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Prologue.

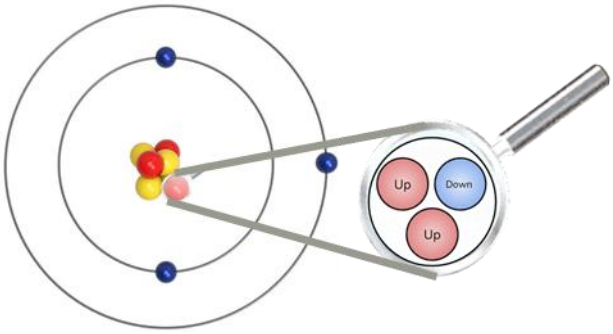
Quantum mechanics and relativistic mechanics are fantastic intellectual concepts whose predictions are of a precision never before attained but are now described by distinct formalisms.

The aim of this paper is to explore the possibility that a particular physical representation of particles may be a unique underlying mechanism for explaining simply the main results of cosmology, classical mechanics, relativistic mechanics and quantum mechanics.

This note does not seek to replace current physical theories, but to propose a conceptual framework providing an intuitive representation of phenomena already successfully described by existing formalisms.

Introduction

The classic view of the matter around us is to say that it is made up of atoms, each atom itself being made up of a nucleus around which electrons revolve. Nuclei are themselves made up of protons and neutrons, and if we zoom in on a proton or neutron, we can see that they are made up of three quarks.



Our knowledge of physics leads to fantastically accurate results but current physics presents at least three major contradictions:

1. There are two theories that work perfectly but are incompatible: relativity, which describes the immense distances of the universe, and quantum physics, which describes tiny particles.
2. In cosmology, the matter we see is not enough to explain the functioning of our universe, we have to add energy and invisible matter that we call dark energy and dark matter.
3. A particle sometimes behaves like a point object and sometimes like a wave, this is called the particle wave duality but this name does not explain the phenomenon in any way.

The objective of this essay is to imagine a simple physical form to the elementary building block that makes up protons and neutrons, the quark, and to see if this particular shape solves the three problems above.

To explain point 1, the simplest way would be to assume that a particle is not a point ball of matter, but is also quite extended.



To explain point n°2, the simplest thing would be to imagine that each particle that we observe has, in addition to the central ball of matter, an extended part, but which is so low in energy that it becomes almost invisible. The model then becomes :



To explain point n°3, the simplest would be to imagine that a particle permanently has the two characteristics: wave and ball of matter. The model becomes :



This particle, composed of a compact point material part and a wave part too weak to be visible meets our three criteria, but how can we explain this wave coming out of a grain of matter?

A strange phenomenon in quantum physics is called the tunnelling effect.

To explain this, let's take objects from our daily experience: a bowl and a marble. If you put the marble a little below the rim of the bowl and let it go, it's going to go down to the bottom of the bowl, up the other side, down to the bottom, up on your side, and so on. It will eventually stop at the bottom of the bowl because it loses energy with the friction.

If we do this same experiment with a particle, we will generally get the same result: the particle will go down to the bottom of the energy bowl, go up to the other side, and so on. And, as it loses energy through radiation, it will eventually stop at the bottom of the bowl, at the minimum energy level.
But sometimes we will find it outside the bowl! It went through the wall of the bowl. That's the tunnelling effect, the particle has dug a tunnel in the wall and came out of the bowl.

This tunnelling effect seems impossible to us, but it is perfectly documented and calculable: it makes all our current electronic products, phones, computers, etc. work.



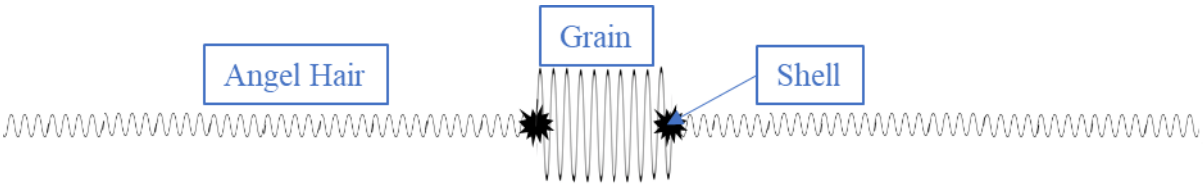
Let's go back to our last model:

The tunnelling effect could explain this wave that comes out of nowhere if we replace the central ball of matter with a bowl containing energy in the form of a wave.

Our model in one-dimensional representation then becomes:



Let's simplify the diagram a little and give names to these three parts: the centre could be a Grain, the bowl that confines this energy would be a Shell and the wave that escapes would be an Angel Hair by analogy with the "angels' share" that a barrel of cognac or whisky loses.





Note that, in this model, there is no matter: only energy.

One way to imagine a Quancha particle would be to make the analogy with a pressure cooker. A large mass of very high energy water (the Grain) is retained in a very thin but very resistant enclosure (the Shell) and a very small steam jet escape (the Angel Hair).



This Grain + Shell + Angel Hair model would explain the three main problems of current physics. But for it to be acceptable, it must at least make it possible to find the known results of classical, relativistic and quantum physics. Let's see together if this is indeed the case and how it will allow us to clarify and evolve this basic model.

In the graphics that will follow I will almost only use one-dimensional figures but you have to imagine three concentric spheres: the inner one, the Grain, the intermediate one, the Shell and the outer one, extending to the confines of the universe, the Angel Hair.

The Quancha theory and cosmology.

Does our particle model explains in a simple way the arrow of time, entropy, dark matter + energy and the period of inflation of the early Universe ?

A simple physical explanation for the existence of the arrow of Time.

The equations of physics, from Newton to Einstein, involve time, but they are written in such a way that time can be positive or negative, as if time were a line without an arrow. Daily experience proves to us that a broken glass remains broken, and that if you put milk in coffee or tea, you will never find again the milk separated from the tea or coffee: time really has an arrow.

The only field of physics where time can only flow in one direction is thermodynamics, whose most well-known component is entropy, which can only increase with time. When the last star will put out, our universe will be completely homogeneous, only filled with very little heat. Entropy will then be at its maximum. This sad end is almost certain, as the laws of thermodynamics have never been found to be at fault in the two hundred years of its existence.

How do you explain entropy? Like so many other phenomena in physics, we know how to calculate and predict the entropy of a system precisely, but not to give it a concrete interpretation. This is where our particle model can help.

The Grain + Angel Hair set keeps a constant energy but the Grain constantly transmits some of its energy to the Angel Hair. The Grain therefore loses its energy as the Angel Hair grows and it cannot rewind it.

Time cannot go back, it does have an arrow and entropy is, alas, a reality. The irreversible decrease in the energy of the Grain could constitute a physical interpretation of the arrow of time and entropy.

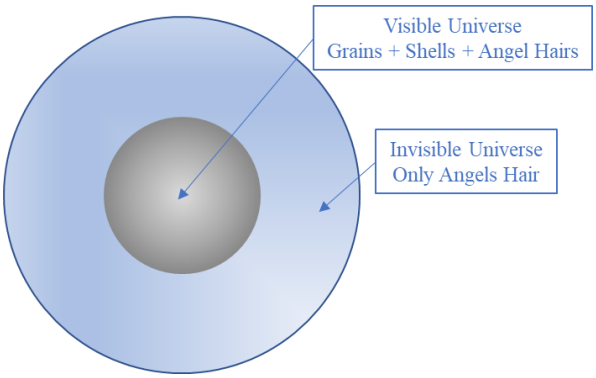


A simple physical explanation for dark matter and dark energy.

If our universe were composed only of visible matter, it would not be expanding but contracting, and many of the values observed would not correspond to the calculations. To explain these differences, in 1933 a name was put to the unknown and this invisible matter was called dark matter. Then the energy of which we know nothing but whose effects we see, we called it dark energy. And, since 1933, we continue to ignore everything about dark matter and dark energy.
In our model, the Grains and Shells have a very high energy density and make up the visible matter. Angel Hair which has a very low energy density and is therefore almost invisible is

the dark matter that possesses dark energy. The numbers you can find in the full version of the Quancha theory are totally consistent with this assumption.

There is indeed a dark matter that has a dark energy but it is not mysterious: it is the Angel Hair. And it is not black but invisible.



At the zero moment of our universe there were only Grains and Shells. The Grains had not yet transmitted any energy to their Angel Hair.

Dark matter currently makes up 25% of our universe. In 14 billion years, the Grains have lost 25% of their energy and given it to the Angel Hair. This still leaves our universe 41 billion years before the Shells contain no more energy.

There is no such thing as repulsive dark energy or dark matter: it is the Angel Hairs and their constant growth that ensure the expansion of the universe.

A simple physical explanation for the period of inflation in the universe.

To explain the remarkable homogeneity of our universe, it is assumed that just after the Big Bang the early universe expanded very rapidly for a very short period of time, and this very short period is called cosmic inflation.

In our model, Angel Hair began to grow at the birth of the universe, but at that time the entire universe could have been encased in a tennis ball. The enormous density and warmth of that time kept the Angel Hair constrained around its Grain. By dint of growing their force of expansion exceeded the force that compressed them and they exploded the primordial universe. The numbers you can find in the full version of the Quancha theory are totally consistent with this assumption.

Cosmic inflation is the short time when Angel Hair that was compressed suddenly unfurled.



The Quancha theory and the four fundamental forces of the universe.

Current physics is based on only four fundamental interactions that act at a distance between them via fields: Newton's gravity which acts over very long distances, the electromagnetic force of Coulomb + Lorentz which acts over a few meters, the strong nuclear force which acts on the scale of an atom and the weak nuclear force which acts on the scale of quarks.

Our particle model allows us to explain these four sets of equations but without remote interactions, only with contact interactions.
In this simplified document you will find only short descriptions, the equations and demonstrations are available in the full version of the Quancha theory.

A simple physical explanation for Newtonian gravity.

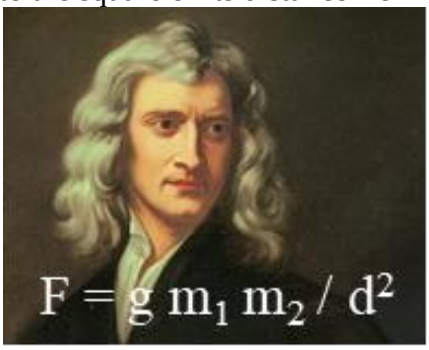
The gravitational force of attraction between two bodies, as calculated by Newton, is a force that is proportional to the masses present but whose value decreases rapidly, as a function of the square of the distance between the bodies.

How do we explain what gravity is? Like so many other phenomena in physics, we can accurately predict the results of gravitational attraction, but not give a concrete interpretation to this phenomenon that acts at a distance. This is where our model can help.

With our particle model, Newtonian gravity is explained by the contact interaction between the Angel Hair and the Shells.

In a first approximation, the attraction between two quarks comes from the contact between the Angel Hair of Grain 1 with the Shell of Grain 2, and vice versa. An Angel Hair that encounters a Shell is always locked by it and this locking force is proportional to the energy of the Angel Hair this locking force is proportional to the energy of the Angel Hair and the shell, and therefore to the energy of the Grains. Since Einstein we have known that energy and mass are equivalent: $E=mc^2$. The force of attraction between two grains therefore varies in proportion to their masses.

Geometrically the surface area of the Angel Hair sphere increases as a function of the square of its distance from the Grain: area of a sphere = $4\pi r^2$. The energy density of Angel Hair therefore decreases according to the square of its distance from the Grain.



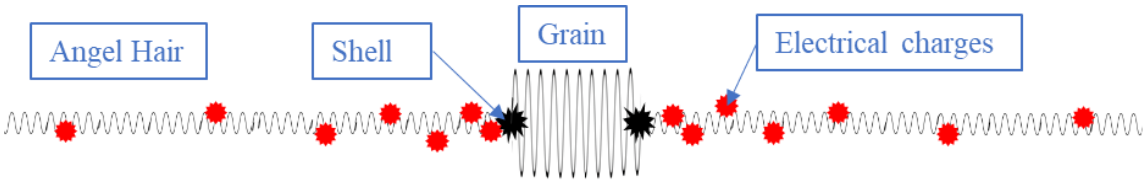
As a first approximation, the results of our particle model lead to results similar to Newton's for gravity.

A simple physical explanation for electrostatic force.

The electrostatic force, also called the "Coulomb force", can be stated as follows: "The intensity of the electrostatic force between two electric charges is proportional to the product of the two charges and is inversely proportional to the square of the distance between the two charges. The force is carried by the line passing through the two charges." "

How do we explain what a electrostatic field is? Like so many other phenomena in physics, we know how to calculate it precisely, but not to give it a concrete interpretation. This is where our particle model can help.

In our particle model, the Angel Hair carries, glued to it, point particles carrying electric charges whose energy is a function of the energy of the Grain.



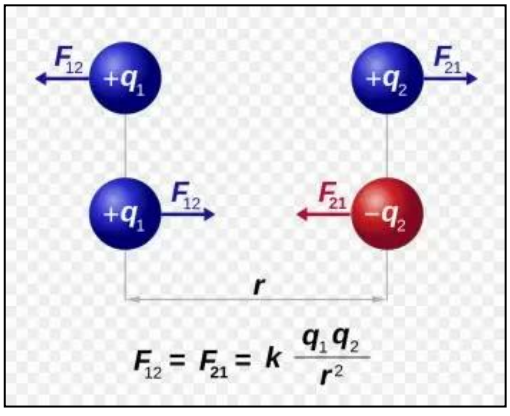
There you have it, this is the last schema of the Quancha theory in the state, certainly incomplete, in which it is now. Among other things, it lacks the orders of magnitude of energies and waves, but this requires calculations that you can find in the full version of the Quancha theory.

Geometrically the surface area of the sphere that carries these particles increases as a function of the square of its distance from the Grain: area of a sphere = $4\pi r^2$. The density of charged particles and therefore of energy decreases as a function of the square of the distance from its grain, as in the Coulomb equation.

Gravity does extend to the end of the universe, but even a very powerful coil like that of an MRI does not affect its environment beyond a few meters. In Quancha theory this is due to the fact that the lifetime of these particles does not exceed a few tenths of a nanosecond, allowing them at the speed of light to have an influence on only a few meters.

Our particle model brings similar results to those of Coulomb for the electrostatic force.





A Simple Physical Explanation for the Electromagnetic Force

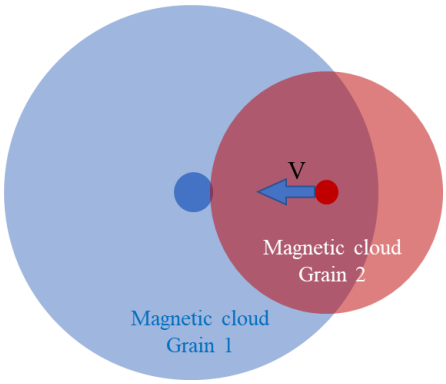
The electromagnetic force has two components: the electrostatic force that we have just seen and the magnetic force, known as the Lorentz force, which acts only on charged particles in motion.

The classical calculation of this Lorentz force says that charged particle A creates a "force field" around it and that the displacement of charged particle B in this field generates a force whose value is similar to Coulomb's law but multiplied by the square of the velocity of B with respect to A. This is the "Lorentz force".

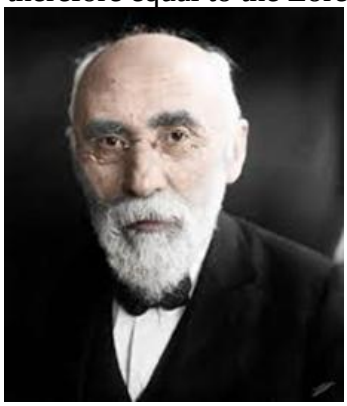
How do we explain this electromagnetic force? Like so many other phenomena in physics, we know how to calculate it precisely, but not to give it a concrete interpretation. This is where our particle model can help.

With our particle model, the electromagnetic force is due to the contact interaction between Angel Hairs.

The Grains are surrounded by their Angel Hairs that carry with them very short-lived charged particles. These particles create a kind of cloud around each Grain. When two Grains move relative to each other, their magnetic clouds move with them, and this creates an interaction comparable to friction between the two clouds.



In fluid mechanics, experiments show that the coefficient of friction between these two clouds is proportional to the square of their velocity. The magnetic force of attraction/repulsion between two Quancha particles is therefore equal to the Lorentz force.



Our particle model brings results similar to those of Lorentz for the magnetic force.

Electrostatic force + magnetic force, in total the results of our particle model bring results similar to the formulas of the electromagnetic force.

A simple physical explanation for the strong nuclear interaction.

The strong nuclear interaction is the fundamental force that holds quarks together and holds atomic nuclei together. The strong force is characterized by an extremely short range, about the size of an atomic nucleus, and decreases rapidly with distance, making it almost undetectable outside the nucleus. Contrary to the electromagnetic or gravitational force, its intensity increases with the distance between quarks.

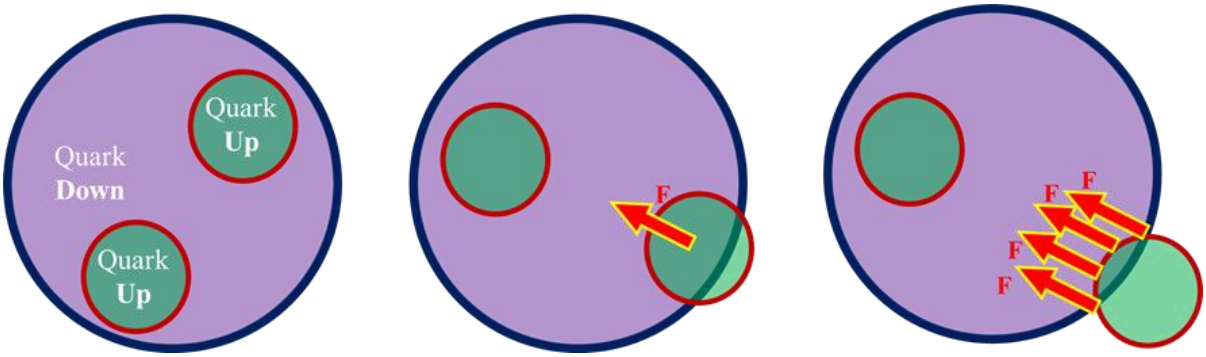
How do we explain the strong nuclear interaction? Like so many other phenomena in physics, we can accurately predict its results, but not give this force at a distance a concrete interpretation. This is where our particle model can help.

With our particle model, the strong nuclear interaction is due to the contact interaction between the Shell and the Grains.

The Shell keeps its Grain inside its sphere.
The usual matter that surrounds us is composed of protons and neutrons, which are themselves composed of quarks of two kinds: the Down quarks and the Up quarks. A Down quark is much larger than an Up quark. Given the difference in size, two Up Quark Grains can fit into the Shell of one Down Quark Grain.

When a Grain Up is inside a Shell Down, it can move almost freely, but if a tenth of an Up comes out of the Hull Down, then a force F calls Up back to the inside of Down.

If two-tenths of Up comes out of the shell of Down, then two forces F recall Up inside Down, and so on. If 8 tenths of Up are exited from Down, then 8 forces F recall Up towards the inside of Down: the greater the distance between the centres of the Grains, the greater the restoring force.



Our particle model brings results similar to those of the formulas of the strong nuclear interaction.

A simple physical explanation for the weak nuclear interaction.

The weak interaction force acts over a very small distance, ten billionths of billionths of a metre. It is responsible for radioactivity and fusion in the cores of stars.

How do we explain the weak nuclear interaction? Like so many other phenomena in physics, we can accurately predict its results, but not give this force at a distance a concrete interpretation. This is where our particle model can help.

With our model, the weak nuclear interaction is due to the contact interaction between Shells.

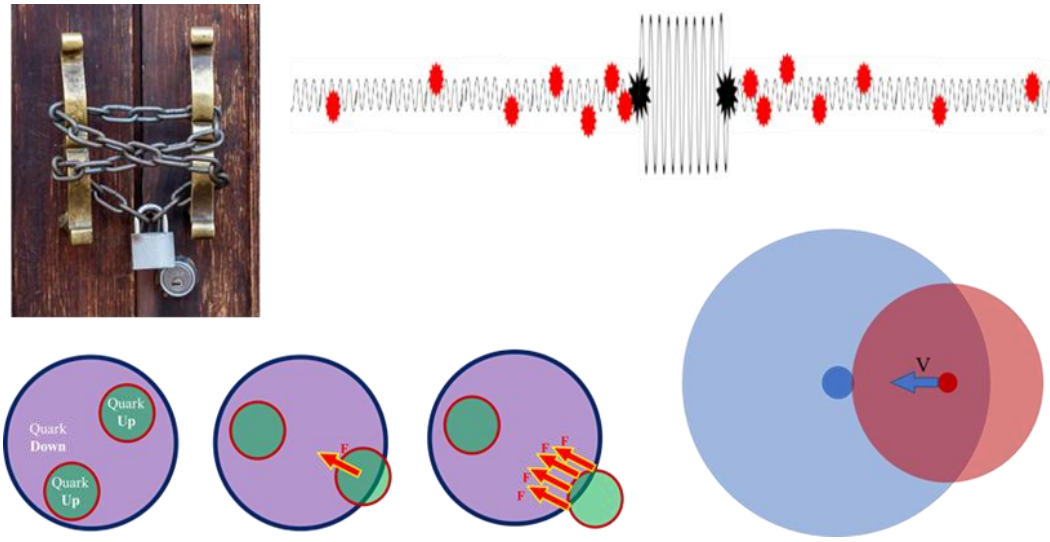
The thickness of the Shells is equal to the interaction distance of the weak nuclear force. When two quarks are close enough, their Shells touch and behave like two grains of glue or weld in the macroscopic world.

In our ordinary life, if we approach two non-dry glue or weld slots, they interact to form one. When they touch each other they stick very strongly together and it becomes exceedingly difficult to separate them, but if they are far apart, even from a very small distance, they do not interact with each other at all. It is this same phenomenon that glues two Shells together.

Our particle model brings results similar to those of the formulas of the weak nuclear interaction.

Our particle model brings results similar to those of the four fundamental forces of the universe.

But without mysterious actions at a distance, so it's easier to conceive.



The Quancha theory and special and general relativity.

The Quancha theory reiterates the fact that light, gravity, and time bend in the vicinity of a large mass, and the greater the mass, the greater the curvature.

In this simplified document you will find only short descriptions, the equations and demonstrations are available in the full version of the Quancha theory.

We are used to thinking of space and time as a still curtain against which our environment and lives unfold without interference. This is true as long as we stay at low speed and low gravity values because the differences are so small that they are not visible to humans. But as soon as you need extreme precision or get close to the speed of light or a black hole, all these certainties become false.

Relativity then becomes an indispensable computational tool whose exact results are counterintuitive to our daily experience, as time and space can contract or distort. For example, if we look at an object going at high speeds, we will assign it a shorter length than the length we would assign to it at rest. Time can also contract in the vicinity of a large mass such as the Earth and this phenomenon is essential to take into account for the operation of the GPS.

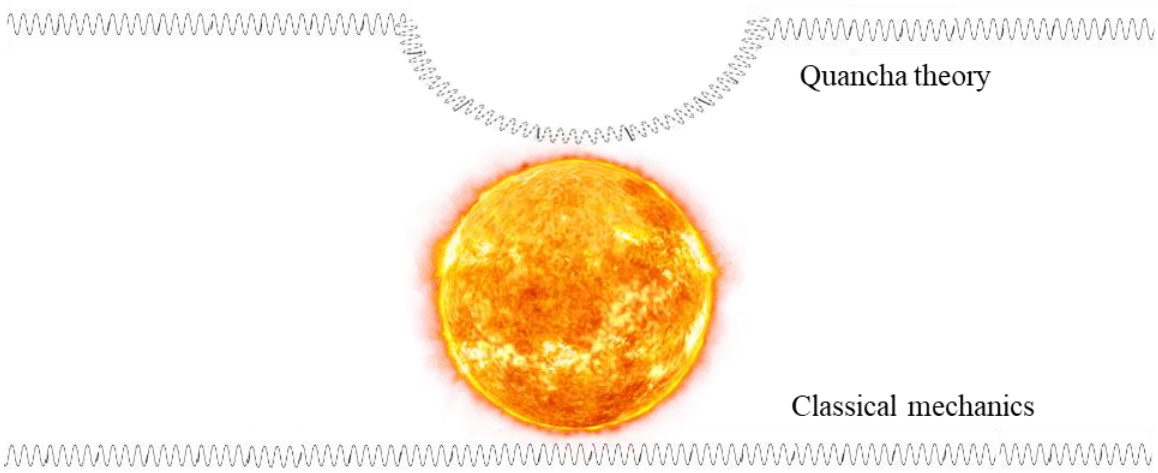
How do we explain this curvature of these two theoretical concepts of time and space? Like so many other phenomena in physics, we can predict the results precisely, but not give them a concrete interpretation. This is where our particle model can help.

A simple physical explanation for the curvature of light around a large mass.

In the paragraph devoted to Newton's gravity, we took great care to specify that: "in a first approximation", the attraction between two quarks comes from the contact between the Angel Hair of Grain 1 with the Shell of Grain 2, and vice versa. This approximation is sufficient for everyday life and even to go to the Moon, but in the cases mentioned above, we can no longer neglect the interaction of the Angel Hair with each other. Their energy density is extremely low but their length is extremely important.

If an isolated Angel Hair comes into contact with another isolated Angel Hair, the energies involved are so low that nothing noticeable will happen. But this is no longer the case at all if an isolated Angel Hair comes into contact with a considerable number of Angel Hairs coming from the same place, as for example if it passes close to our Sun.

Angel Hair is incompressible but it is deformable perpendicular to its direction of progression. An Angel Hair passing close to the Sun will be "pulled" towards the Sun by contact with all the Angel Hairs that comes from it. This force of attraction is perpendicular to its direction of propagation, which will no longer be rectilinear but curved towards the Sun.



Angel Hairs are a sort of electromagnetic waves and they curve around large clusters of Angel Hairs. Light is also an electromagnetic wave.

If there are many Angel Hairs, there are also many Grains, and the greater the number of Grains in the attractor, the more curled the Angel Hair in its vicinity. So, if we come back to the mass of these Grains, the higher the mass of the attractor, the more the electromagnetic waves bend towards it:

With our particle model, light bends around a large mass and the greater the mass, the more light bends.

A simple physical explanation for the curvature of space and time

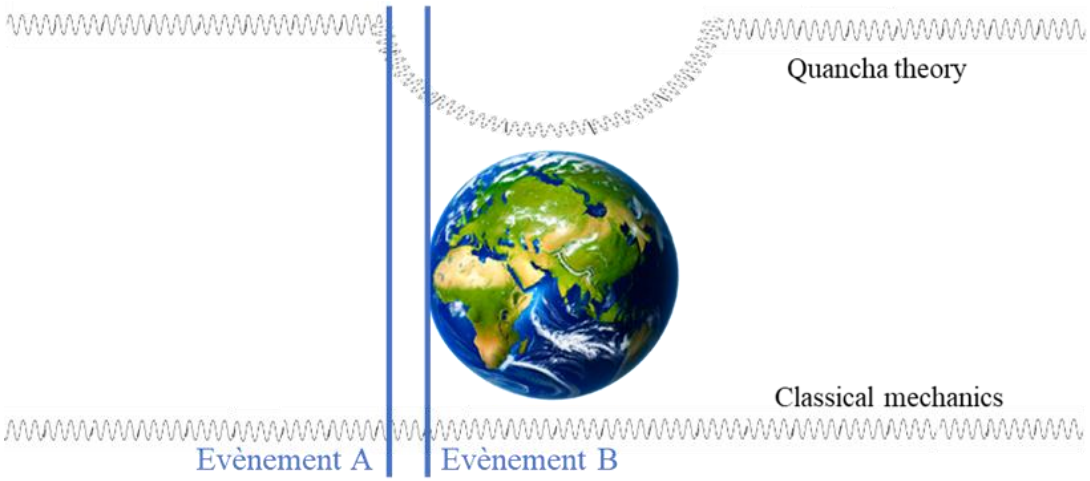
In the first approximation of gravity, we considered only the interaction between the Angel Hair and the Shell. But the interaction between Angel Hairs has been neglected.

The force of gravity carried by Angel Hair decreases according to the energy of the Angel Hair, i.e. according to the square of the distance from its Grain. The reasoning on the interaction between Angel Hair is therefore exactly the same as for light.
You can see the details of the reasoning in the full theory.

The interaction between two Angel Hairs leaves them almost straight, but if there is a large cluster of Grains, gravity bends. And if we talk in terms of mass:

Gravity curves around a large mass. But what happen to time ?

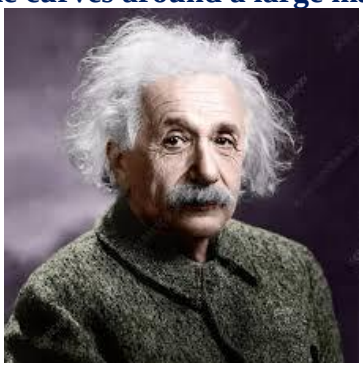
The value of the time elapsed between two events is measured by counting the number of beats of an Angel Hair that take place between these two events. In classical mechanics a wave goes in a straight line but in Quancha theory we have seen that, near a large mass, the Angel Hair does not go in a straight line but describes a curve. Since the curve has more complete sinusoids than the straight line, the same number of sinusoids and therefore the same time will not be measured around a large mass in Quancha theory as in classical physics.



Where a classical observer measures one meter of straight Angel Hair that passed between the two events A and B, a Quancha observer on a curved Angel Hair will measure more than one meter of Angel Hair.
For the Quancha observer, more time will pass than for the classical observer between the same two events: time passes more slowly for the Quancha observer than for the classical observer.

As in relativistic mechanics, Quancha time flows more slowly near a large mass: the more intense the gravity, the slower the time flows relative to an observer located in a zone of lower gravity.

Time curves around a large mass.



Light, gravity, and time curve around a large mass.

Our particle model brings results similar to those of Einstein's relativity.

But easier to visualize.

Quancha theory and quantum physics.

Relativity applies only to large distances and large masses.
On the other hand, quantum physics only applies to the world of particles.

To perform a calculation in quantum physics, we start by replacing the objects of matter by a "wave function". Then we do the calculations on the wave functions and at the end of the calculation we give the result a meaning in terms of matter.
Since Quancha removes matter and replaces it with a wave, the quantum computational formalism applies to Grains in the same way that it currently applies to a particle of matter. We simply remove the two initial and final translations in terms of matter, which are now useless.

In current quantum physics, gravity is not taken into account for calculations because its strength is derisory on particles. In the same way, one can neglect the Angel Hair in the Quancha calculations and keep only the Grain.
Quancha will therefore naturally find all the results of quantum physics, completely unchanged.

The results of quantum physics are fabulously precise, but their interpretation in terms understandable by our human experience is impossible. It is on this point that the particle model of the Quancha theory becomes interesting and I hope that this visualization of quantum phenomena can lead to new questions or intuitions.

Below we will see some exact but surprising results from quantum physics and how our particle model helps explain them simply.

In this simplified document you will find only short descriptions: further explanations, precise equations and demonstrations are available in the full version of the Quancha theory.

A simple physical explanation for quantum entanglement: information can be transmitted instantaneously, faster than light.

Not all quarks are alike, quantum particles have particularities that differentiate them into several subgroups: we speak of "spin", "polarization", "colour" or "flavour". These are only vocabularies that do not cover any reality belonging to our usual environment: particles do not rotate on themselves and have no colour or flavour. Since quarks are point particles, it is very likely that they do not even have surfaces to speak of.

When two quantum particles are brought into contact at a very low temperature, they can enter a special state called "entangled". These entangled particles then acquire very special

properties. For example, if we study a photon closely and read its polarization, its entangled cousin instantly acquires complementary polarization. The problem is that the term "instantaneously" is to be taken literally, so if the two cousins are far apart, information has circulated between them faster than light. Which should be impossible, nothing can go faster than light.

Numerous experiments have proven that this state of entanglement really exists and that the information between two entangled particles actually goes faster than light. It is on this entanglement property that quantum cryptography works, which will make our communications tamper-proof and impossible to intercept in the near future.

How do we explain this contradiction in quantum physics? Like so many other phenomena in quantum physics, some of which we will see later, we can predict the results precisely but not give them a concrete interpretation. This is where our particle model can help.

First, let's look at a simple experiment where information travels faster than light.

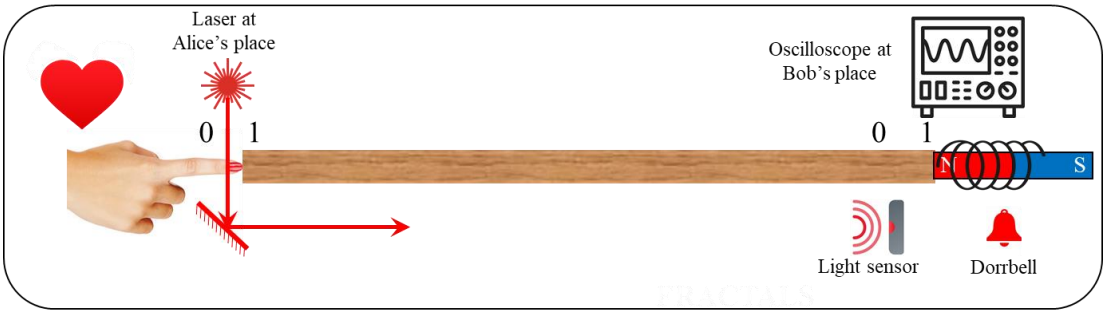
Alice's cat is very sick and Bob, who loves the cat very much, wants to know at all time if the cat is alive or dead. So, Alice and Bob install a simple device: a large stick is placed between their two houses. As long as the cat is alive, the stick remains on its left position, marked 0, and if the cat dies, Alice will push the stick to the right in position 1 in her house.
Instantly the stick will also move in Bob's house, who will only have to see that the stick is in position 1 in his house to know that the cat is dead.

Since Bob is not always near the stick, Alice installs a laser at her home above the end of the stick that is directed at a 45° mirror installed under the stick. When the cat is alive and the stick on the left, the laser only illuminates the stick. But when the cat is dead and the stick on the right, the laser beam will hit the mirror and will be sent parallel to the stick to Bob's house. Bob installs a light detector connected to a doorbell, and if the detector is illuminated by the laser beam, the doorbell will warn him. In addition, he installs a device on the stick that will use the energy generated by the movement of the stick to record the characteristics of the stick’s movement, precise time, speed and acceleration.

When the cat dies 😩 Alice pushes the stick into position 1 and Bob, who was near the stick, sees his end of the stick move into position 1 at the same time as Alice pushes it. A few moments later, the doorbell rang but Bob already had the information of the cat's death. With its continuous physical contact, the stick transmitted information instantaneously, faster than light, which, having no continuous contact with its two ends, must travel between the two points.

The information did not travel inside the stick by displacement of constraints, which would only go at the speed of sound. It is the movement of the stick itself that IS the information. The transmission of information without contact cannot go faster than the speed of light, but the transmission of information by physical contact can.

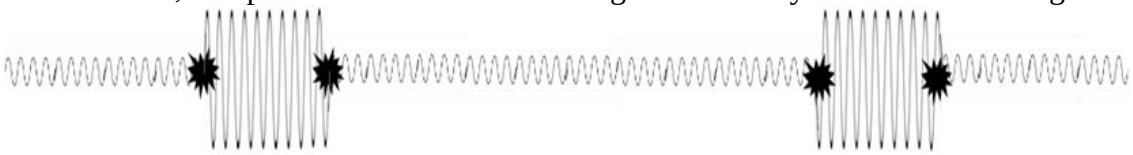




The stick transmitted the information faster than light.



With our model, two particles are said to be entangled when they share the same Angel Hair.



All you have to do is replace the stick of the previous experiment with an Angel Hair and the change of state of one particle has repercussions on the other instantly and continuously, regardless of the distance.

Angel Hair transmits information instantaneously between two entangled particles.



Schrödinger's cat.

Erwin Schrödinger imagined a thought experiment in which a cat is locked in a box with radioactive uranium and a Geiger counter. If the counter detects a radioactive particle, it will activate a device that will break a vial of poison, which will kill the cat.

Quantum mechanics indicates that, as long as nobody observes the inside of the box, the atom is in a superposition of two states at the same time: intact and disintegrated. So, like the atom, the cat would be both **alive and dead at the same time**, until the opening of the box by an observer which will triggers the choice between the two states. This is incomprehensible for a cat but perfectly accurate and calculable for a particle: it is this principle of superposition that ensures the operation of quantum computers on which all the security of our communications will depend in a few years.

In Quancha theory the change in state of the radioactive particle induces a change in its Angel Hair. With its very high frequency and very low energy, the Angel Hair interacts very little with the matter of the cat's box and therefore passes through it without interaction. The cat is either alive or dead, but not in both states simultaneously because, despite the fact that the box is closed, the state of the radioactive particle is known instantly and permanently by outside observers.



A simple physical explanation for the existence of energy quanta.

In quantum physics, particles can only take a few energy levels. And these permitted energy levels are very separate: this is the "energy quantization". All other energy levels are prohibited.

How do we explain this ban in quantum physics? We can't explain it: we can calculate precisely the permitted and forbidden energy levels but not give them a visual interpretation. Here too, our particle model can help.

First of all, let's have an experiment. Open your water tap a little bit, a small drop will form, it will grow and then fall and quickly other drops will follow. Turn off your tap, and turn it back on a little. Sometimes you'll get a big drop that fall slowly or a small drop that falls off very quickly, but you have no way of predicting the size of the drop or how long it's going to stay attached to the tap.
Why can't you predict it with certainty? Simply because very small differences in water or air pressure, or a tiny difference in the position of the drop on the tap will change everything. This phenomenon of extreme sensitivity to the surrounding conditions that create the drop is called "chaos".

What we call chaos is not a physical phenomenon different from others. It materializes under a simple name the fact that tiny changes in the initial conditions of an action induce very different, even opposite, results after a short time.

If you turn on your tap more, the water will flow in a steady flow, it is called a laminar flow but if you open your tap even more, the noise will change, the flow will no longer be regular, vortices will appear and then disappear, small drops will gush out of the flow, the flow is said to be "turbulent". When a system becomes turbulent, we can no longer predict anything with certainty, this is the domain of chaos mechanics.

If you drop a lemon in the water, each release will give you splashes of different shapes. In retrospect we could calculate the trajectory of each drop, but a priori we cannot predict the precise shape. Chaos is very organized: the equations are known but the result is unpredictable.

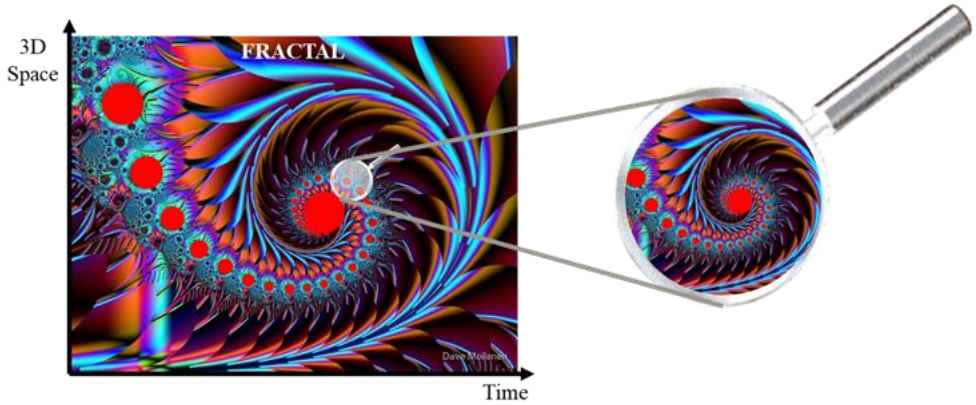


In physical phenomena stability is not the norm, it is just an island of calm in an ocean of chaos.

What is true for water is also true for waves. When we listen to the radio or watch television or our phone, we are used to thinking that we can get waves of the frequency we want, at the amplitude we want, and that we can keep them at these stable values indefinitely. This is quite true in our usual orders of magnitude. But if we increase the frequency to really very high values or if we decrease the amplitude to very low values, then, as with a fluid that goes from a laminar flow to a turbulent flow when its flow increases, when we have left the usual stable zone, we will get chaos and, in the middle of the chaos, a few islands of stability.

The gigantic frequency of a Grain and the ridiculously small amplitude of Angel Hair are not stable: the quark constantly passes between chaotic values and islands of stability. If we give different colours to the different states of the observed Quancha particle and represent time by intervals of one second and space by intervals of the millimetre, the representation of the different possible states of the particle will be a "fractal". Each point of the fractal is the result of the calculation of the same equation.

In addition to its visual complexity, a fractal has a property called "scale invariance". This means that, if one randomly chooses a point of one mm^2 and looks for what this mm^2 looks like if one looks at it with a magnifying glass, then the near view of that mm^2 will have exactly the same shape as the initial figure and one can continue this indefinitely



In this figure, only the uniformly red spaces will remain uniformly red, regardless of the magnification of the magnifying glass. They are the only islands of stability in the midst of chaos. The Quancha particle is only stable when it is in one of these islands.

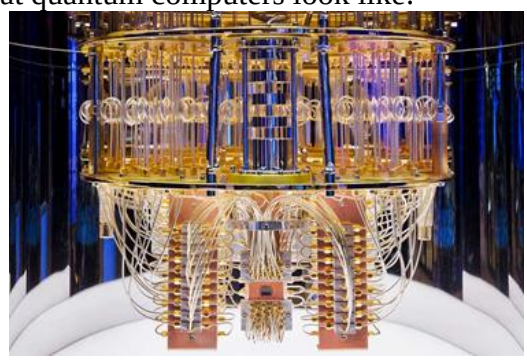
Our particle model brings results similar to those that describe the quantum behaviour of energy.

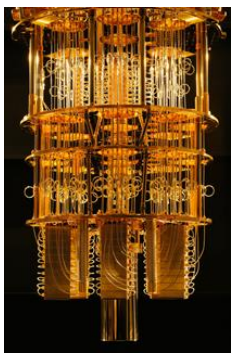
A simple physical explanation for the superposition of quantum states.

In quantum physics, when a particle goes from point A to point B, it doesn't just go in a straight line. It also goes a millimetre to the left or to the right or above or below. And also a centimetre on the left or on the right or above or below. And also a meter on the left or on the right or above or below. But don't think that this means that we don't know exactly where it goes to get from A to B, it means in quantum physics that it has passed through all these places at the same time and also through all the others between them. Yes, at the same time, this is what is called the "principle of superposition".

It sounds crazy, but it's on this reality of superposition that quantum computers work. And they work very well. Instead of having billions or even hundreds of billions of transistors working in a processor on particles taking the values zero or one, the quantum computer will work on a single particle but that particle takes all possible values at the same time. And so, instead of chaining calculations one after the other as in a classical computer, all these calculations will be done in parallel, at the same time. And if we want to work with several particles, "qubits", we will entangle these particles and the calculation will be done at the same time on all these entangled particles.

This is what gives the extraordinary computing power of quantum computers.
Here's what quantum computers look like:



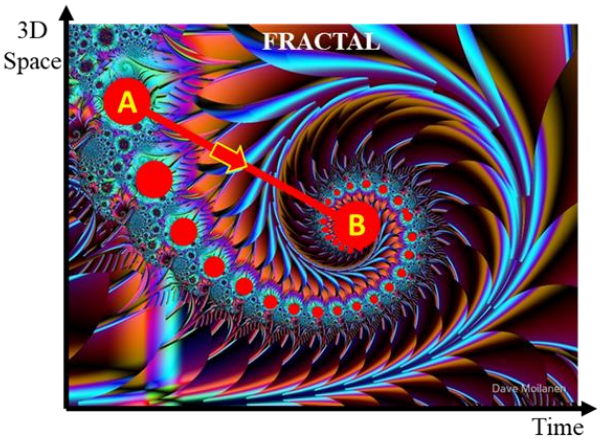


How do we explain the principle of superposition in quantum physics? We can't explain it: we can calculate everything precisely but not give a visual interpretation. Here too, our particle model can help.

In Quancha theory, a quantum object does not necessarily change its state by well-defined and regular quanta. When it emerges from one island of stability, it eventually arrives at another, passing between the two through the infinitely complex fractal points that fill the chaotic space.

In the diagram below, each colour represents a different state of the particle, and only the red dots are steady states. This diagram gives the impression that, in order to go from A to B in a straight line, the particle will pass through a finite number of known states. But remember, by scale invariance, there is not really a point of a single colour on the diagram of a fractal: we can zoom in on each point and it will then be represented by the same complete fractal shape.

The particle goes in a straight line from A to B but the path from the stable point A to the stable point B passes through a high number of different point states and it is equivalent to consider that it passes through a high number of different paths in a non-chaotic uniform space.



With our particle model, the best way to predict the state of a particle is therefore, as in quantum physics, to imagine all the possible paths, all the possible changes of state, to weight them and to average them.

A simple physical explanation for the tunnelling effect of a particle

A quantum particle can have different states characterized by what is called spin, flavour, colour... A Quancha particle has all these characteristics but it also adds one: the vibration frequency of the Shell.

Maybe you've seen a video of a bridge twisting in all directions under the effect of a troop marching in step or under the effect of the wind? This is what is called the phenomenon of resonance. This phenomenon also exists for a particle Shell. As long as the particle is at a temperature above absolute zero, the Shell is constantly subjected to vibrations. In some cases, this vibration frequency will be equal to the resonant frequency of the Shell.
Then the Shell will start to increase the amplitude of its vibrations and increase its energy level enormously. If this particle is enclosed in an energy cage, it will briefly acquire more energy than the cage, and then come over the top, out of it.
This is the tunnelling effect that we saw at the beginning for the Grain but applied to the Shell and, as the Shell is welded to the Grain and Angel Hair, it is the whole particle that will benefit from this tunnelling effect.



A simple physical explanation for quantum decoherence.

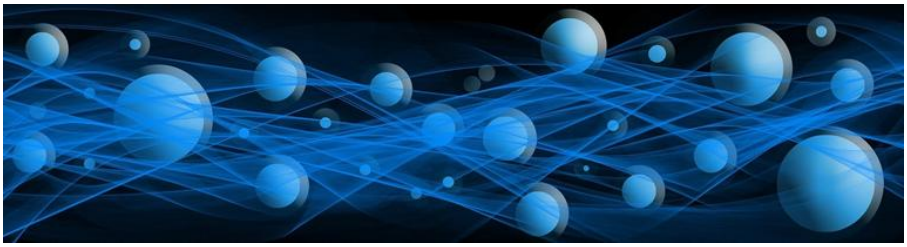
In our daily lives, we never see our objects behave in the incredible way that quantum particles have. Why? Because in our environment particles are never isolated: there are 60 million billion iron atoms on a pintip. And this proximity forces the particles to remain in their steady states. This is called "quantum decoherence".

How do we explain the principle of decoherence in quantum physics? We can't explain it: we can calculate everything precisely but not give a visual interpretation. Here too, our particle model can help.

Any particle whose temperature is above absolute zero vibrates constantly. When a particle is isolated or in contact with very few other particles, the Shell is in a state of thermal agitation. It vibrates and this unstable state causes the Grain, its Shell and its Angel Hair to go into chaos and come out of it, remain stable for a moment and plunge back into chaos.

As soon as there is physical contact between an isolated particle and an Angel Hair, this Angel Hair will absorb some energy from the affected particle. If this number of interactions is large enough, these Angel Hairs will play the same role as a shock absorber and the Shell of the isolated particle will no longer be able to vibrate freely.
The Shell of a particle subjected to a large number of interactions with a cluster of stable particles can no longer vibrate anarchically, but only in the same way as the other particles. The close presence of many particles therefore forces an isolated particle to remain in a stable state, which consumes little energy. This is decoherence.

Quantum decoherence of a particle occurs when it comes into contact with a cluster of stable particles whose Angel Hairs dampens the vibrations of its Shell.



Our particle model brings results similar to those of quantum physics.

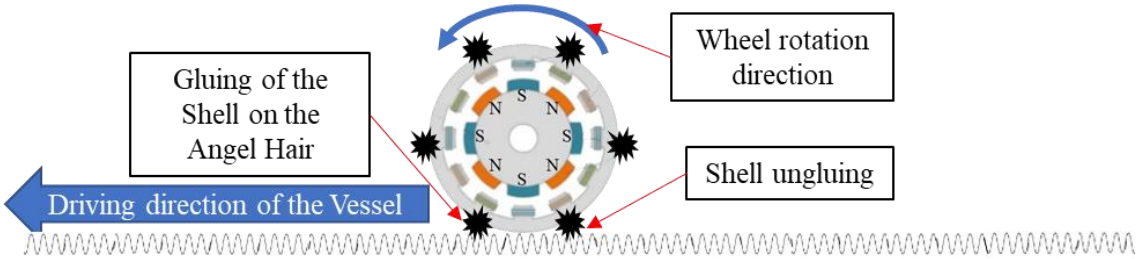
But easier to visualize.

Two practical applications of the Quancha theory: the space engine and the warp engine.

The "void" between the stars is filled only with Angel Hair.
When we will have learned how to easily glue and take off the Shell of an Angel Hair, we will be able to make engines to propel vessels into the void.

The space engine:

We could make a space engine on the principle of snow tires, with Shells acting as studs. This wheel would be driven on the same principle as a permanent magnet synchronous motor. The limitation of this motor is related to the maximum rotational speed of the ball bearings.



The principle could be refined by eliminating the friction of the wheel hub and rotating the wheel into vacuum on a magnetic bearing. The theoretical speed limit is now only limited by the laws of relativity: the wheel becomes infinitely heavy as it comes close to the speed of light.

The warp engine:

No part of the wheel can go faster than the speed of light, but if you can create a local distortion on the Angel Hair just upstream of the gluing, there will be a very long length of Angel Hair between each Shell of the wheel. The wheel rotates at a speed below the speed of light, but the length of Angel Hair between the two propulsion studs is much greater than the distance between these studs.

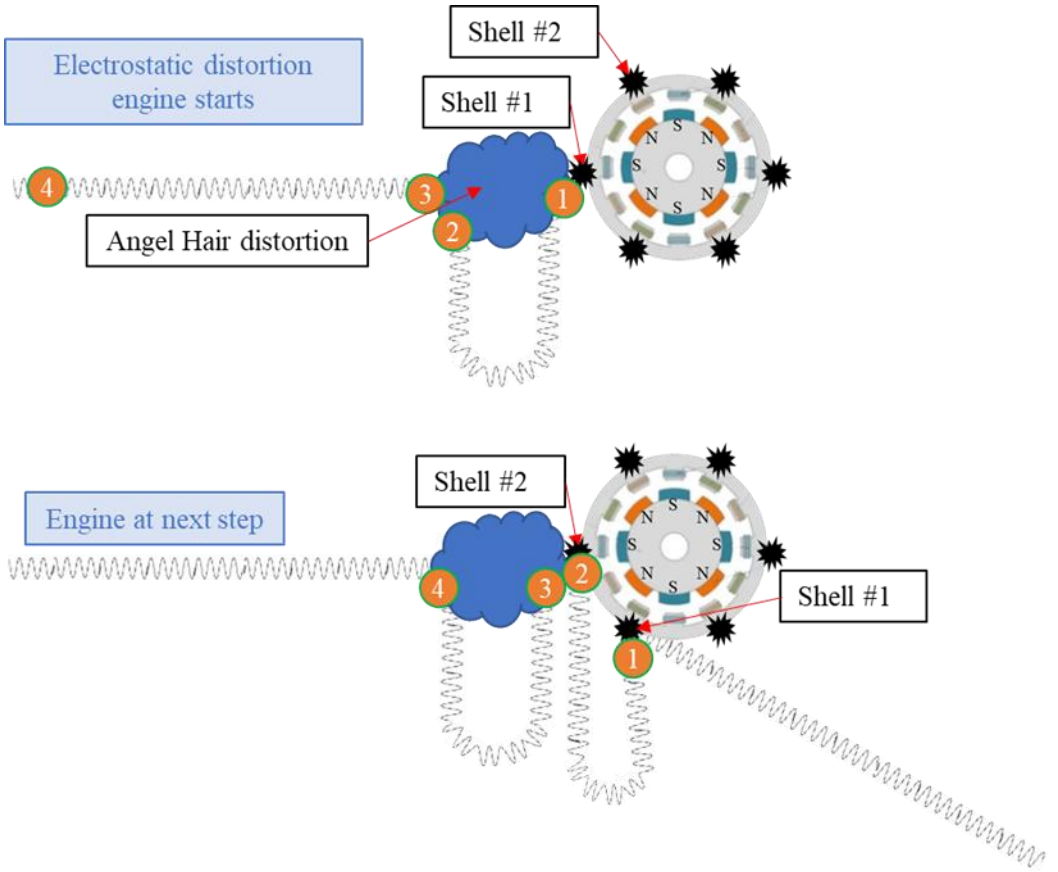
We have seen that Angel Hair bends under the force of gravity but also under the electrostatic force. Gravity is difficult to reproduce but not the electrostatic force.
It would therefore be necessary to create the distortion by using the electrostatic properties of Angel Hair.

If you put enough wheels wide enough at the front of the vessel, all the Angel Hairs that were in front of the vessel will move to the sides, which creates a bubble around the vessel.

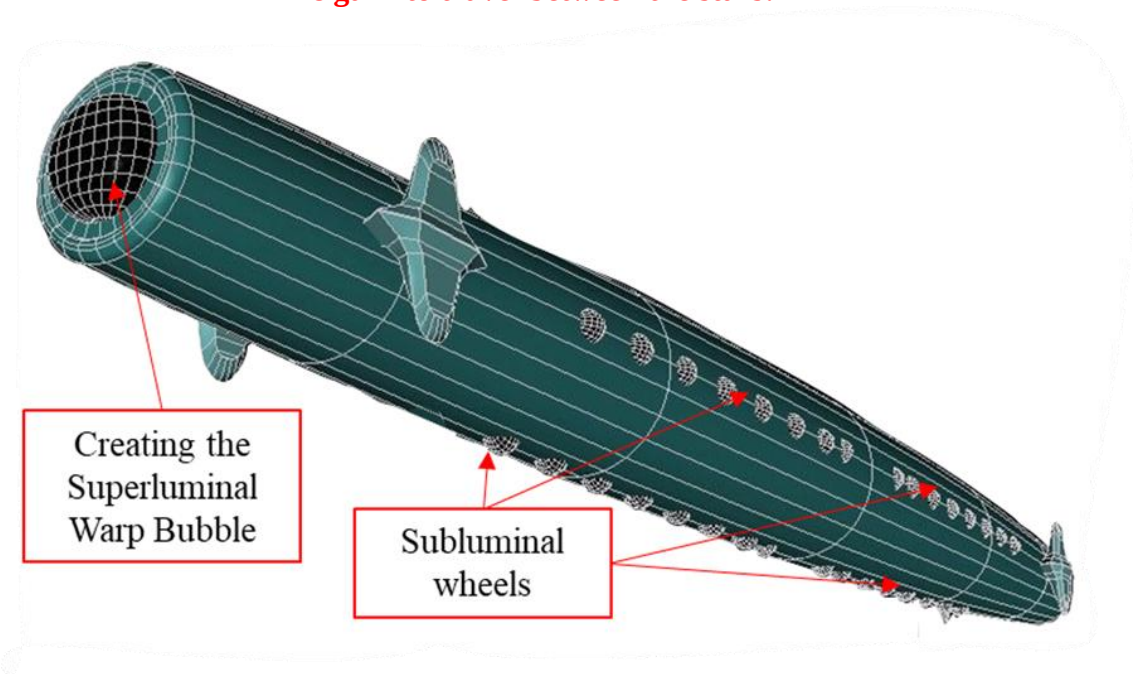
Inside the bubble, the vessel remains stationary in relation to its local space. The passengers do not feel any acceleration or sensation of speed. In this configuration the vessel does not really move, it takes space in front of it and sends it behind it.

The amount of space sent behind the vessel depends on the warp factor, but there is nothing to prevent this value from being large enough for the space around the vessel to move faster than light.

Here is an electrostatic warp engine at the time of its start-up:



Here's how you could install these wheeled and electrostatic distortion engines on a "cigar" to travel between the stars:



Conclusion

The Quancha theory shows that with a very brief hypothesis that is easy to represent in four dimensions, we can give a simple physical explanation to many phenomena of quantum physics, relativity or cosmology that we know to be exact and that we can calculate perfectly well but that we do not know how to describe well.

The Quancha theory has not been confronted with the reality of experimentation. In this incomplete state, the Quancha theory leaves questions unaddressed, in particular on waves whose interaction properties and certain characteristics need to be replaced or completed.

The purpose of this Quancha hypothesis is only to provide a simple visual representation of known phenomena in quantum or relativistic physics in the hope that this simple representation can inspire future theoretical and experimental developments.

FECI QUOD POTUI, FECIANT MELIORE POTENTES.

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