different densities in a wave direction around the vertical axis that creates a wrinkled network. (<http://forum.jotero.com>)**

The superposition is a structural basis that will achieve a relationship that has its distinction and uniqueness and has its intended effect and role in achieving the values of rhythm, balance, proportion and unity and is one of the set of foundations through which the designer seeks to achieve the aesthetic foundations of the design in a way that provides specific perceptions of each of the relationship between the elements and the connotations of cohesion, movement and connotations. Space and depth. " (3-p.821) Many contemporary artists have been interested in relying on string theory in their artworks such as: (Andrea Lohmueller - David Grossman - Fredrick A. Lohmulter - Don Li-Leger – Leigh Arnold) Yauoiku Sama - Seven Geuer - Randall Klooping)



**Figure (14) Artist (Fredrick A. Lohmulter) "String Theory" The use of the spherical shape by repetitive rganization establishing a multi-dimensional network according to the topology processes of tension and adhesion that form multi-dimensional spatial structures (<http://www.f-lohmueller.de>)**



**Figure (13) the artist (Leigh Arnold) "Infinite Creation" illustrates the three-dimensional meshwork process. ([www.leigharnold.com](http://www.leigharnold.com))**

Einstein) was ahead of his time, as he hoped for a unified theory for everything, that is, a combination of the four forces in the universe. String theory came to confirm what (Einstein) started, as it is called the possibility (the overlapping of time and space), and space can be folded so that the two farthest points in the sphere of earth can meet in a certain circumstance and the distance becomes zero, the time required to cross these two points, which are originally on the two sides of the globe, is zero - meaning that the earth collapses. (20) The curvatures and ripples of time and space give rise to a network structure on the cosmic level, where the convexity of the grid arises from the convergence of the lines forming the flat geometric network and the

direction of the depth, turning it into a three-dimensional geometric network, with a perceptual meaning that expresses the spatial depth and the discretionary movement, so the convexity changes the geometric rules that he formulated (Euclid) is defined as "the diffraction of an object, space, or space-time from the flat shape." (8-p. 425) Many contemporary artists have been affected by these quantitative fluctuations in their artworks, and they have been implemented in several forms that suggest the delusional movement through processes of transformation, repetition, superposition and emanation with the presence of an element of space to emphasize the dimensional, temporal and spatial multiplicity, this theory gives a new detailed picture of the nature of space and time on the scale (Planck), so the scale at this point is not continuous, but rather is composed of a group of separate elements forming moving shapes in the form of flexible units that emerge from the ground of the cosmic network, and may separate from the original network in a vacuum. " (11-p. 422) And out of it grids in the form of irregular three-dimensional shapes from the flat two-dimensional geometric network, either linked to the original network or separate from it, and this is determined by the amount of its quantum energy as in (quantum foam), so new geometric entities are created moving in the space, organizing its grid lines according to the emergent figure, which appears in the form of superimposed, intertwining forms, delicate and complex intertwines that suggest many plastic formulas that can be used artistically.



Fig. (15) Artist (Jacob D. Bekenstein) Flexible units emerging from the floor of the spatial network of space-time by the action of energy. Suggest movement through processes of superposition and overlap (<http://astronomicamens.wordpress.com/2012/12/07/la-struttura-a-forma-di-schioma-dello-spaziotempo-quantistico>)



Figure (16) Artworks of the artist (Norberto Conti) showing the new moving geometric entities in the form of shapes overlapping in space. (From: <http://kevinspraggettonchess.wordpress.com/2011/06/14/norberto-conti-and-bobby-fischer>)

Quantum theory emphasized the importance of energy and forces starting from the atomic and sub-atomic level, and their effects on the nature of matter in terms of morphology, transformation and movement of bodies and what happens in their internal structures of changes, interferences and overlays of grid structures, which are considered as systems and formulations that give new design dimensions to the formation in space to suggest the third illusory dimension.

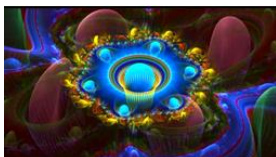


Figure (17) the artist (Frankief Devianta) titled Color Riche shows the formation and transformation of atoms and what happens in their internal structures from the processes of overlap, superposition and emission, which result in network structures in space that suggest the third dimension and delusional movement. (From: <http://www.pinterest.com/pin/458804280761920255>)

Consequently, the current research came to deal with contemporary scientific theory and how it is achieved (superposition) as one of the important design processes that results from (superposition design), by addressing one of the (strings) theory to reach various constructive



formulas related to issues of suggesting the delusional third dimension, the third real dimension and the relationship of time to space. (The fourth dimension) and also (the fifth dimension), which adds to flat formations other dimensions that are considered a source of resources that can be used to enrich the field of three-dimensional decorative designs, while taking advantage of the use of computers and graphics programs. Operational framework: - The practical framework of the research includes the subjective artistic experience as follows: - 1- Extraction of super positive formulas in string theory. 2- Producing a group of three-dimensional decorative designs based on those structural systems and formulas in string theory. 3- Using the superposition formulas extracted from string theory to perform artistic experiments carried out on two axes: The first axis: superposition through three-dimensional topological systems of string theory. The second axis: working out a set of experiments to produce graphic designs to take advantage of (overlay) and the value of movement. The first axis: superposition through three-dimensional topological systems of string theory: Reliance on the hypothetical structure of string theory, which is linked to mathematical patterns and systems that yielded three-dimensional geometric shapes that translate the properties involved in the vibrational movement of strings. Where the researcher designed network structures that take various directions and axes in her structural system that determines the way of distributing vocabulary such as the vertical direction, oblique, spiral system and the central axis, which gave a sense of the continuous rotational and dynamic movement in the works clearly by emphasizing the use of macro and partial superposition processes through contrast and enlargement and miniaturization, growing repetition, progress, regression, attraction and vacuum tension. The illusory overlays between the three-dimensional vocabulary have led to the impression of the dimensional multiplicity arising from the spatial depth, the rhythmic movement systems, and the varied visual perception of the elements as a result of the directions of these structures, the varying sizes of the vocabulary and the numerical density of the combined vocabulary, and the designs as a whole suggest the temporal and spatial dimensions that coincide with the concept of the theory of space.

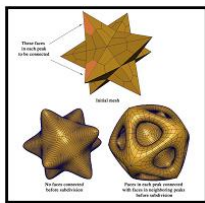


Figure (18) models for three-dimensional topological systems that represent the content of the vibrational movement of tendons, whose structure changes through transformation, merging and rotation processes, resulting in constantly changing and different shapes

**First design:**

**Characterization:**

<p><b>Work size</b></p> <p><b>The unit used in light of string theory Overlay type the structural system of superposition</b></p>	<p><b>50 x 50 cm</b></p> <p><b>An important three-dimensional geometric term represents the hypothetical structure of string theory.</b></p> <p><b>Partial superposition.</b></p> <p><b>A circular structural system.</b></p>
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**Analysis:** The design idea depends on complexity and stacking through the numerical density of partially overlapping vocabulary so that the existence of the void vanishes with it clearly, and the space tension between the vocabulary increases by distributing the elements through a semi-circular structural system, giving an impression of rotational movement. The overall

formal appearance of the overlapping vocabulary almost appears as a result of the increase in the number and density of the vocabulary, which confirms the artistic and aesthetic values of the superposition, and the light source has been inserted in one corner in the right direction of the design, which gradually fades into the rest of the directions with the introduction of shadows, increasing the illusory sense of spatial dimensions and multiplicity. The formality and depth that is confirmed through the variation in the volume of the superimposed vocabulary, and a harmonious rhythmic system is achieved as a result of the superimposed lattice structure that includes the concept of the kinetic vibrations of the strings.

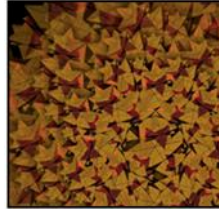






Table No. (1) illustrates the implementation stages of the design






The singular	Superposition formula	The wording	The design architecture
			

### Second design: Characterization

<p>Work size</p> <p>The unit used in light of string theory</p> <p>Overlay</p> <p>Type the structural system of superposition</p>	<p>50 x 50 cm</p> <p>An important three-dimensional geometric term represents the hypothetical structure of string theory.</p> <p>Partial superposition.</p> <p>Spiral structural system.</p>
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**Analysis:** The processes of change and modification of the previous singular were carried out by means of modern techniques found in the program (Max Autodesk 3D), so the word appeared more solid to suggest the illusory third dimension by adding light and shadow in some parts of the singular, and the color of the singular was changed to a more intense color to make the shapes look like luster and gloss, and give the design a characteristic of vitality and glow, and the structural formula used in the design consists of completely superimposed vocabulary that is similar in size and color, taking the shape of a curve or an arc. The superimposed vocabulary in its network structure takes the spiral structural system with wide distances that emphasizes the existence of the void, which suggests depth and strengthens the interconnected relationship between the shape and the floor, as well as the difference in the size of the overlapping vocabulary and operations of enlargement and reduction from the outside to the inside and the change in place and position in terms of front and back. It investigates and confirms the continuous superposition structural formulation in reproduction and growth through the spiral structural retina, to suggest that it is moving in space, expressing a rhythmic aesthetic system that gives a sense of the third dimension, the fourth dimension, and the different spatial dimensions, to be consistent with the hypothetical structure of string theory.



The singular	Modulation of the singular	Superposition formula	The wording	The design architecture
				

**Findings and recommendations:** The researcher reached through the theoretical and practical framework of the research to a set of results and recommendations that confirm the investment of superposition processes of both macro and partial types through the hypothetical structure of string theory to enrich the delusional three-dimensional decorative designs, as the researcher assumed that the virtual structure in string theory and the resulting vibrational patterns of tendon movement fare from the Vocabulary that are new experimental entries that can be used to inspire diverse values and formulations. –

### Results:

The results were according to the theoretical and practical study and the verification of the research hypotheses as follows:

- 1- The study of superposition processes in space through the hypothetical supra-microscopic structure of string theory enriches the field of illusory three-dimensional decorative designs.
- 2- The superposition and repetitions resulting from the vibrational movement of the tendon provide new and innovative solutions for plastic formulations and superimposed retinal structures moving in the delusional space.
- 3- There is a relationship between the superposition resulting from the kinetic vibrations of the strings, and the superposition processes in the design provided aesthetic and plastic dimensions for the superposition processes.
- 4- The hypothetical structure of string theory, through my introduction of (topological patterns) of important three-dimensional vocabulary, and also the superposition arising from the vibrational movement of strings influenced the field of virtual three-dimensional decorative designs and created a new design logic for the transformation of superposition in two-dimensional designs to superposition in virtual three-dimensional designs .
- 5- String theory provided an explanation for all quantum phenomena. It also presented a modern concept of time and space through the additional curly and superimposed dimensions, which enriches the plastic and aesthetic values of superposition processes in the design.
- 6- String theory is related to some concepts of energy, motion, vibration, oscillation, and space, and it is one of the most important concepts that the designer seeks to achieve in his designs as well as contribute to enriching them.
- 7- The structure of string theory is the result of the interaction between the four major dimensions (length, width, height, and time) on the global level, resulting in new patterns that

stimulate the artist's thought and imagination through the application of superposition processes.

- 8- The superimposed design structure of string theory is related to Art Op, Digital Art, Fractal3D, Morphogenetic, Autogenic, and Chaos Theory, thus providing constructive solutions. New ones were used in the implementation of overlay operations.
- 9- The superposition through string theory can be applied through the vertical, horizontal, and tilted axes, as well as through different structural systems such as the radial, circular and spiral.
- 10- Superposition processes in space through string theory achieve many plastic aesthetics, such as delusional space depth, delusional movement, harmonious rhythm, dimensional and temporal multiplicity through processes of gradation in size and color, reduction and magnification, transparency, repetition, and frequency.
- 11 - The superposition is divided into two types (total superposition, and partial superposition), as it appears through different cases such as superposition with intersection, or superposition with overlap, or overlaying with interlacing, or overlaying with transparency, or overlaying with zooming in and out.
- 12 - It is also clear that the superposition processes are affected by several factors such as the formal appearance of the vocabulary, the area and volume, the direction and movement of the vocabulary, the numerical density of the vocabulary, the color harmony of the vocabulary, the shade and the light, the difference of touch, the material, and that the superposition has technical and plastic functions which are the assembly in space and the achievement of artistic unity and the sense of the depth of space, building the general shape of the perceived body, and the suggestion of the delusional movement, which highlights and confirms the aesthetics of the superposition.

### **Recommendations:**

Through this study, the researcher reached a set of recommendations, which are:

- 1- To delve into the study of the superposition of the quality of the macro and the micro in various theories and scientific systems to reach more overlaying plastic solutions and formulas and implement them through digital art programs that give countless varied and innovative results.
- 2- To benefit from the research findings from the multiplicity of ideas of superposition processes based on the hypothetical structure of string theory, as these superposed formations represent new experimental solutions and approaches that can be applied in the teaching process in the design department.
- 3- Interest in studying modern technologies for three-dimensional computer programs to implement superposition operations to give unconventional design solutions and structures that cannot be implemented manually, thus enriching virtual three-dimensional designs.
- 4- Deepening the study of mathematical laws and engineering systems related to the structure of string theory and linking it to the field of art and design by emphasizing the implementation of superposition operations.