The Principle of Consistency: A Unified Framework for Classical, Quantum, and Relativistic Physics

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Abstract:

This paper proposes a novel framework to derive all known laws of physics from a single foundational principle: the *Law of Consistency*, introduced in Section 2.

By applying this law to symmetric states and conditions—regardless of the method of execution—it becomes possible, through pure mathematical reasoning, to reconstruct both classical mechanics (as developed by Isaac Newton) and, more significantly, quantum mechanics.

Quantum mechanics is reinterpreted in this paper under a new conceptual framework rooted in consistency, providing coherent explanations for key phenomena such as entanglement, decoherence, wave function collapse, interference, the Pauli exclusion principle, and others.

The principle of consistency is also extended to the domain of special relativity and shown to underlie its transition into general relativity. Some well-known equations
(e.g., *$E = mc^2$*) are re-derived, not for novelty, but to emphasize their foundational basis in the proposed axioms of consistency (Axioms 1 and 2) and logical deduction.

Constants of nature (e.g., Planck's constant, *G*, *k*, etc.) are not addressed in this work. It is argued that they may represent arbitrarily assigned values within the universe, preserved through space and time by definition and by the consistency law.

Finally, the paper proposes a *testable hypothesis* suggesting that quantum mechanics arises from interaction, and also provides a formulation to determine the *reaction force during collisions* between two objects at a given speed.
This paper suggests, for quantum mechanics, a testable way to prove that quantum mechanics is due to interaction.
Also, this paper offers a formulation to use for determining the reaction of contact when two objects collide at a certain speed.

Forword:

This work is the result of independent exploration, guided not by formal research sources but by a deep engagement with mathematics and a desire to reach a clearer understanding of physical reality. All derivations presented here were developed from first principles using mathematical reasoning alone.

While no direct sources were used in the derivations themselves, my conceptual understanding of formal physics was shaped over time by foundational texts such as Hilbert's writings and the General Chemistry curriculum I encountered during my university studies. These works laid the groundwork for a broader scientific perspective.

Much of the remaining insight was gained through a long process of self-inquiry, driven by questions and refined through conversations — many of which took place with ChatGPT via WhatsApp. These exchanges played a formative role in helping me test ideas, clarify doubts, and pursue consistent reasoning.

This paper is offered in the spirit of intellectual curiosity and as a step toward deeper coherence between mathematics and the physical world.

keywords :

Law of Consistency; Fundamental Physics; Classical Mechanics ; Quantum Mechanics; Superposition; Symmetry Linearity; Newtonian Mechanics; Electromagnetism; Relativity; Physical Interactions; Unified Theory; Cause and Effect; Scaling Laws ; Derivation of Physical Laws

Acknowledgment:

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Declaration of Competing Interests
The author declares that there are no competing interests

Author Contributions
The author performed all research, analysis, and writing for this study.

Symbol	Definition
(+)	"simultaneously applied with", might differ in principle than arithmetic addition +, if the global outcomes are not necessarily equal to the sum of the isolated outcomes(for e.g synergetic)
Ψ (Psi)	Eigenstate wave function
|Ψ>	An element of the Hilbert space **($\mathcal{H}$)** that fully describes the quantum state.
$\mathcal{H}$	**Hilbert Space ($\mathcal{H}$)**: An infinite-dimensional complex vector space where quantum states live, allowing for superposition and complex coefficients.
h (h)	Planck's constant
Pi	Probability of the *i*-th eigenstate
i	Index of an eigenstate or operation(|Ψi>, the eigen state I vector)
$_a$ or $_b$	Subscript indicating which object is described by a given propery.
M or M'	Mass of an object, source or destination respectively
p	Mass density (mass per unit volume)
q	Charge density (electric charge per unit volume)
Q	Total electric charge
n	Number of copies or identical objects
N	Total number of copies of s system of objects.at an instant.

Symbol	Definition
(+)	“simultaneously applied with”, might differ in principle than arithmetic addition +, if the global outcomes are not necessarily equal to the sum of the isolated outcomes(for e.g synergetic)
f	Mathematical or physical function; not necessarily expressed in closed-form
r	Distance between centroids
u or U	Motion in the general sense; may represent various physical quantities depending on context(displacement,velocity,acceleration,jerk..etc)
A	In context, A as a value is the motion of object A(can also be written as Ua)
Ai	Individual cause , can be created by individual object/system(for e.g one planet)
B	In context, B as a value is the motion of object B (can also be written as Ub)
c	Celerity (speed) of light in vacuum
C or C(x)	A function, expressing a cause, that inputs the position x of an object, and outputs a behavior/motion U.
v	Velocity of the object
E	Energy of a system
Ei	Energy of a copy/eigen energy of state i.
$\langle E \rangle$	Expectation value of the energy
G	gravitational constant.Also can be seen as the motion created by 1kg of an object at 1m distance
G’	Motion due to gravity,created by 1kg of an object at distance d in meters

Symbol	Definition
(+)	“simultaneously applied with”, might differ in principle than arithmetic addition +, if the global outcomes are not necessarily equal to the sum of the isolated outcomes(for e.g synergetic)
G”	Motion due to gravity , of M kg object due to 1kg distant 1m
G1	Motion due to gravity of an object ok 1 kg due to a 1kg at a distance scaled by factor of S to 1 m, relative to a person inside the scaled universal version.(=G by consistency)
g	In this paper it is a term used to simplify calculation (see(Eq.7)) and it is not the gravitational acceleration.
h(...(x)n)	General function giving an outcome of n causes when applied simultaneously using as input n, and the effect of individual application of a cause.
J(x1..xn,y1,,yn,z1..zn)	A function that describes a property of a physical object in function of all object-derivation configurations in spacetime
K(x)	Weighted Cause including intrinsic property effect. Usefull for combining effects with different intrinsic properties.
S	Scaling factor, used to describe the dependency of a property/behaviour on the scale S of the system.
V	Volume in m^3 of an object.
X or X’	The motion of a reference object of certain material after collision with another reference object at velocity v

Symbol	Definition
(+)	"simultaneously applied with", might differ in principle than arithmetic addition +, if the global outcomes are not necessarily equal to the sum of the isolated outcomes(for e.g synergetic)
X0 or X'0	The motion of a reference object of certain material after collision with another reference object at reference velocity v0

Scale invariance/scalability:
scaling of observed system, by factor s, doesn't affect any physical behaviour/state, including cosmological constants(G, h,c etc..)

Motion Effects:
Vectors that represent an effect in term of motion, as caused when individual cause is present. when this motion is acceleration , then it is called acceleration effect.In other words it is exactly as "classical force" but without inclusion of mass.such definition is limited and can't be solving contact interactions.

Exotic Vectors:
Vectors that represent instantaneous direction and amplitude of the shift in position of a generated copy. this type of vector to be possible it must respect irreducibility.

Irreducibility:
In context of this paper, it is the inability to represent two or more vectors by a less quantity of vectors. For e.g. in quantum level, the general behavior possible rules, where causes creates shifted copies in multiple directions. Thus instead of making one displacement in one direction, it goes beyond that and make many displacements in many directions, permitting symmetry to be preserved in special way, each copy adopt a direction and shift, each of those is an exotic vectors. They cannot be added because they are not translational vectors, but have specific non reducible functioning.

Copy:
In the context of this paper, copy is any object belonging to a set of objects which have common origin.It is generated by interaction effects(motion effects) in a way that respect symmetry and that satisfy the axioms of consistency.

Indistinguishability vs Identicality:

indistinguishability is the absence of any mean to be able to distinguish.

Identicality is the absence of any difference.

this nuanced difference is crucial to understand the three axioms.

for e.g in 3.5 we see the indistinguishability of the system of two particles. Although in this paper it is clear that each path of the copies of the particle can be different, we can say the two particles are non-identical, but because the term used in axiom 2 is “indistinguishable” it puts the lack of the ability to see that difference, which depends on observers and not on a objective truth , as the key for applicability of the axiom 2.

- **SUMMARY TABLE:**

1. Introduction

Complex theories and analytical models in physics have been developed to describe and predict the outcomes of experimental observations. Quantum physics and relativity, in particular, have yielded some of the most accurate predictions in science.

However, there remains a need to understand the *underlying cause* of these phenomena and to unify the different fields of physics under a common framework. A clearer understanding of what fundamentally governs reality could lead to the discovery of

new physical laws—even before they are observed experimentally.

This motivation led me to write this paper and propose a unifying principle: the *Law of Consistency*, which aims to explain significant aspects of physics across both classical and quantum domains.

Certain elements of quantum mechanics and relativity still lack a complete scientific explanation. This paper seeks to address those gaps by offering clear and simple answers through the lens of consistency and its logical implications.

Furthermore, this paper proposes a deterministic framework that aligns with the probabilistic outcomes of quantum mechanics without invoking randomness or collapse. While it shares surface similarities with the Many-Worlds Interpretation, it introduces objective constants—such as the cosine correlation in Bell-type scenarios—and mechanism of evolution/entanglement derived from consistency rather than branching or subjective observation. This may provide a more grounded physical basis for phenomena typically left to interpretation.

1.1 Definition:

the theory says the following three axioms:

1. Indistinguishable circumstances must yield **identical** outcomes.
2. Two unseeable explanations of two indistinguishable observable, are true simultaneously. (unseeable doesn't mean invisible, but it means there is no ability to be seen)
3. It is expectable to get all possible type of behaviors in the universe as long as they satisfy the two first axioms

1.2 General Consequences:

Axiom 3 means consistency ensures that, out of the infinite range of all absolute possibilities, in which reality can behave, reality evolves in only the ways that satisfy all the first two axioms across space and time rather than permitting pure chaos where no rules can hold. This axiom also expect that all possible ways in that context to be present in the infinite cosmos.
one of the implication is the existence of vast range of particle types which don't have interaction with electric field, such particles can have masses and thus gravitational effects.
the subgroup of particles that do not have a kind of force similar to electrical force or nuclear force applied in between those of same type ,that causes repulsion or decay, it will never be repelled, it will fall under its own gravity , with no resistance except by its own gravity, which creates a long-term oscillation of particles that appears as hallows. Such type of particles is similar to what we search for as "dark matter".
Also from this same axiom, It is predictable to have category of forces that multiply and shift position an object, those particles are the one involved in quantum mechanics(refer to chapter 3)

The axiom 2, can be a source of many physical laws, in this paper it occurs in 4 places or more: scale invariance, vectorial aspect of forces, relativistic effects, indistinguishability of a system of quantum particles.

<u>scale invariance pose the following:</u>

a static universe , is indistinguishable from a version in which the universe is exactly the same but scaled by amount S.
Indistinguishable by defining the universe as the container of all physical observable(can be observed)
the universe as simply unscaled and as scaled in complex formula that maintain all the physical properties, are two explanation that cannot be observed of the same universe/ two indistinguishable universes.thus according to axiom 2,both explanations stand true.

This extend to space dimensions as well as time dimensions, because the indistinguishability is related to observer and not objective truth(not like identicality) each awareness has inner clock, time measure then emerges from ratio between frequency of inner clock, and the frequency of emitted signals.

When objects are scaled by s in all the universe, the distance of physical interactor (index of awareness, in other words to what body the consciousness receive through the information from the physical world) from signal emission source is also scaled equally even if it was infinitesimal distance.

Thus, the frequency of signal reception is reduced s time because it requires a motion of a distance *s .by scale invariance imposed by axiom 2, we should have the same perception of time in both scaled and unscaled as to be undistinguishable, thus the rate inner clock/signal emission should be the same. Therefore, time should pass s times faster in scaled version to compensate this reduction and have indistinguishability

Thus s sec==>1 sec.

Concerning vectorial aspect of forces/causes:

When *n* distinct causes (denoted A_1, A_2, ..., A_n) individually produce effects Ai=fi(x) on an object D, their combined simultaneous influence can be understood as a simultaneous superposition of identical causes, C, acting over a time interval t.

causes C represents the effect resulting from alternating sequential application of the A_i causes (i.e., A_1, A_2, ..., A_n, A_1, A_2, ..., A_n, ...) at infinite frequency(figure 1). Cause Ci represent effect C starting with Ai.

for e.g If n=2:

C1=A1 then A2 in dt sec

C2=A2 then A1in dt sec

C1 and C2 in principle could be different because the outcome of A2 applied on product of A1 might differ in outcome then A1 applied on product A2.:

For e.g if we theoretically say C1 add 2m/s for the distance to object D and C2 multiply the distance by 2 the order becomes significantly important on the outcome(2d+2 vs 2(d+2))

When C1 or C2 are repeated indefinity(t>>dt) algebrically we can say if that initial effects A1=f(x)

A2=g(x).

C1(x)=fogofog….f(x) going indefinitely

C2(x)=gofogof….g(x) going indefinitely

x the representative value of object D(for e.g motion) being infinitesimal at dt seconds C1 and C2 converge to the same value..so we can call it effect of cause C=C1=C2. [10]

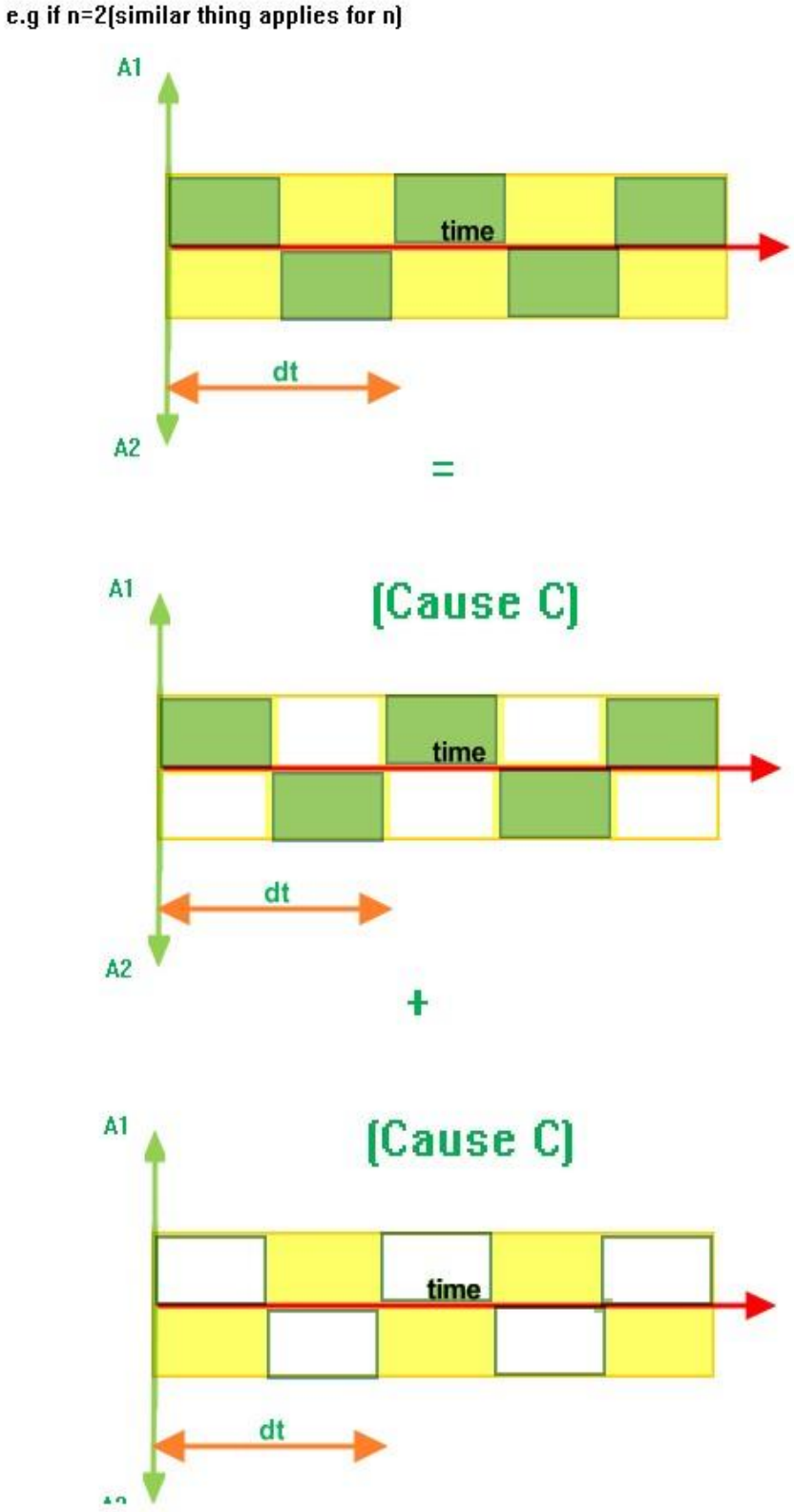


Figure 1 blending superposition frequency diagram

Considering A_i as an instance of total cause *C*, which source occupies a finite volume *dV*. The combined influence of these Ai causes can be explained(axiom 2) as the *simultaneous

application* of *n* identical effects *C(x)* on *x*. This simultaneity is expressed as:

$C_0(x)$ (+) $C_0(x)$ (+) ... (+) $C_0(x)$ (n times) (Eq.1)

At first glance, it may seem intuitive that this simultaneity results in a total effect of *n·C(x)*. However, this must be derived from more fundamental principles to show the extent of consistency

Let *h(...)* be the operator that applied simultaneously on the indivudual cause function C(x) gives the combined effect. For example, h(C(x), C(x)) gives the combined effect of two standard causes acting together. Define h_1 = h(C(x), 0) as the effect of C with effect of an empty region (0) simultaneously/ in other words h(1(x)C(x)). Now, let's consider scaling the system by a factor *S*. Due to spatial scaling, any volumic distribution of the cause C will be multiplied by S^3.thus the number of C units becomes S^3 in the *original frame*, though each remains a unit volume in the *scaled frame*.

Each object class/type might have a property that makes it convertible to other class of objects with different intrinsic properties (e.g. mass/charge density) and therefore convertible to a references class.

Let cause K(x) be the effect of any source object with any intrinsic property p on property x of destination object D

K(x)=p*C(x) (Eq.2)

By scaling S times each dimension

The motion u of scaled system relative to original(unscaled) reference is the simultaneous effect of S^3 of f(K(x),S),f being the function that includes the scaling of their property p.

u= h(S^3(x)f(K(x),S))

Also u is the motion u0 measured in the original reference scaled by S^z=S for linear motion(in meters/s^m thus z=1),as the scale invariance derived from consistency of axiom 2 requires(see list of definitions and 2.1.1) =K(x)*S if time scale is considered fixed.

But as already explained in 2.1.1, time duration is scaled as space, by factor s.

If motion is per sec^m then

h(S^3(x)f(K(x),S))=S*K(x)/S^m=

K(x)*S^(1-m) (Eq.3)

We know two mathematical implications on the function f:

> Any physical parameter e.g density, can be written as a function of infinite number of positions in time and space of infinite number of entities:
> a=j(x1,x2…xn,y1,y2…yn,z1,z2…zn,t1,t2…tn)
> In other words property a(including intrinsic and extrinsic)could include any correlation and any derivation order using all what defines the space and time.
> Scaling in the context of this paper, is a substitutiom of all these x1…tn parameters by s*x1…s*tn.
> Thus we conclude the following property for any function f(a,s) that describe the image of scaling on property a.

1. fofofo..n times f(f(a,s),s)=f(a,s^n) because scaling system consequentively is like scaling it multiplicatively.(scaling twice by s is equivalent to scaling by s^(2))

   This condition impose the shape of f to be invertible in S.
2. f(f(a,s),1/s)=a becauses scaling by s then descaling by s result in identity function.thus f(a,S)=f^-1(a,1/S)
   thus f(a,1/S)=f^-1(a,S)

(we shoulde note the distinguish between scaling and extrapolation)

These two implies mathematically[1,2] the shape of f as

f(a,s)=a*S^k with k a constant to determine.

Thus h(S^3(x)K(x)*S^k)=K(x)*S^(1-m)

h(S(x)K(x)*S^(k/3))=K(x)*S^(1-m)/3

h(S(x)K(x))=S^((1-m)/3-k/3).K(x)

h(n(x)K(x))=n^((1-k-m)/3).K(x) (Eq.3a)

Thus we can say for now is that (Eq.3a) is the direct outcome of application of consistency axiom 2 through translation into symmetrical scalability in term of any linear motion related property.

We determine k in the next section as -4

We know

(1-k-m)/3=1→1-k-m=3→

k=-(m+2)

thus setting m=2 k=-4 will have linear behaviour.

= thus we obtain for U as acceleration:

h(n(x)K(x))=n.K(x) (Eq.4)

Thus we obtain h(n(x)pC)=n*p*C (Eq.5)

Which means the effects are linearly superposable/additive.

Same applies for point particles by assuming them an extension of the limit of volumetrically distributed cause

(V→0)

If I attribute the effect of those point like particle to infinitely small volume it is not necessarily that it be 0.it could sustain a finite value if we compensate by a property p →infinity.thus p.dC and f(p.dC) can be greater than 0.

All being said we conclude that simultaneity of identical causes adds up linearily (we consider motion is unit length/s^m)

This establishes that the function U is linear with respect to the scaling of cause C:

U(n(x)C) = n·U(C) (Eq.6)

This shows that *motion effects can be linearly added*. Moreover, the direction of the total effect is aligned with the *vectorial sum* of all individual effects $f(A_i)$.

Additionally, as will be detailed in the next section, a cause influencing the position of an object cannot result in unidirectional motion if such motion violates the system's initial symmetry. In such cases, the object must either:

1. Move in multiple directions simultaneously (i.e., be in many positions at once), which will be shown to correspond to *quantum behavior*, or
2. Move along the unique, symmetry-preserving direction: the axis connecting the source and the affected object.

For example, two identical objects in a closed system exhibit symmetry about the midpoint of the line joining them. Any valid transformation must preserve this symmetry. The only possible result, while conserving the number of objects and satisfying symmetry, is motion in *opposite directions along the connecting line*.

Otherwise multidirectional copies should emerge from the object under irreducible state of superposed vectors of motion.(quantum effect)

This *multidirectional behavior* converges to *classical unidirectional motion* at macroscopic scales, as we will demonstrate in Section 5 on quantum mechanics.

Being *linearly superposable* and directed in similar way as vectors, then we can represent each effect induced/cause by a vector of motion*U*.

In the next section, we will explore how the implications of consistency and the vectorial nature of effects form the foundation for all of physics.

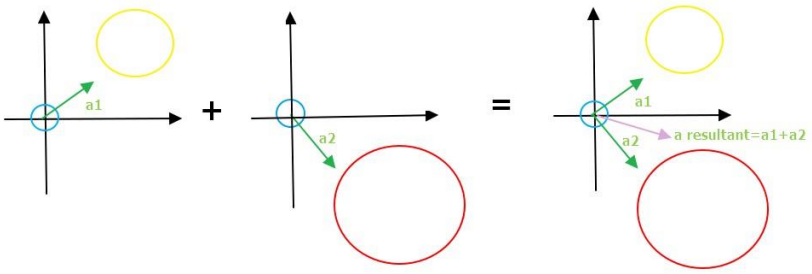


Figure 2 llnear vectorial addition of effects

2. The Newtonian Mechanics

"The purpose of this section is to continue the development of Newtonian mechanics, primarily by deriving the principle of energy conservation, and to establish a conceptual structure upon which quantum and relativistic physics will later be built."

2.1-Law of Gravitation:

2.1.1 Force emergence from consistency:

"Assume there is an object A with a volume of 1 meter (m^3), located at a distance of 1 meter (m) from another object B, which also has a
volume of $1m^3$. Both objects are composed of the same material for now and are initially at rest."

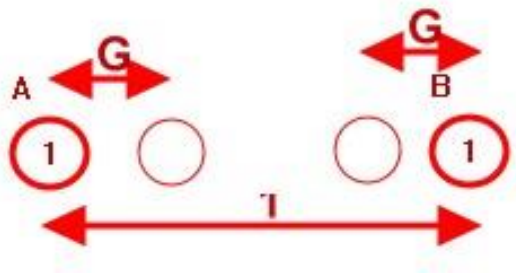


Figure 3 standard gravitation motion

If A affect B, being indistinguishable according to consistency axiom 1 B affects A in the same manner.which means the effect will be equal and opposite (assuming classical behaviour for now).it could be attractive or repulsive(like in electrostatic).Lets assume that the effect can be written as U in meters per seconds^m (it could be velocity, acceleration, or any other derivation.at this stage we treat them all as instantaneous 'motion' .in section 3.1.2 we will show that it fits well as acceleration)

For standard case of figure 3 U is what newton calls as G assuming, density of both is 1.

if we have volume A and volume B of same material distant 1 meter from each other:

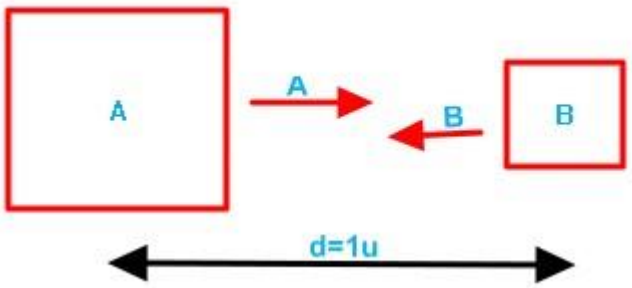


Figure 4 gravitational motion of different volumes

studying A,

A is attracted by pb*Vb;
Which is pb*Vb*superposition of 1kg effect (standard reference unit for gravity attraction)
on paVa of A.(lets call it G")
therefore
Ua=h(paVa(x)G")=(paVa)^((1-k-m)/3)).G" (Eq.7)

Now G" is obtained in function of G as follows:
In general if we have A and B the effect of the the units of B on B motion can be neglected as follows

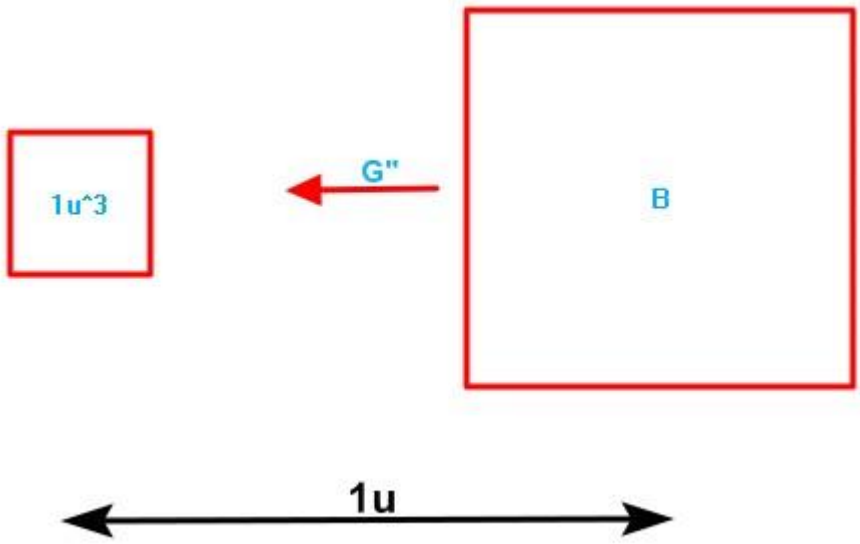


Figure 5 effect of one unit on a volume Vb

If we divide B into Vb slices of 1m^3 each, being indistinguishable, they all are affected similarly by motion U(called G")

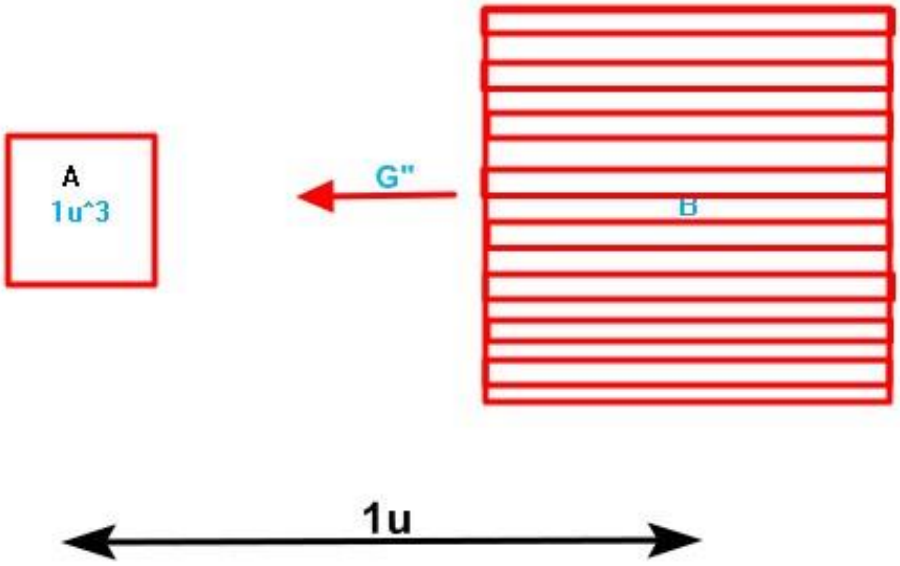


Figure 6 effect of 1 unit on each unit of B

If we take the slice at the axis joining the center of the original cubes,

The effect on that slice would be the effect due to A+effects of each other slice.

The slices being distributed symmetrically above and below the axis,

the vertical components would cancel out evenly, thus only the effects in horizontal direction would remain.
If we assume there is no deformation induced by the gravity we can assume no connection between the slices (no internal horizontal resistance/effects between slices.)
Thus the effect on one slice is independent of the quantity of slices.

->G"=G

Which means:
Ua=(paVa)^((1-k-m)/3).G (Eq.7a)
similarly

Ub=(pbVb)^((1-k-m)/3)*G

Lets simplify by posing g=(1-k-m)/3 (Eq.7)

(paVa)^g*Ua=(pbVb)^g*Ub=

(paVa)^g*(pbVb)^g*G

If we call G(MaMb)^g product as "force"

then we would get the three laws of motion in new form.as applicable for gravity distant interaction:

1) if F=0 u=0And 2) F=M^g*u (Eq.7b)
2) Each action are equally opposed by a reaction→redefined energy conservation.

2.1.2 Force as function of distance:

Until now equation (Eq.7a) Is in term of G which applies validly for distance d=1 if d is different than 1, we have:

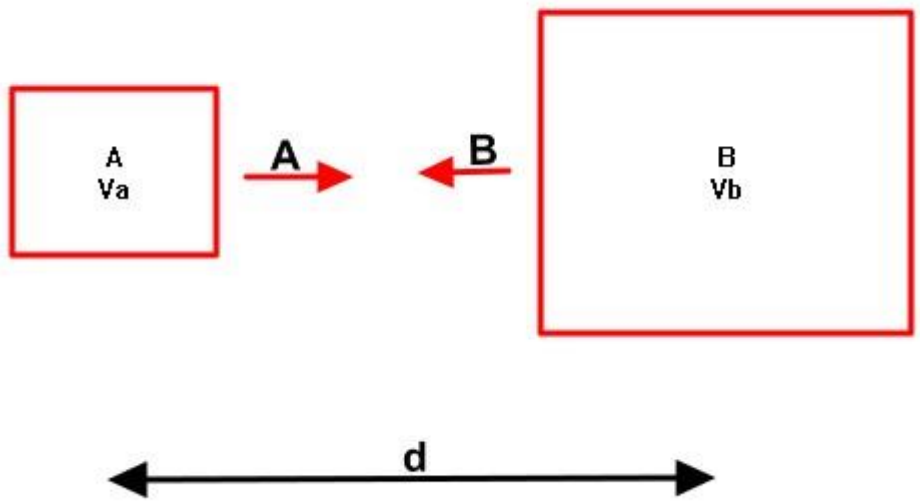


Figure 7 effects of A and B at a distance d

We know that

F=(Ma*Mb)^g*G' (Eq.7)

G' is the motion of 1 kg on distant d in meters per seconds^m

now we will determine G' as function of G using the second axiom of consistency:

a static universe for the interior observers, is indistingishable from a universe with all its spatial and temporal dimensions scaled.According to the second axiom we can suppose that both perspectives are correct.thus in both scales the motions and trajectories must be identical but for different scale for each. This extend to space dimensions as well as time dimensions.

(see 1.2)

Knowing this,through observation in original scale of both cases we can determine G'.

For e.g , if we had the following case:

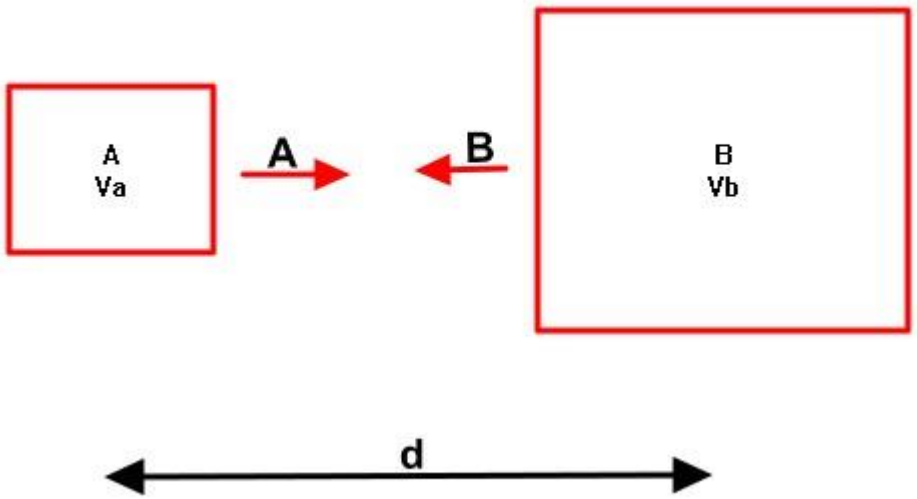


Figure 8 efffects between A and B at real scale

System scaled 1/d

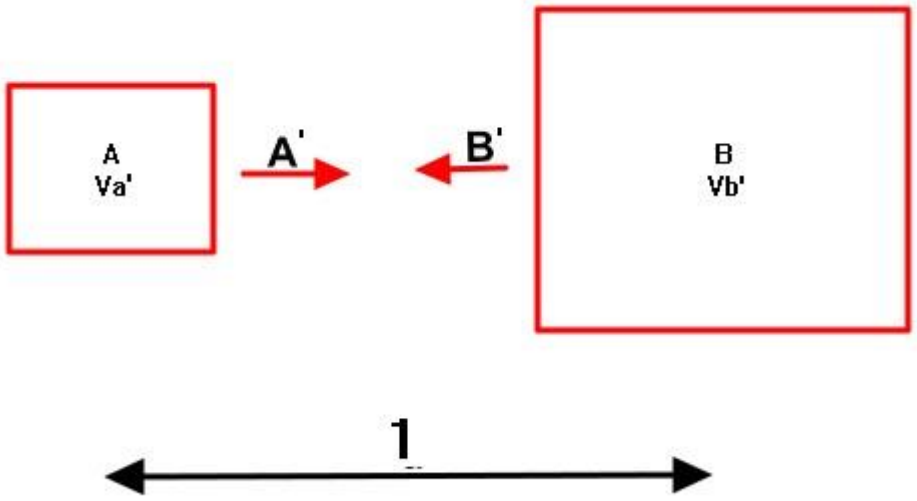


Figure 9 effect of A and B at a scale 1/d

Then it is relatable to G as follows:
If we assume the constant of gravity at the initial scale is denoted by G; and become at the scaled version as G1.
In the scaled perspective we should have G1 equal to G in meters'/s'^m; 1s'=s seconds
Meter'=(s)meter
Thus G' measured in the original perspective
is G'=(G/s^m)*s=G.s^(1-m)
Knowing that s=1/d ,G'=G.d^(m-1).

The scaling affect volume by multiplying it by S^3…in our case S=1/d
The scaling affect density p as demonstrated earlier
f(p,c)=p*s^k=p*d^-k
Now A' is the motion created in the scaled perspective due to attraction of f(pbVb,1/d) *1kg applied simultaneously.
1Kg effect on 1 unit distance is G1 in u/s^m
Thus we can write:
A'=h(pbVb/d^3(x)G1)=
G*(pbVb/d^3)^g
=G*((Mb/d^3)^(1-m-k)/3)
A=A'*s/s^m=G*d^(m-1)*(Mb/d^3)^g
=G*(Mb^g)*d^(m-1-3g)

=G*(Mb^g)*d^(m-1-(1-m-k))
=G*(Mb^g)*d^(2m+k-2)

-->F, in original perspective is F=Ma^g*A
F=G*(Ma*Mb)^g*d^(2m+k-2) (Eq.8)

for scalability to be consistent
The escape velocity[1,2,3,4,5] must relatively remain the same because otherwise stability of orbits falls at certain scale while it doesn't on other scale, which contradicts consistency. thus escape velocity /actual velocity ratio must remain the same independently of the scale.
This means that scaling by s all the system the escape velocity should be multiplied by s for spatial dimension and divided by s for time scaling as velocity itself.
Thus escape velocity should be preserved through scaling.
The correlation between escape velocity and F in the form given in eq 9a Is obtained by equating kinetic energy with potential energy.
Potential energy for F is integral of F.dx(x=d is radius)If we take u as acceleration => m=2
we get
thus P.E= G*(Ma*Mb)^g*d^(2m+k-1)/(2m+k-1)
= G*(Ma*Mb)^g*d^(3+k)/(3+k)/(3+k)
Kinetic energy: (1/2) (Ma^g)*v^2
KE=PE for escape velocity
Thus ve^2=2G*(Mb)^g*d^(3+k)
For the system (S') with d'=s*d
PE'=G*(Ma'*Mb')^g'*d'^(3+k)
KE'=1/2(Ma')^g*v'^2
ve'^2=2G*(Mb')^g'*d'^(3+k) (Eq.9a)
=2G*(pb*(sd)^-k*Vb*(sd)^-3)^((1-m-k)/3)*(s*d)^(3+k)/(3+k)
=2G(Mb*d^-(k+3))^g*d^(3+k)*s^…
=2G(Mb^g)*d^(-(k+3)*(-1)(1+k)/3+(3+k))*s…
=2G/(Mb^g)*d^((k+3)(k+1)/3+3+k)*s^…*
=2G/(Mb^g)*d^((k+3)((k+1)/3+1)*s(…*s
=2G/(Mb^g)*d^((k+3)((k+4))/3*s(…*s
=(ve^2)^(k+4)*s^(k+3)(k+4)/3 (Eq.9b)

If a solution exist for all values of d and s then the exponent of s and d must be zero simultaneously.otherwise it would be absurd.

Solution k=-4 which leads to linearity with u as acceleration and the gravitation law of newton and the three laws of motion applicability on attractiom forces .

Ma*A=Mb*B=G0*Ma*Mb/d^2 [1],[2],[3],[4],[5] (Eq.10)

2.2-Law of Electrostatic force:

Electromagnetism can be derived similarly, if we replace p. the mass density, with q the density of charge, however if we take a simple mass-like definition of charge we get QaUA=QbUB instead of Ma*UA=Mb*UB, thus
not equal opposite reactions,
that's why a redefinition of "charge" have been done to conserve that 3rd law of newton which extend conservation of momentum and energy as well on electric force [13].
Also, as general formula, J() might depend on the mass of the source and destination objects.
This means F=J(pa,pb,qa,qb,Va,Vb,d); q being the charge density, and p mass density.
UA=Vb*K(pa,pb,qa,qb,1,1,1)/d^2 by analogy to the previous procedure used for gravity.
and
B=Va*K(pb,pa,qb,qa,1,1,1)/d^2
by imposing the third law we
obtain:
Ma*UA=pa*Va*Vb*K(pa,pb,qa,qb,1,1,1)/d^2
Mb*UB=pb*Vb*Va*K(pa,pb,qa,qb,1,1,1)/d^2

Now we define q as the property that makes action and reaction equal.lets say qa and qb (q source or q destination)
Additionally, q source increases acceleration linearly while q destination does not affect acceleration as demonstrated earlier.

K(pa,pb,qa,qb)=qa*K(pa,pb,1,1)
K(pb,pa,qb,qa)=qb*K(pb,pa,1,1)

Ma*A=pa*Va*Vb*qa*K(pa,pb,1,1)/d^2
Mb*B=pb*Vb*Va*qb*K(pb,pa,1,1)/d^2

Ma*A=Mb*B then:[(pa*qa)/(pb*qb)]=[K(pb,pa)/K(pa,pb)]
which is absurd, meaning that the definition of q is impossible

lets consider qdestination increase acceleration linearly along with q source, then

Ma*A=Ma*Vb*J(pa,pb,qa,qb,1,1,1)/d^2

=pa*Va*Vb*qa*qb*J(pa,pb,1,1,1,1,1)/d^2
Mb*B=Mb*Va*qb*qa*J(pb,pa,1,1,1,1,1)/d^2

Ma*A =Mb*B get:

(pb/pa)=J(pa,pb)/J(pb,pa) which is an acceptable ratio(independent of charge densities q) this relation of f(x,y)=(y/x)*f(y,x) have as solutions the form

$$f(x,y) = Ax \cdot k(x) \cdot k(y) \quad \text{for any } k(x)$$

lets assume a third constrain for charge, by choosing
f(x,y)=C*y*(1/y)*1/x=C/x
J(pa,pb)=a/pa

this leads to F=Ma*A=Mb*B=
C*pa*Va*Vb*qa*qb*/pa
F=C*Qa*Qb/d^2

in other words we obtain
F=K*Q*Q'/r^2 (Eq.11)
the fundamental equation of electrostatic force.

The previous demonstrations are just to highlight that consistency and convention are behind the two laws of interaction: gravity and electrostatic.
convention affected the definition of charge(the way it is calculated in experiments) and the rest is automatic mathematical deduction.This helped maintain two proposition: F=m*a and ACTION=REACTION

2.3-Contact interaction, and indirect interaction:

So far we proved that the law of consistency is enough by itself to describe the laws of interactions at a distance(non mediated). however if we shift from the ideal assumption of non mediated interaction to forces mediated by particle/other object, the formula might change, especially if the particle/other object mediating have some property P≠0 which affect computations in the system and which lead to a more complex formula then F=F0/d^2.
we see that clearly in strong nuclear force interaction.
Briefly we will not enter to derivation of such more complex behavior in this paper because our target is to show how consistency axioms alone+maths result in most if not all physical laws.

We might say, why did gravity and electromagnetism formula work without including mediation of bosons? and why we took that for granted?
the particle that mediates those two types of interaction are massless and chargeless, which makes it a valid assumption as it do not affect the system by definition and therefore can be ignored; however, why is that? general relativity and quantum mechanics answer that in quantum field theory, confirming the classical behaviour and the nature of force-carrying particles. [9]

Contact interaction: is when two objects boundaries are in close approximation or even contact with each other.

we will simplify the procedure at the first attempt, and deal with rigid objects
rigid objects: are objects only divisible into parts that maintain a fixed distance in between.

Non rigid bodies:are objects that have parts that do not maintain fixed distances with each other.

Assume we have a rigid body A, hits a rigid body B at a certain motion m/s^n.

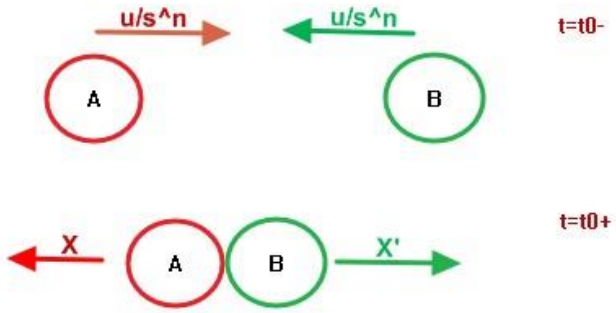


Figure 10 Collision effects of A and B

they collide on the rigid limits of each other, and undergo a repell motion X for A and X' for B. If A and B where of the same properties then X=X'

Statement 1: an object B' decomposable to B1 and B2 , of same properties and identical to each other and to B defined in picture 11, forming a rigid body
B'=B1-B2
If A hits B'; either on B1 or on B2,in both cases the motion of the center of B1-B2 is parallel to the motion of A prior collision. (being of same property we can assume that the center coincide with geometric centroiide.in reality when we have different materials it coincide with center of mass.(see statement 3)[1,2,3,4,5]

Demonstration:
let's consider the case, A hits B1 (same applies for hitting B2 scenario)

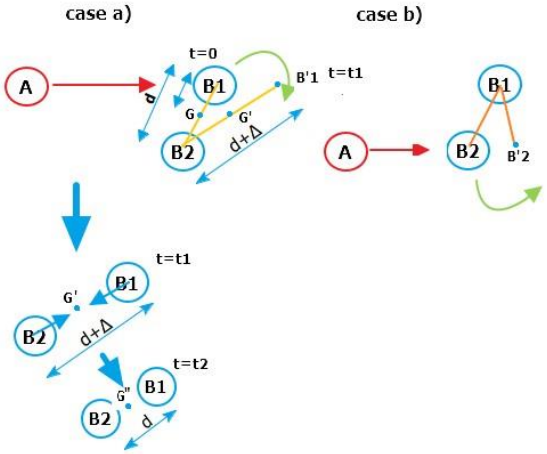


Figure 11 dissipation of motion at unitary level

the motion of the B1would be the superposition of B1 under reaction of collision with A+ motion due to restrain from B2. in reality, they are simultaneous,but we are able to consider as sequential (refer to linearity section 1.2).the first effect exclude the restraint from B2.

B1 moves parallel to A.the centroid in the middle would be half the motion of B1 therefore according to the mathematical theorem of Thales, X'(G(B1-B2))=X'/2

G being the center of mass.

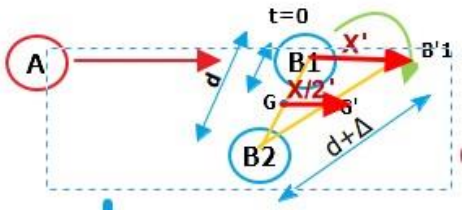


Figure 12 directionality of collision

The second effect happens symetrically w.r.t centroid G which means it doesn t contribute in centroid motion.thus for case of B1-B2; X'G=X'(G(B1-B2))=X'/2
As seen in the figure 12, A moves B1 by amount X'which make the centroid between B1 and B2 moves parallel to X'

under no restrain , and keep its position under restrain of each symetrically-> in sum the centroid moves parallel to A.

let's see if this fact is correct for n particles, would it be correct for n+1 particles?
if we consider A hits an object of n+1 identical particles, it is equivalent to A hitting one particle B1 linked to n particles B2-B3-B4-…-BN+1; the centroid of B2-B3-B4-…-BN+1 moves parallel to the line of action (in effect like B1 hits B2-B3…BN and being parallel to the line of action is correct for n), and also B1 moves parallel to the line of action, therefore the motion of centroid of B1-B2-B3-B4-…-BN+1 is parallel to the line of action.(figure 13)
being true for n=1 thus we had proved by recurrence that whatever is the amount and arrangement of particles, the centroid will always move in parallel with the line of action of the collision reaction effect(the repulsive acceleration effect due to collision from A)

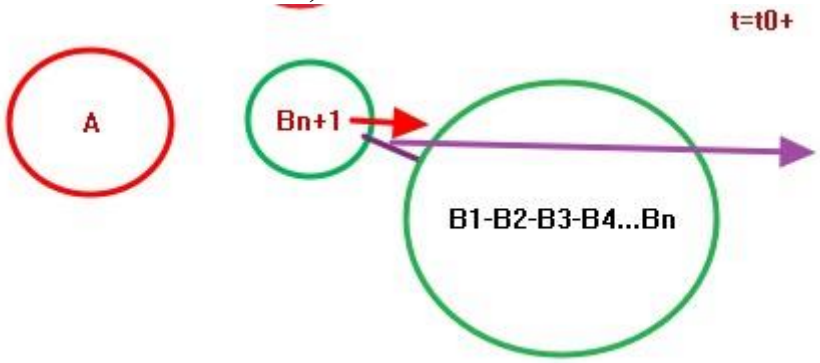


Figure 13 dissipation of motion at recursioned level

Statement 2: the infinitesimal motion of A ,which is made of m identical objects, divided by the final infinitesimal motion of B,which is made of n identical objects units is uA / uB =(n/m)*(x/x'); x and x' being the motion of 1 unit object of A and 1 unit of B respectively when they both collide in isolation.

demonstration:if object A hits particle B1 of object B1-B2 (object with two identical particles), we have X'(G(B1-B2))=X'/2 (figure 15)

if object A hits particle B1 of system B1-B2-B3(object with three identical particles), it is similar as if we consider B2-B3 as one object BB2.(figure 15)
and B1 receive collision from A. the location of the centroid of the whole system falls between centroid of BB2 and centroid of B1 not in half way like previous scenario of A colliding with 2 particles, but instead it will be at a distance d/3 from BB2.Therefore according to Thales the centroid will move X'/3. (the geometric center in homogeneous object)

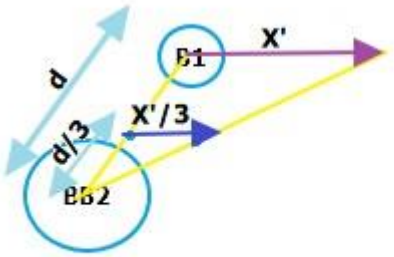


Figure 14 thales application and centeroid motion

Likewise, recursively,if A hits an object with n particles lets say particle B1 of object B1-B2-B3-….-BN, the
Centroid of the system is at a distance d from centroid of the remaining of the system
d= $\sum ni*di/\sum ni$

the centroid will be at d/n from BBn which means the centroid will move X'/n according to thalès when B1 collide with A.

if object A(m) equivalent in collision to m* units of A hitting standard object B. B(n) equivalent in collision to n*units of object B hitting object A.
A and B collide then Ub= m*X'/n; by symmetry we obtain Ua=n*X/m
uA / uB =(n/m)*(X/X'); .

Statement 3: Ma*Ua=Mb*Ub

after collision:
uA /uB=(n/m)*(X/X')

X and X’ are velocity dependent reference quantities(velocity) defined as the motion of 1 standard measure unit of A and 1 standard measure unit of B when colliding, at a colliding velocity v

if the ratio X/X'depend on v0
uA/uB=(n/m)*f(v,X/X')
uB/uA=(m/n)*f(v,X'/X)
Thus f(v,X/X')=1/f(v,X'/X)
The general solution for this type of equation is
f(v,X/X')=(X0/X'0)^l(v)
X0/X'0 is the ratio of reference velicity independent quantities(velocities) obtained for v=v0

uA/uB=(n/m)* (X0/X'0)^l(v)
uB/uA=(m/n)*(X'0/X0)^l(v)

if instead of the A(n) B(m) v0 system
we have the same N*A(n) N*B(m) v0 system
It would give the same uA/uB ratios, because Nn/Nm=n/m and X0,X'0 v0 are conserved .
But this new system is equivalent to simultaneous application of N (x) the previous system.
The effect applied on A(or on B) is according to 1.2 and 3.1.2 is expressed by function h(N(x)K(x))=N^((1-k-m)/3)*K(x)
k haven’t been determined for contact interaction ,which do not require equating escape velocities.
K(x) we are interested in is=pa*v
p.being a intrinsic property of A(or B)
Therefore m=1(K being velocity related)
Thus the effect obtained is equivalent to
pa*v'=N^(-k/3)*pa*v thus v'=N^(-k/3)*v (Eq.12)

Thus equivalent to system with A(n) B(m) and v' instead of v.
Unless k=0, this results that varying velocity don’t affect ua/ub ratio.
If k=0 it means uA/uB is the same for N*B(m) hitting A(n) and 1*B(m) hitting A(n) which contradict the mechanism of statement 3 because statement 3 proves that at same speed uA/uB=(n/m)*(X0/X'0)*l(v) gets different replacing n with N*n .
Thus k must be different than 0 which means uA/uB is independent of precollision velocities.

We conclude that uB/uA is still the same when v0=0 m/s

Therefore, if we take two planets A and B with mass Ma and Mb, under gravity resting on each other.

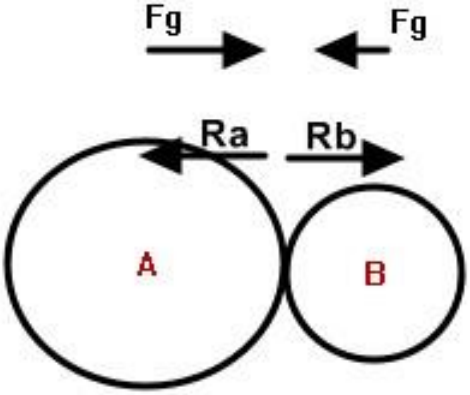


Figure 15 rest between two planets under gravity

we have at equilibrium, Ra=Ma*uA;
Rb=Mb*ub
By derivation with respect to.time:
Ra=Ma*aA;Rb=Mb*aB
we know that gravity Fg is equal on A and B. if we take A alone,
ΣF=Ma*aA=Ma*0=0
ΣF=Ra-Fg=0-->Ra=Fg,
ΣF=Fg-Rb=0-->Rb=Fg
==>Ra=Rb-->Ma*aA=Mb*aB and therefore
aB/aA=(m/n)*(x’/x)=Ma/Mb (Eq.13)

we conclude that not only for distant interaction the Action-Reaction are equal but also for contact interaction which make the Action reaction law valid for all type of forces observed.
In fact without transfer of forces, any problem is solvable with acceleration effects alone, but to go beyond isolated system, transfer of force was provided by the action reaction law applied on the "force" formulated as M*a.and that is the importance of newtons laws.[1][2][3]

In this section it have been proved that all classical laws needs only consistency axioms, from there mathematics alone provide all the rest.

So to resume what have been done in this chapter:
the target was to derive the Newtonian mechanics from the three axiom of consistency alone.
to do that I had to target the 3 laws of motion which are
1) definition of “force” as the term Mass*acceleration
2) the hidden rule that give benefit to such term:action reaction law, which means that force as M*a is transferred equally through all type of interactions: Gravitational, contact, and by intentional twist of charge definition the electrical force.
to prove that, we dived into each of the three mentioned interactions by deriving each based only on axioms of consistency.
First,the axioms where enough to impose vectorial additivity of acceleration effects by linear additivity of the motion effects in case of acceleration, and by directionality created by indistinguishability of simultaneity causes with simultaneity of n infinite frequency alternations which direction is preserved by scaling.
this leads to ability to solve a situation by summing up the acceleration effects.
for e.g if a body A is subject to 2 or 3 causes which we know their effect ai on A when applied individually, we can know the effect they have all together by summing each cause’s effect vectorialy:
$aA=\Sigma ai=a1+a2+a3$ (vectors)

To determine individual effects, gravitational law and electrical law are derived. Those can directly be applied as acceleration effects ai without need for definition of Force.However for contact between two bodies, it is impossible to know the equivalent acceleration effect for the reaction without introducing dependency on the object's own volume.
in fact it was proven that motion uA/uB=Vb/Va*(Xb/Xa)
which also by consistency was proved to be velocity independent and thus Xb/Xa express the mass density ratio==>uA/uB=Mb/Ma (a)
such formulation, helps seeing why Newton chose F in the form M*u.
the gravitaional and electric effects forced, through consistency axioms, to have linearity and scale invariance of physical system by posing u as acceleration.
additionally the gravitation force, electric force also preserve the equation (a)==> defining F=m*a leads to action-reaction law.

3. Quantum Mechanics:

In this section a re-interpretation of quantum mechanics is naturally deduced from the law of consistency. we will show:

- How quantum mechanics arise naturally from law of consistency .
- The simplest and evident solution for the wave function collapse.and quantum evolution.
- The simplest explanation for entanglement without spooky action
- the derivation of Schrödinger equation.
- The simplest explanation of decoherence.
- Explaining quantization of energy, and Pauli exclusion principle derivation from law of consistency leading to chemistry laws
- $E=mc^2$ leads to quantum field theory including all types of particles and fields.

3.1 -Derivation from consistency and wave-function collapse

In classical mechanics, when a body affect the position property of an other body, the body have to be affected in the direction that join both objects, to preserve initial symmetry with respect to midpoint,otherwise, the only solution would be that the outcome, due to whatever process acting on the system, will be multiple vectors of motions applied on each body, so that symmetry be conserved, causing multiplication and copying of the bodies,because the object can no longer be in one place only, with a shift in position for each copy, the outcome due to.each effect/vector.

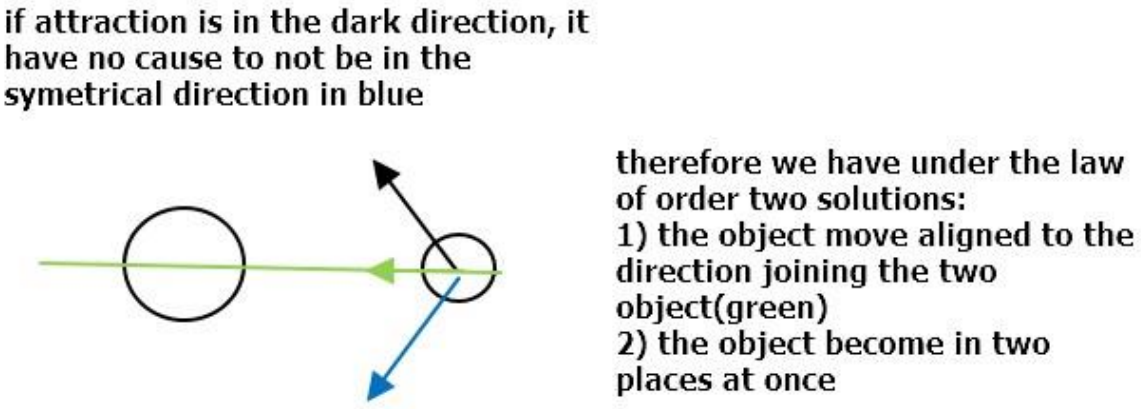


Figure 16 General natural effect on position

the first solution is visible in classical mechanics. The latter solution is more general and lead to the quantum/wave behavior of particles on small scales and as we will see later,classical.mechanics on the large scales.
What happens in the second solution is this:

two objects influencing each other's position A and B.

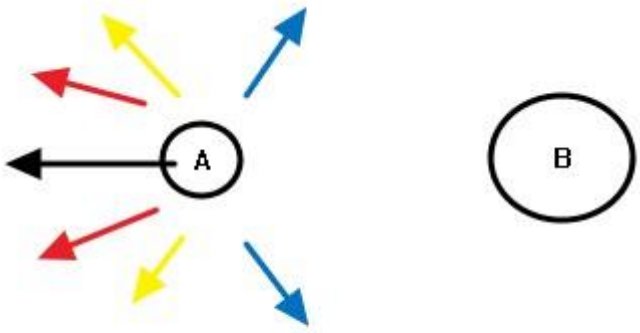


Figure 17 symmetries and dissymetries of general effects

The effect, although multi directional and of multi intensities possible, is restrained by the law of consistency to have a symmetrical feature for all observable quantities around the axis that join A and B (for e.g the arrows that have same colors in figure 1.).
also it is restrained by the laws of consistency derived previously under classical mechanics :linearity of acceleration superposition,the inverse square law for each vector's module,and action reaction law.
However there must be a key difference included in the vectors generated by this method(I will call it exotic vectors) and the classical vectors.the key difference is that these vectors express the direction and magnitude of position shift of a copy and not of a one original object.if this vector was additivable with other generated exotic vectors of same source ,it would mean the two vectors are reducible to one and therefore lead to one copy and not two which is absurd.thus exotic vectors of the same source are not additive.
The quantum evolution happens as follows in the most general sense:
Under influence of B, copies of A are generated.each new copy of A is still affected by copies of B and there is a

possibility,even if in another format that copies be generated by influence of all the other copies of A, thus leading to more and more A'

The general behavior is necessarily expressed as evolution of copies and not of parallel world because considering the latter won t preserve symmetry in any parallel world thus making two indistinguishable circumstances leading to two different outcomes which go against 1st axiom of consistency

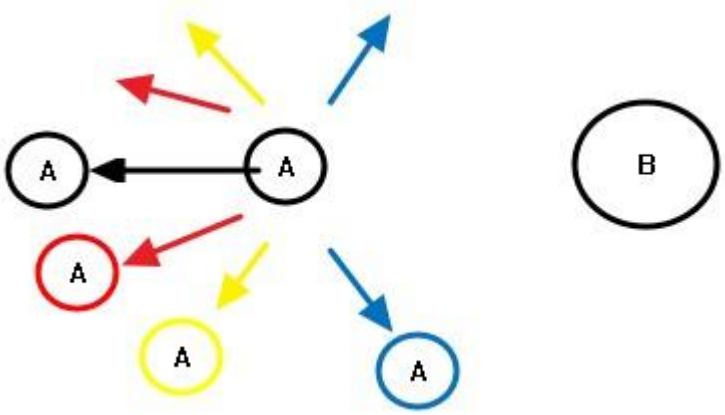


Figure 18 Copies generation under effects from source B

The outcome perceived in copying scenario by our brain would be that of one copy for each source as will be explained next.however this do not contradict the first axiom because although we obtained distinguishable outcomes, they are still part of identical outcome.so the key of first axiom is that indistinguishability(no ability to distinguish) differs from identicality(objective reality)

Exotic Vectors are symmetrical vectors w.r.t axis joining source.

at each instant

when the copy emit any kind of signal, regardless of the method, indirectly or directly, each signal of each evolved copy(each colored A),reach the brain.

The brain then creates copies of itself with each copy as reaction to signal of a different copy because addition of such

effects is impossible by definition of exotic vectors. And that is what at makes collapse and superposition of a quantum system.(more in section 5 question 1)

For e.g if v1 v2 v3 create red green blue sensation respectively. If the three comes from the same source you will measure one of them at a time and not a combination.
But when different sources emit signals in parallel no restriction on the addition seems necessary .in fact contrarily to copies , originals must have their effects superposed linearity (f(n(x)C)=n*C for classical acceleration vectors under the same demonstration of 2.1.1 of the previous chapter.

Contrarily the different effects of the n copies on a singular object are permitted to be non additive because simultaneity can t be written as f(n(x)C) because C caused by 1 copy do not exist in the first place, as the copies co exist always and therefore they are never in a singular state, but always in groups of determined numbers.

Now the question is,could the effects of different copies on a object be reducable and therefore no longer exotic?if yes which eigen states of each source adds together? The answer can be detailed as follows:
We define as eigen state of A, the state of a particular copy of A at an instant t.
An identical copies must create Cj copies with states Sij each.j being the index related to which copy, and i the index of which vector. being identical according to axiom 1 they should behave in a transposable way .e.g if one vector is 30 deg from the source-copy segment there would be one vector at that angle with its source segment for each copy.and all those would be labeled as "having same eigen state i".

Symmetry of the system(source-destination), must be preserved regardless of the evolution. This implies that

vectors of symmetrical eigen state only, can be added together.
for e.g, 2 sources equidistant from the object A studied, create C exotic vectors each on A, and all symmetrical w.r.t metiatrix of the segment joining the sources.if they are reducible it would be with symmetric outcome w.r.t mediatrix.This is only possible if the same eigenstates only , are added together.

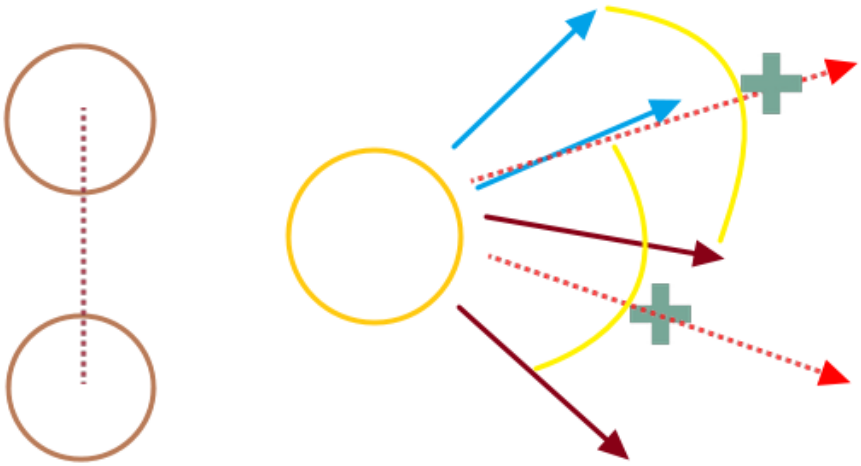


Figure 19-THE SYMETRICAL REDUCIBILITY

This being said, we obtain numerous copies of the brain each for a particular evolution signal.can be reducible for each eigen state.
the question is then which one should I observe? Which brain am I associated to?
By consistency I must be associated to all of them simultaneously, but being a “one” person, and “one” awareness, and as this person is a dimension of the brain, I cannot be many persons at once and experience things from one isolated person perspective as we do at the same,thus nature have to relate our conscious experience to an individual brain copy at least in the subjective perspective

nature must choose which brain to connect the individual to. Leading to an observation of one outcome under phenomenon “wave function collapse”.

If selection is made according to some property within a consciousness at specific time,and the property p,and this impact of consciousness is localized, then beyond the scope of consciousness impact, if an eigen state got a probability Pi to be as an outcome on collapse this probability will respect symmetry of time and space with no hidden variables.

Now, lets consider the double slit experiment and explain it:
once the screen detector measures the particle , it is not the screen which collapse the wave function, rather the particle copies falls simultaneously on each location of the screen , and each give a signal for the detector for its location and each signal create a copy of the brain reacting to it, and then nature assign my consciousness to one of these brain showing the particle falling in one place on the screen.

Now you might ask, why does it appear as entering one slit if detection is made between the slit and the screen?
For the interference part refer to decoherence section. For the probabilistic wave part the answer is fairly simple:
When the particle cross the slit and become far enough from the source that made it act as multi-locational, no more effect are on the particle, and therefore no more copying,thus measuring the copy position at first time means the other copies became excluded.the remaining copy do not evolve because its free of interaction and that leads the particle to hit the screen predictably by classical mechanics as single unique copy.
let me clarify further:
lets suppose A have at t0 one location and becomes under the influence of B from t0 to t1 seconds:
If not observed, from my point view all ways in orange are available for A to follow as possibilities.

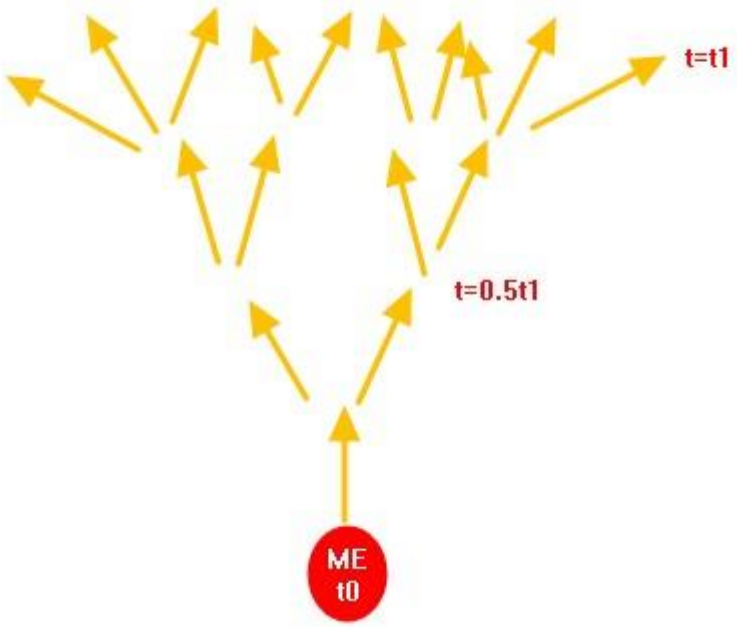


Figure 20 branching choices

If I did a measurement at t=0.5t1 I would know the position on that moment.
And until t1, the object A's pathways have been narrowed to less than half the ones that were initially present because I am now located on a different branch by exlusion of black pathways:

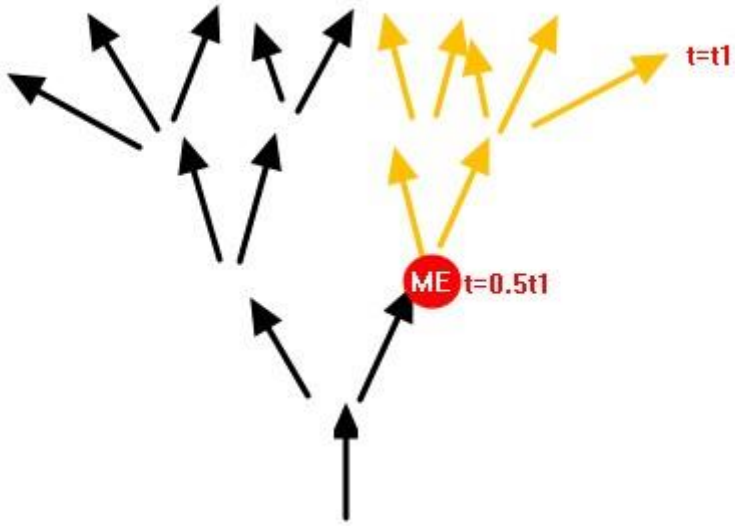


Figure 21 limitation of branching after measurement

If we consider the influence stops at t1, and the measurement is done at t1 then the only remaining path is equivalent to classical(one arrow/one state)

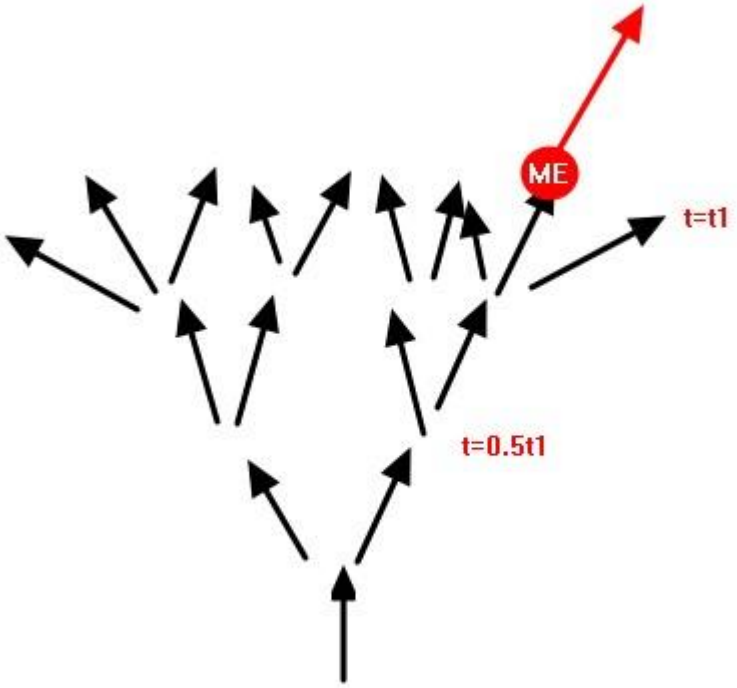


Figure 22 definite path after measurement at end of influence

Now understanding this lets derive the most fundamental equation of quantum mechanics: Schrödinger equation.

From what we said previously, we know that:

1) in a system of two identical objects, A and B, by the mere symmetry they have, according to law of consistency axiom 1, they must be of the same influence. Thus if A creates a field of acceleration effects on B, with each acceleration effect having its own weight of probability (as well as the symmetrical effects with respect to A-B) then an exact similar field of acceleration effect is created by B on A. each state under each acceleration effect is eigenstate.

When we look at the system as containing all states at once(as discussed earlier), and we want to know the total energy ,we have for each acceleration ai on A, a some eigen state of equal acceleration ai on B in same and opposite direction, regardless if they are interconnected states or not. Thus the sum of

algebraic, as well as vectorial accelerations ai on A + B will be equal to zero.
The same applies, as explained in section 3,to two non-identical objects A and B , with term force=m*a instead.
the sum of forces in the closed system is equal to zero and
a.ds=v.dv

$\sum F_i . ds = 0 \Rightarrow$momentum conservation

$\int \sum F_i . ds = \int \sum M * v . dv = C$

$$= \sum \frac{1}{2} M * v(t2)^2 - \frac{1}{2} M * v(t1)^2 \quad \text{(Eq.14)}$$

This formula is always respected in isolated system.
at macro scale Energy (conservative force work) + internal work(non conservative forces)=kinetic energy
this only lead to conservation of energy if all U is potential.
But at quantum scale all the forces are conservative which make potential energy=kinetic energy always.
=> conservation of total energy of the global state is thus always respected in isolated system unlike classical system.
(gravitational and electrostatic forces are both conservative as demonstrated and govern at the small scales and in isolated system therefore all work of forces would belong to potential energy=>energy is conserved always in a closed system.)
[6],[8]

2) If we take the system of A-B alone (see 3.2)
we can know that for each eigen state of A with energy Eai=KE+PE evolving to E'ai, there is an eigen state of B with energy Ebi evolving to E'bi where A's and B's eigenstates under the same influence/same eigen state.
Every force being conservative it is suffiscient for the system A-B that net external force =0 to obain conservation of energy of A-!B system.m
the "forces" of eigen state i on A+ "forces" of same eigen state i on B=0 (refer to 3.2)
thus havig a closed system :

Eai’-Eai=Ebi-Eb’i=C, which mean Eai’+Eb’i- Eai -Ebi=0 this means that Ei(A)+Ei(B) is conserved.Thus if we are talking about system A-B, then the eigen state describing the system have a conserved energy-->Ei=constante

Additionally momentum of the system A-B is conserved. [6],[8]

3.2 -The entanglement as a natural consequence of consistency

A recap of what I explained about wave function collapse: no matter how many objects are involved in the system, each eigen state of each object is reaching the brain that react to each copy independently making the “superposition states” translated as copies of the your brain.but once your consciousnes, which is the individual’s personal awarness, receive/comprehend the signal, it must happen in one of the brain copies, thus "collapsing" superposition into one outcome.
that one outcome concern all the system, because it is measurement of all the system, directly or indirectly.
if an object is independent of all the other objects in the system, then it is an isolated one and we do not gain any insight about his state by knowing the others’ states.

when we look to such system, lets say A-B, and we know that A can be in state A1,A2,A3….An and B can be in the states B1,B2,B3,…..Bn then if A independent of B, the states of the system (A-B)will be:
A1-B1;A2-B1;…..An-B1; A1-B2;A2-B2;…..An-B2 ……An-Bn which actually make N:total number of states=n^2 and outcome will be $\psi_{A-B}=\psi_A*\psi_B$

When A and B interact with each other, they affect how much each ψ_{A-B} is likely to be measured, and ψ_A becomes $\psi_{A/B}$(probability while knowing state of B);

This is simply a kind of entanglement somehow.
And similarlily as in entanglement tests, when we measure B, then no matter where is A and B and no matter how distance they became from each other, if no external forces evolve any of them, the outcome of A-B will be according to $\psi_{A/B}$, not due to spooky action, but due to the fact they became mathematically correlated at near distance due to interaction in the system they formed, and if kept without external forces on any, they will remain correlated mathematically, even if the distance becomes infinite without need for more interaction.

Because what is happening is that our localization on the branches(see previous section) reduces the possible configuration so that it seems of certain probability dependence.

Now, If we have a system of two identical objects A and A' forming a closed system, the objects before measurement being identical, the system A-A' is symmetrical with respect to center of
[A-A']
Therefore, according to law of consistency which forces laws of nature to apply symmetrically to the center of A-A' by indistinguishability, the outcome will be also symmetrical with respect to the center of A-A' .
that means the accelerations should be of exact amplitude, and the opposite direction of each other, which means that on measurement, they must collapse with motion symmetrical with respect to center of A-A' or in other word with equal and opposite values .
we will have that if $\psi_A=1$ for outcome i of A at measurement then $\psi_{A'}=\psi_{A'/A}=\psi_{A'}=1$.

That is simply is what entanglement is all about.
In Bell's experiment it is shown that this entanglement impose a shape of the probability distribution of each eigen state as function of θ with an expected value of cos θ in Bell's experiment result.

In the framework of this theory, the correlations observed in Bell-type experiments are not evidence of "spooky action at a distance" but are rather the result of an underlying universal probability distribution governed by consistency. Specifically, the probability correlation between measurement outcomes on entangled particles follows a cos θ dependence, where θ is the angle between measurement settings.

This cos θ correlation emerges as a fundamental feature of interaction-induced entanglement and is treated here as a natural constant of the universe — specific to the type of force

or interaction involved. The value is not derived from hidden variables or subjective processes such as consciousness, but rather is imposed by the requirement that all physical outcomes remain consistent under symmetry transformations.

By treating the probability weightings (e.g., cos θ in the Bell setup) as constants preserved by consistency, the theory avoids speculative assumptions about the mechanism behind outcome selection. Whether or not the underlying process involves complexity or consciousness, the effect is fully encoded in the constant itself. This approach provides a deterministic and local explanation for entanglement correlations, while preserving the appearance of probabilistic outcomes due to the coexistence of consistent copies or branches. [6],[8]

3.3 -Derivation of the Schrodinger equation

What we got till now is that total energy of the system A-B is conserved. and the eigen state of the system A-B has also energy conserved. And we now will try to extend this energy conservation to determine Schrodinger equation.

lets consider $|\psi>$ is a function in Hilbert space, and basically we want that $|\psi>$ represent the superposition state of all eigenstates produced by acceleration effects of the system A-B including information about the system.

by knowledge that the quantum state is due to superposition of eigen acceleration effects, and that acceleration effects of different eigenstates applied on an object do not combine with each other(refer to definition of **exotic vectors**) then the outcome $j(\psi i)$ is independent of $j(\psi j)$ for all i,j. thus $d J(\psi j)/d J(\psi i)=0$

$\rightarrow (d j (\psi j)/d\psi j)*(d\psi j/d\psi i)*d\psi i/dj(\psi i)=0 \quad (1)$

we know by the definition of j that $d j (\psi j)/d\psi j\neq 0$ and $d j (\psi i)/d\psi i\neq 0$

therefore the only solution for (1) is $(d\psi j/d\psi i)=0$

which means $|\psi i>$ and $|\psi j>$ are independent states

which means <ψj|**ψ**i>=0 for i≠j;

thus we can represent as **ψ** as vector of Hilbert space |**ψ**>
=Σai(t)*|**ψ**i>
what ever is the form of **ψ**i , either complex number or not, it can be written as **ψ**i(x,y,z,t)=bi(x,y,z,t)*e^if(x,y,z,t) (Eq 14)
with Ai and f as real functions.
this means that <**ψ**i|**ψ**i>=||bi||^2=1 if normalized.
==> <**ψ**|**ψ**>=Σ ||ai||^2
Now lets define expected energy as E=ΣEi*pi, with pi being the probability of each Ei to be measured as outcome.
the probability comes from the fact that a acceleration effect is chosen arbitrarily at collapse as one of all the paths possible.It will respect geometrical symmetry, but acceleration effects with more "weighted" path are also possible, as equivalent to superposition of identical paths in comparision with other non symmetrical pathes. And this happens also respecting geometrical symmetry

also we defined the Hamiltonian $\left|\widehat{H}\right|\psi i>=$ Ei $*$ $|\psi i>$

==>$<\psi i\left|\widehat{H}\right|\psi i>=$ Ei

Now we will see why setting the equation (1) below,we will have coefficients ai of $|\psi i>$ so that $ai^2 = pi$ and will get conservation of expected energy in closed system:

$$<E>=\frac{<\psi|\widehat{H}|\psi>}{(<\psi|\psi>)} \qquad (1)$$

According to model we built so far, on consistency solely we have the following:

lets assume a system of two identical objects A and B(although similar procedure can be applied for non -identical by transforming to a common equivalent)

we know that if A forces B to exist in many positions at once,we can

give a number n for the number of different positions created.
at t=t0, n=n(t0)
at t0+dt, A and B would be in each new multi-locating position, under the influence of same force on greater distance.

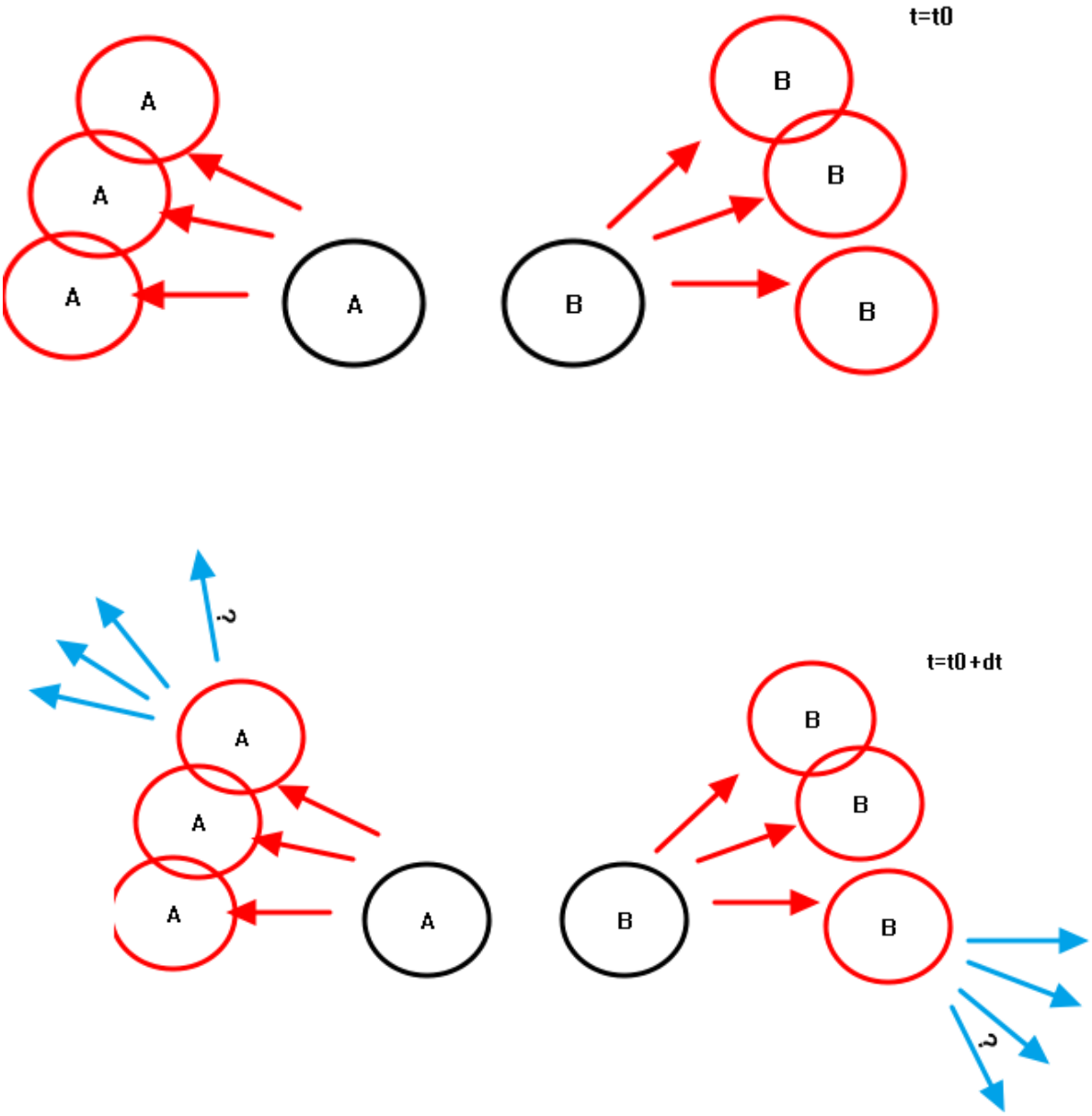


Figure 23 Quantum Evolution

The effect of distance cannot be affecting the number of muli-locating positions, due to consistency axiom 2 applied on scaling and on scalable universe
In fact if the number of virtual positions per outcome increase with distance, it means there would violation of scalability as adding

number of outcome cannot be bypassed by scaling.It would be a totally different system.
;
In the most general possible sense, each copy of the destination object after dt, is affected by each resulting copy of the source object and each other copy of the destination object.this leads to
N(t+dt)=N(t)*C'*(N(t)-1)*C*N(t)*C
N(t+dt)=(N(t)^2)*(N(t)-1)*(C^2)*C'
By development and taking infinite number of dt and we can write as approximation
N(t) ≈ exp[3^{t} · (ln(N₀/sqrt(K))]

N(0)is the classical mechanical number of multi-locating position=1
Thus it can be writen in the form.

==>N(t)=C*e^3^t=K'^t (Eq 15)

the probability pi(t)=Ai/N(t)
Ai is the weight of each outcome, which is in this observation ,timr conserved.
-->pi(t)=Ai*K'^-t (Eq 16)
This observation is not the only possible way to observe the situation.
For example, we can instead think of the evolution, as hidden identical paths diverging due to some parameter, with a defined total number N(t)=N=constant, thus Ai becomes time dependent in such case.
In that observation we can still use pi(t) as it is.

the expectation energy is thus= $\sum_{i=0}^{N} \mathrm{pi(t)} * \mathrm{Ei} = K'^{-t} \sum_{i=0}^{N} \mathrm{Ai(t)} * \mathrm{Ei}$

d<E>/dt= $-\ln K' * K'^{-t} \sum_{i=0}^{N} \mathrm{Ai(t)} * \mathrm{Ei} + K'^{-t} \sum_{i=0}^{N} \frac{\mathrm{dAi(t)}}{\mathrm{dt}} * \mathrm{Ei}$ (Eq 17)

$\sum_{i=0}^{N} \mathrm{pi(t)} = \sum_{k=0}^{n} K'^{-t} * Ai(t)^{-\mathrm{t}}$ (Eq 18)

Sum of probabilities is always =1 --> derivation is =0 ==>
Derivation with respect to time:

$$\sum_{i=0}^{N} \frac{\mathrm{dpi(t)}}{\mathrm{dt}} = 0$$

$$= \sum_{k=0}^{n} -\ln(K') * K^{-t} * Ai(t) + K^{-\mathrm{t}} \sum_{i=0}^{N} \frac{\mathrm{dAi(t)}}{\mathrm{dt}} = 0$$

$$= K'^{-t} \sum_{k=0}^{n} -\ln(K') \quad * Ai(t) + \frac{\mathrm{dAi(t)}}{\mathrm{dt}} \quad = 0$$

C cannot be zero==>

$$\sum_{k=0}^{n} -\ln(K')\blacksquare * Ai(t) + \frac{\mathrm{dAi(t)}}{\mathrm{dt}} = 0 \quad) \qquad \text{(Eq 19)}$$

The highlighted terms in (Eq 17) and (Eq 18) are equal thus we have <E>= constant (d<E>/dt=0) in closed system.

In time dependent system(not necessarily closed),
setting $<E>=\frac{<\psi|\hat{H}|\psi>}{(<\psi|\psi>)}$= Σ||pi||*Ei=Σ||ai||^2*Ei/Σ||ai||^2 for whatever value of Ei(t) is ,thus the coefficients ||ai(t)||^2/Σ||ai||^2=||pi(t)||,
By normalizing |ψ> (and |ψi>) , we get <**ψ**|**ψ**>=Σ ||ai||^2=1; thus ||ai(t)||^2=||pi(t)||
which mean that the square modulus of ai(t) is the probability density pi(t) of an eigen state to be measured.

thus setting $<E>=\frac{<\psi|\hat{H}|\psi>}{(<\psi|\psi>)}$ lead to ai^2=pi in all systems and <E>= constant in closed system.

<u>Now lets derive shrodinger equation:</u>

we know by definition that $|\hat{H}|\psi i> = Ei * |\psi i>$;
We are interested in unitary eigen basis of |ψ >; thus < ψi|ψi >=1
ψi must be a function of complex space, to be usefull in extracting variable

quantities.
thus it can be written as $\psi i = B(x,t) * e^{i(\varphi(x,t))}$;
product $< \psi i|\psi i >= * \psi i.\psi i = B(x,t)^2 = 1$ for all values of x and t
thus $\psi i = e^{i(\varphi(x,t))}$

We know in classical physics that all motion equation behave backward and forward in time in the exact same way. This behavior is called time irreversibility.

as our model of quantum mechanics being a superposition of multiple states of a system, and these states each behave according to classic mechanics as shown earlier, the irreversibility of time we have in the force equations, and thus in all equation of motion in classical mechanics, extend to all the superposition and therefore to ψi irreversibility with time.
because ψi describe the system studied, directly or indirectly.
Thus observable quantities, like speed, acceleration, energy, momentum, etc.. which have irreversibility with time, extend that irreversibility to ψi
thus, $\psi i(-t)=\psi i(t) \rightarrow e^{i(\varphi(x,-t))} = e^{i(\varphi(x,t))} \Longrightarrow \varphi(x,-t) = \varphi(x,t)$
(a)
Additionally, similar to classical physics, the system evolves with time, thus each state at time t+dt is an evolution of the state at time t.
Lets call operator
$U(\widehat{x,y,z},t)$, the operator describing that evolution.

$\psi i(t+dt)=U(\widehat{x,y,z},t) * \psi i(t)$
we know that $\psi i(t+dt)=e^{i(\varphi(x,t+dt))}$
by maths we can say $\varphi(x,t+dt) = \varphi(x,t) + \frac{d\varphi}{dt}.dt$
which means
$\psi i(t+dt)=e^{i(\varphi(x,t+dt))} = e^{i\left(\varphi(x,t)+\frac{d\varphi}{dt}.dt\right)} = e^{i(\varphi(x,t))} * e^{i\frac{d\varphi}{dt}.dt} =$
$\psi i(t) * e^{i\frac{d\varphi}{dt}.dt}$
Thus the operator U is $e^{i\frac{d\varphi}{dt}.dt}$
Time reversibility also means that U(-t)=1/U(t)

in case of complex number it means the conjugate *U=1/U

U(-t)=$e^{i\frac{d\varphi(-t)}{dt}.dt} = e^{-i\frac{d\varphi(t)}{dt}.dt}$-->

$$\frac{d\varphi(-t)}{dt} = -\frac{d\varphi(-t)}{dt} \qquad \text{(b)}$$

from (a) we get

$$\frac{d\varphi(-t)}{dt} = \frac{d\varphi(t)}{dt} \quad \text{(c)}$$

having (b) and (c) the only solution possible is that $\frac{d\varphi(t)}{dt}$ is independent of t.

thus $\frac{d\varphi(t)}{dt} = ki;$

$\varphi(t) = k * t + c;$

c must be =0 because e^ic must be equal 1 (unitarity of the eigen vector)

thus **$\psi i(t)=e^{i.ki.t}$**

always true regardless if the system is time-dependent or not.

With that form of ψi(t); we derive dψi(t)/dt as i*k*e^ikt

therefore dψi(t)/dt=ikψi(t)

$$\widehat{H}|\psi i(t)>= Ei * |\psi i(t)>= -i * Ei * ki * \frac{d|\psi i(t)>}{dt};$$

time dependent Schrodinger equation on eigen state(applicable for time independent SE also at eigen states)

Classical energy:

$$E = \frac{p^2}{2m} + V(x)$$

this is to be applied on all eigen states at all locations.

to obtain the hamiltonian at TISE, we only need to find which operator to use on ψi to get pi^2/2m +Vi(x)

the operator, without going deep into maths behind it, is

$$\hat{p} = -i\hbar\frac{d}{dx} \qquad \hat{V} = V(x)$$

Therefore:

$$\hat{H} = -\frac{\hbar^2}{2m}\frac{d^2}{dx^2} + V(x)$$

is the Hamiltonian operator applicable on eigen states.
This hamiltonian is linear, because of the left and right hand side term being independent on time .
thus if we apply $\hat{H}|\psi > to\ any\ vector\ |\psi >= a(t)|\psi 1 > +b(t)|\psi 2 >$
Then from the equation of Hamiltonian in terms of operators we can say
that $\hat{H}|\psi >= a(t)H|\psi 1 > +b(t)H|\psi 2 >$

when we take a quantum state $|\psi >$ from which we can derivate through different operators the different quantities and observables of an actual system,
we know by definition that $|\psi >$ =$\Sigma a_i(t)*|\psi i >$ with ai(t) being a complex number with a square amplitude=probability of $|\psi i >$ as an outcome.

$H|\psi > = \Sigma ai(t) * H|\psi i >= -\mathrm{i}\,\Sigma \mathrm{ai(t)} * \mathrm{Ei} * \mathrm{ki} * \frac{\mathrm{d}|\psi \mathrm{i(t)}>}{\mathrm{dt}}$;

$\frac{d|\psi>}{dt} = \Sigma(ai(t) * \frac{d|\psi i>}{dt} + \frac{dai(t)}{dt} * |\psi i >)$ (3);

Previouly I derived the probability form as pi(t)=Ai*K'^-t for each eigen state with Ai being time-independent
pi(t)=ai^2==> ai=$\sqrt{Ai} * K'^{-0.5t}$ (note that ai is already defined as real number)
dai/dt=-0.5*ln(K')*$\sqrt{Ai} * K'^{-0.5t}$=-0.5*lnK' *ai(t)
(3) becomes $\frac{d|\psi>}{dt} = \Sigma(ai(t) * \frac{d|\psi i>}{dt} - 0.5 * \mathrm{lnC} * \mathrm{ai(t)} * |\psi i >)$

$$|\psi i > = -\frac{i}{ki}\frac{d|\psi i >}{dt}$$

Thus

$$\frac{d|\psi >}{dt} = \Sigma\left(ai(t) * \frac{d|\psi i >}{dt} + \frac{\mathrm{i}}{\mathrm{ki}} * 0.5 * \mathrm{lnK'} * \mathrm{ai(t)} * \frac{d|\psi i >}{dt}\right)$$

$ih\frac{d|\psi>}{dt} = ih\Sigma(1 + \frac{i}{ki} * 0.5\ln(K'))(ai(t) * \frac{d|\psi i>}{dt})$ (4)

lets call Z the complex number

$\mathrm{Z} = \mathrm{ih} - \frac{0.5*\mathrm{h}*\ln(\mathrm{K'})}{\mathrm{ki}}$;

(4) gives $ih\frac{d|\psi>}{dt} = \Sigma Zi * ai(t) * \frac{d|\psi i>}{dt}$ (5)

We have from what we derived earlier the shrodinger equation of eigen states:

$H|\psi(t)> = -i\,\Sigma ai(t) * Ei * ki * \frac{d|\psi i(t)>}{dt}$

Lets call Z'= -i*Ei*ki

Then $H|\psi(t)> = \Sigma Z' * ai(t) * \frac{d|\psi i(t)>}{dt}$ *(6)*

Z is constant

Z' by experiments on photoelectric effect, that related energy Ei to frequency w as Ei=h*wi, and knowing that the frequency of any outcome from the eigen wave function have frequency of same frequency of the wave function(not proven here, but it is built in the operators used mathematically)

then wi=-ki=-Ei/h

we obtain Z'= =ih which is also constant with time, and independent of the state number i.

when there is no interaction between objects of the system, the paths of each object will not be under divergence ,as explained in the mechanism suggested by this paper. Thus probability will be conserved as if K'=1. that simplified the derivation by making Z=ih=Z'

which make the shrodinger equation $H|\psi(t)> = ih\frac{d|\psi>}{dt}$ in case there are no interaction in the system.

Valid not only for eigen states, but also for any superposition of those.

THUS SHRODINGER EQUATION IS DEMONSTRATED FROM THE LAW OF CONSISTENCY IN MOST GENERAL FORM, AND IN ITS SPECIAL CASES. [6],[8],[10],[11][14]

3.4 -The simplest explanation of decoherence:

Seeing that its all based on superposition of states, why would that superposition effect only appears at nano scale and not on macro scales?
is it interaction with the surrounding that removes interference?and why it additiomally loose wave like behaviour and appears classical at macro scales?

first to answer this we must remember what I said previously and how the most general behavior of particles is like:for e.g
an object A under influence of object B, becomes in n copies, those copies have effect on external objects and internal ones (between copies of the same object) but non reducable, I call as “exotic vectors”
We already said that number of copies in total was
N=A*K'^t

Now why decoherence happens:

3.4.1 -Decoherence of interference:

Entanglement between two copies of the same object is absurd, because on the outcome only one copy will appear, as already explained earlier.
so if an external particle B interact with the system of copies, we will get entanglement between B and each copy of A, because one of those copies on observation will appear, and the particle B also will appear.
due to this entanglement ,the probability of getting B with a certain exotic vector orientation, equals the probability of finding A1 or A2 or …Ai,…An, with opposite and equal exotic vectors.(refer to entanglement)
To simplify, lets consider two copies of A(blue) and the particle B

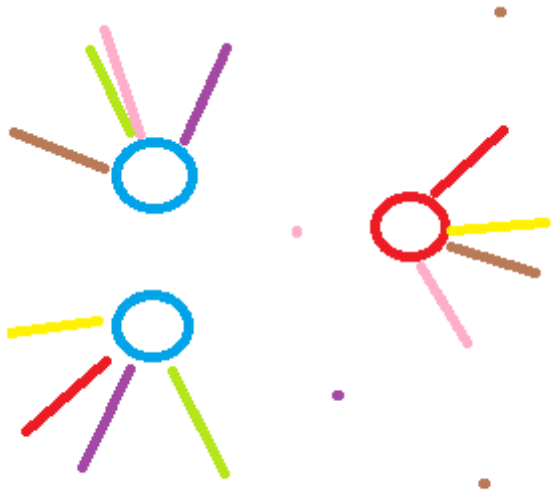


Figure 24 decoherence as a result of consistency and collapse

Because the particle B is necessary in outcome, its exotic vectors produced by the particles of A are dominant.those are colored in red yellow,brown and pink in the picture above.
the corresponding effect, which represent the entanglement, are also represented with the same color.Therefore at measurement one color direction will appear on A1 or A2 and B.
this fact, rules out the green and purple outcomes ,which represent the interaction between the copies themselves.
Thus, we obtain removal of interaction between copies due to entanglement with a original particle.
In the double slit experiment, the particle ejected enter the slits, and the wave-like superposition continue to exist. However, the slits divide the beam into two.these two beams are formed by copies of the particle evolving in time.the beam intersects, and the copies interact with each other in the intersection, leading to interference, detected on the screen by interference pattern.
Once a particle entangles with the copies, the influence between the copies is eliminated. And this remove the interference pattern.
Nonetheless, the beam of superposed copies still evolves as superposition but like a beam of particles instead of a beam of wave.

this is what decoherence is all about simply.

However, on the large scale, decoherence remove interference

between objects as waves, but it is not enough to explain why outcome is obtained as classical mechanics.
this phenomenon I will call: the global decoherence:
and it consists as the following:

3.4.2 -The global decoherence:

the effect of quantum mechanics is not visible at larger scale for the following reason:
if the force acts on a macroscopic object, each of the particles of the object is subject to the exotic forces.bond between the atoms, holding them together, resist deformation,and make the body act as rigid. , this led to the fact that the particles will move together to keep the shape non-deformed, but they will tend to a direction more than the other depending on how many/much each particle adopted a direction more than the other summed on all the number of particles.
When applied on a huge number of particles, the reduced forces, will be toward a specific direction as much as they are toward a symmetrical direction around the axis that join the centers of the objects because of the huge amount of objects included in a statistical analysis(for e.g if I flip a coin 1 billion time the deviation from average would be minimal). thus we obtain the classical

mechanics behavior.

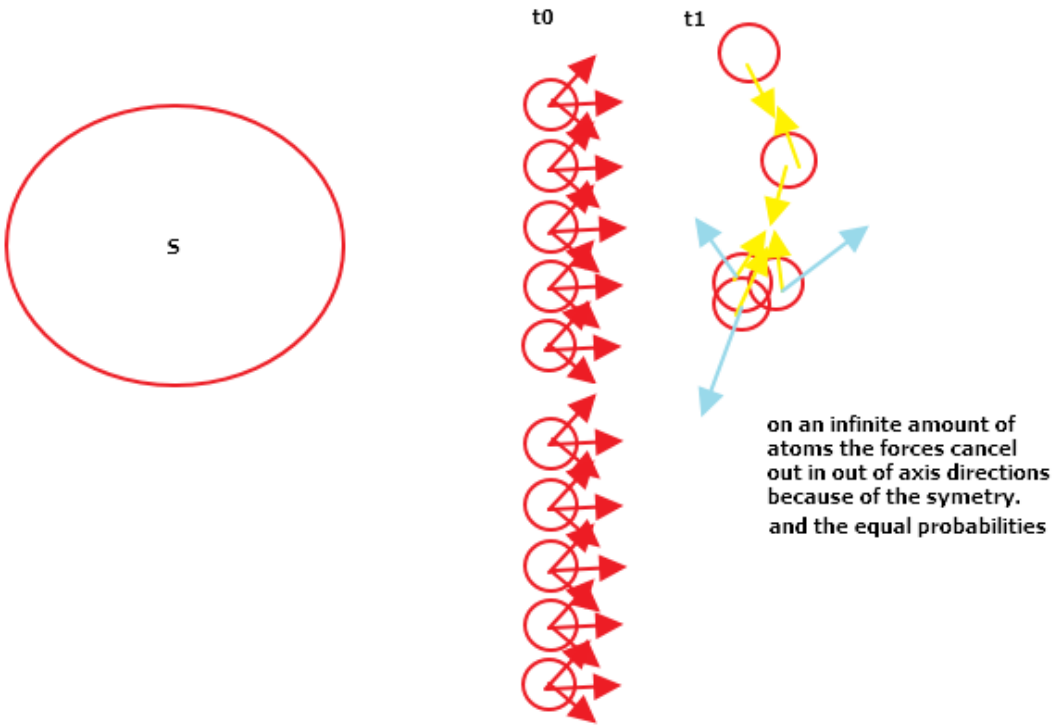


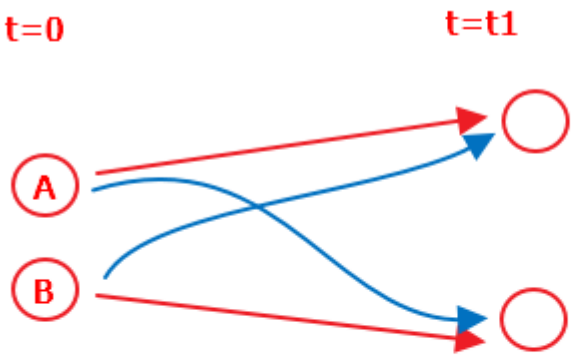
Figure 25Global Decoherence as result of statistical symmetry of outcomes

Therefore what we conclude is that, the most general way of affecting position, mathematically, is what nature does, appearing as quantum mechanics, and at a higher scale, the same thing is happening but because it is applied on a huge number of particles it behaves like it is impossible to be at many locations at one→classical mechanic.

3.5 -Quantization of energy:

Till now, we derived Schrodinger equation and entanglement using only maths and consistency theory.
shrodinger equation is too broad to resolve the system by specifying the way that particles and their copies evolve like we do in classical mechanics,because each influence of a copy and interference are too complex to be resolved by simple calculation.
However, nature by following consistency principle, limits the behaviour, and thus narrow the possibilities by imposing correlations between different elements of the systems.

when viewing a system of two or more particles, we know that if for example we have a particle A and B with exactly the same property(identical), we will get the following characteristics,by the mere fact that time evolution is related to copies which are not measured, thus make a phenomena a physical outcome of multiple abstract explanation, and by consistency theorem, any effects that can be derived from those abstract explanations must applies on the real physical outcome.
Briefly, at measurement we get what described in the following diagram:



in reality we have at t=0 and t=t0 two indistinguishable particles.
A and B have two ways to get to the results of t=t1 (blue and red)

Figure 26 indistinguishablity as cause of identicality

the final outcome could be interpreted in two ways, motion according to red or blue.so in other words even if A moved along blue path, it also seems to have moved in the red path, and due to this similarity the rules for motion in red path should apply also to A due to law of consistency

this indistinguishability yield that the wave function of the system should be in a way, the real outcome like probability $|\psi(a,b)|^2=|\psi(b,a)|^2$ always respected because both red and blue paths should happen simultaneously.
This lead to $\psi(a,b)=+\psi(b,a)$ which happens to be the case of bosons and $\psi(a,b)=-\psi(b,a)$ which happens to be the case of fermions.
the latter correlation by itself is enough to prove the Pauli's exclusion principle which imposes a fixed number of particles that cannot be exceeded in each orbital of an atom:
$\psi(a,b)$; if a and b are independent(which is valid assumption for non-entangled particles), is $\psi(a)*\psi(b)=\psi(b)*\psi(a)=\psi(b,a)$, this ok for bosons, but for fermions it is absurd unless $\psi(a,b)=0$ which mean impossible to exist in such a state.
What we conclude from this is that it is impossible of 2 identical fermions in the same system(note that entangled fermions are automatically considered distinguishable by their opposite behaviors described earlier)
This means, that two indistinguishable particle(same properties) in same system(because it have to be possible to switch positions theoretically), cannot exist at the same time.

Concerning quantization of energy:
the resolution of the Schrodinger equation leave by applying boundary conditions(known values of ψ at certain boundaries) yield to having sin and cosine functions equated to constants.thus to resolve this, we obtain only discrete values(for e.g $2n\pi$ -->E as a function of n-->discrete and quantized.

Thus most if not all of chemistry can be derived from Pauli Exclusion + Quantization in resolution of SE, which both are natural result of application of consistency law+maths. . [6],[8]

3.6 -Quantum Field Theory:

The shrodinger equation we have till now describe any system.However the Hamiltonian usually used to determine mechanics of the particles, can be extended to take into account the rest mass energy derived by relativity(see next section)

by relativity we get E^2=(mc^2)^2+p*c^2
we have from shrodinger: H|ψ>=E|ψ>
using both, by focusing on type of outcome interested in and how the equation leading to it must be for those cases, dirac , using spinors of different sizes, the relativistic equations of shrodinger can be written for each, and helped describe each particle type.
thus we obtain quantum field theory which at least shows 4 type of equations:0 spin, spin ½, spin 1,spin 2.
Thus we can say quantum field theory is also rooted in consistency as it is just about particular solutions of the TDSE. . [7],[8],[9]

4. Relativity:

4.1 -Special relativity:

Special relativity also can be derived from the fact of non –infinite speed limit of the cosmos combined with the theory of consistency as follows: can we consider time as 4th space dimension parameter?
this flat paper represent a space with 2D, therefore the eye ball is a 2D object and not as the real eye ball.what it receives from the light emitted by the star is an image in form of line❾1D image.

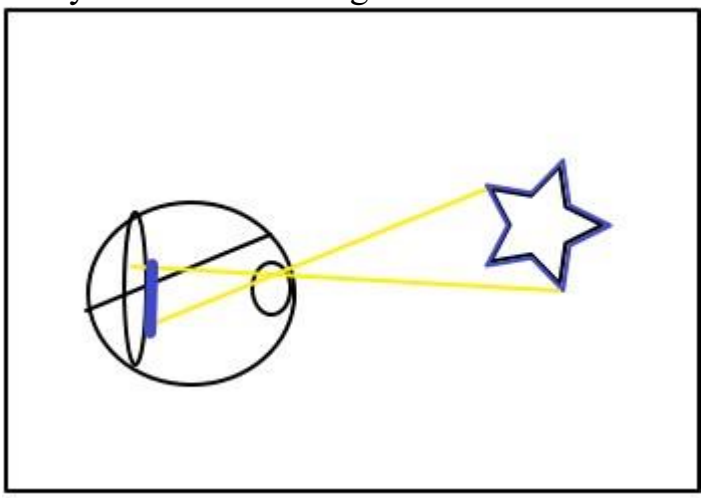


Figure 27

lets suppose now that there is 3D object emitting light in all directions, including the in plan rays in the 2D world we created.

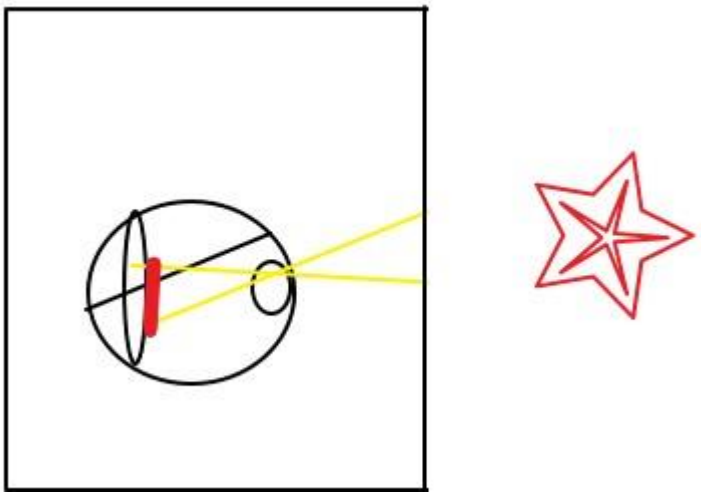


Figure 28

The only light that arrive to the eye ball is the light in plane with our 2D world. Now lets suppose that this 3D star,have a variable shape in space(like a pyramidal star for example)
and we move the paper/2D world orthogonally to its plane, what will the eye ball see?
It will not comprehend the shape of the 3D star but it will perceive a variation in the red line it sees.
Extrapolating this to 3D world, an eye ball having 3D shape will perceive a 2D image of a 3D object, and a 2D image of a 4D object, but what happens is that when the relative 3D world(for e.g our physical presence) starts to move orthogonally to itself in 4D , the 3D eye ball will perceive variation of the image emitted by the 4D object, without seeing the 4D object at once, and that will be an exact phenomena as that of considering 3D world eye ball and 3D object with time parameter added instead of 4^{th} spatial dimension. Being totally similar, according to the theory of consistency(axiom 2), both must apply their rules simultaneously. There are no mathematical rules that time **should** obey, but when we consider time as being an illusion of our motion in 4th spatial dimension, we have obvious rules which should be respected due to theory of consistency.

we can describe motion and distances in the following simplified diagram:

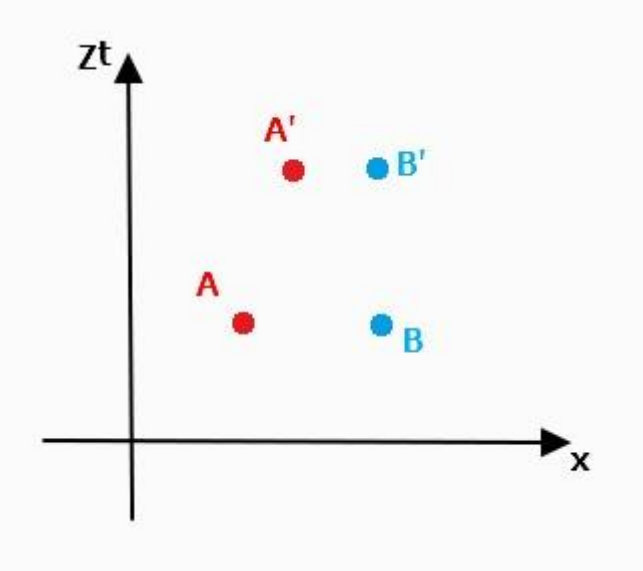


Figure 29 space time diagram

with Z being an unknown speed of motion in the 4th spatial dimension, A and B being objects in the 3D world, and A' and B' being their image at a different 4th dimension position(i.o.w time)

we simplified the process by considering an eye ball, but in fact we are not tied to be eye balls exclusively, but the center of all information reception in our being, and interact with the physical world thus we will call this interactor as awareness index, and therefore this index could be related to physical reality(position in time and space) by its local interaction.

lets suppose that "a" at point A is a person and "b" at point B is another person. To move from A to A', relatively to "a" it would take the speed of consciousness index, v_c multiplied by the time measured by "a" to arrive to A'.lets call it $v_c*\Delta T_0$.If we suppose B is steady in 3D space, and only moves in the fourth dimension, then the distance traveled by b from B to B' is the speed of consciousness index, v_c We naturally assume from the theory of consistency that the velocity of consciousness index is the same for all persons(they feel time in the same way).If we do so this mean that the speed of consciousness index of b is same as that of a and equals v_c.

the distance in the 3D space that "a" travels from A to A' is u* ΔT. with u being the speed of A relatively to B in the 3D spatial dimensions. Knowing these info we apply Pythagoras theorem as follows:

$AA'= V_c* \Delta T_0$; $AA''=U* \Delta T$, $A''A'=Vc*\Delta T$

$AA'^2=AA''^2+A''A'^2$

❼ $(V_c* \Delta T_0)^2=(U* \Delta T)^2+(V_c* \Delta T)^2$ ❼ rearranging the terms

we obtain:

$Vc^2*(\Delta T_0/\Delta T)^2=U^2+Vc^2$

$Vc^2[1-(\Delta T_0/\Delta T)^2]=U^2$

$1-(\Delta T_0/\Delta T)^2= U^2/Vc^2$

$(\Delta T_0/\Delta T)^2=1- U^2/Vc^2$

$$=> \left(\frac{\Delta T0}{\Delta T}\right) = \sqrt{1-(U^2/Vc^2)}$$

the cosmos must limit the speed in the 3D spatial world to Vc to not obtain complex numbers which cause incomprehensible time dilation for our consciousness. Therefore, always u<Vc.

Vc is the speed of consciousness index.

It is either finite or infinite. If it is infinite then we should perceive the wholetime line instantly. And time being infinite as we have said already in chapter 1, then to comprehend all timeline instantly we should be infinite beings which is not our capacity. Therefore consciousness index speed must be finite for us. the maximum speed we can attain in the 3D universe is the speed of a massless object, which is measured in the universe as c, the celerity of light.

$$=> \left(\frac{\Delta T0}{\Delta T}\right) = \sqrt{1-(U^2/c^2)}$$

Therefore we obtain the special relativity formula, which is derived solely from the theory of consistency.

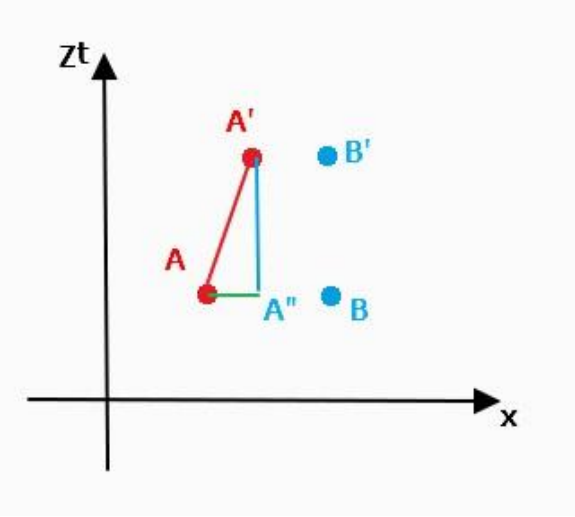


Figure 30 pythagoras application on space time diagram of consciousness physical index

$$lets\ call\ \Upsilon = \sqrt{1-(U^2/c^2)}$$

Consistency is enough to lead also for E=mc^2, knowing that light energy is proportional to its frequency, and here is the thought experiment of Albert Einstein that shows this:

Imagine an atom stationary, in reference frame R at rest.
initial momentum of this atom is p=m*v=0 the atom emits two photons in opposite directionin reference R, the momentum is zero still, as the rays are symmetrical.

Now imagine instead seeing the same event from reference frame R' moving at velocity v to the left.
the atom now have a momentum in R' p= m*v
then the atom emits in all direction the radiation. The momentum in direction of motion , due to doppler effect, is not symmetrical in this reference R', which creates a momentum difference between left and right.this momentum difference is Δp, thus the total momentum becomes p=m*v+Δp (a) but momentum should be conserved as there are no external force.Therefore the term m*v in (a) must vary before and after emission.
v in R was not modified, v in R' cannot therefore be modified, because for e.g for low velocities,v'=v+u where v and v' are the velocity in R and R' respectively and u is the reference R' velocity relatively to R, and thus Δv'=Δv=0.

This means that the only term that can change in (a) is m—call it m'
p=m'v+Δp (b) and p=mv (c)
(b)-(c)=v(m'-m)+Δp=0
Δm=-Δp/v
-Δp=pleft+pright

the variation in momentum of each photon according to doppler effect (which is actually a mathematical observation) is as follows:

$$p'_{\text{light}} = p'_1 + p'_2$$

Substitute:

$$p'_{\text{light}} = \frac{E}{c}\gamma(1-\beta) - \frac{E}{c}\gamma(1+\beta)$$

Expand:

$$p'_{\text{light}} = \frac{E\gamma}{c}\left[(1-\beta) - (1+\beta)\right]$$

Simplify the bracket:

$$(1-\beta) - (1+\beta) = -2\beta$$

So:

$$p'_{\text{light}} = -\frac{2E\gamma\beta}{c}$$

By conservation of momentum:

$$\Delta p_{\text{body}} = -p'_{\text{light}}$$

Thus:

$$\Delta p_{\text{body}} = \frac{2E\gamma\beta}{c}$$

But remember: the body originally emitted **two photons**, each of energy E.
Total energy emitted = $2E$.

Let's define:

$$E_{\text{total}} = 2E.$$

Using this:

$$\Delta p_{\text{body}} = \frac{E_{\text{total}}\gamma\beta}{c}$$

E0 is the energy of one photon, 2E0 is the energy of two photons total energy emitted =E=2E0 therefore $E=\Upsilon\Delta m * c^2$

By defining M'=MΥ as the relativistic mass, we get

$E=M'c^2$. [13],[15]

4.2 -General Relativity:

General Relativity ,Initiated by Einstein, by identifying the exact physical outome of gravity, and an accelerated frame. this is an evident use of law of consistency(axiom 2)

In details, the phenomenon of gravity, as a field of acceleration effects, is described in flat space time as curved trajectories. the exact same effect could be attributed to distortion in space-time curvature. according to axiom 2, sharing both abstract explanations, the gravity should obey laws of spacetime curvature.

That being said,how does it fit with consistency axioms leading to newtonian gravity?
Well, in our previous derivations we simplified the application of axioms by taking for granted that duration and distances are not affected by each other.so while the whole proceedure in section 2.1 Is correct an additional feature of connecting ds and dt was in need of investigation.the disconnection between time and space made in section ?was not justified by consistency but rather simply assumed,and this assumption happen to be tolerable for low mass and speeds helping us ignore its effect for the purpose intended.

Can the curvature interpretation be applied to electric forces? if we suppose we have a source of attractive charge. relatively to the charged particles affected by its attraction, their motion are curve trajectories in flat space time.Now the problem if I consider them caused by curvature of space-time instead, they should be consistent with curvature of space-time that are caused by gravity.IN other words gravity should also create a electrostatic force and there should be no neutral charge objects.which is impossible.therefore there is no equivalence

between curved space-time, and curved trajectories due to electric force in flat space-time.

Dark energy, is the result of the GR equation, as cosmological constant(energy per cubic length of space as property of space itself)

Einstein Field Equation (in tensor form):

$$R_{\mu\nu} - \frac{1}{2}Rg_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4}T_{\mu\nu}$$

Breakdown of Terms:

- $R_{\mu\nu}$: Ricci curvature tensor – describes the degree to which spacetime is curved.
- R: Ricci scalar – a scalar derived from the Ricci tensor, representing curvature.
- $g_{\mu\nu}$: Metric tensor – describes the geometry of s↓etime.
- Λ: Cosmological constant – represents the energy density of the vacuum (dark energy).

This paper don't require diving into derivations of this formula, but rather just the axiom mentioned previously. [13],[15]

5. Anticipated Questions and Objections:

1. Is consciousness truly necessary to explain wave function collapse?
2. Does the theory imply determinism or randomness in outcomes?
3. How indistinguishability is defined in the frame work of this theory?and how is it in relation to consciousness in the two axioms
4. What differentiate the theory from the many world
5. Can the theory of consistency/interpretation of the quantum mechanics be tested?

Answers:

1. In the theory of consistency, consciousness do not collapse the wave function. The mechanism of collapse is simply the result of the physical part of us being transformed into many copies. This physical part, mainly our brain, contain in itself its individuality and identity, which makes us part of one of the copies at a time and not all simultaneously. the copies as

derived from consistency application, have its effects un-additive(otherwise it would reduce to classical), but spreading(creates different copies to conserve symmetries), leading to numerous signals that do not interfere while hitting the brain each. the brain being a physical object, it will also react to each signal as an effect, without being additive. This means that the brain will experience the existence of one copy only.
that reduction from the multiple copies to one single copy is observed as “wave function collapse”.

2. The theory implies determinism and randomness at the same time. the theory shows that at the objective reality, everything happens symmetrically and deterministically in that sense, undergoing all processes under the determined classical physics.
however, the subjective experience as individual copy state, perceive one side of the reality. And which side it chooses must happen arbitrarily, with a certain probability distribution.

this randomness looks like violating the first axiom that says: “Indistinguishable circumstances must yield identical outcomes” but in reality, when our awareness becomes an element of the circumstances, we must point out that two consciousnesses cannot be neither be distinguished nor commonized. This makes the indistinguishability circumstances out of the scope of this axiom.

It is natural to ask, how do I know if ever two circumstances are distinguished? And then what is the use of the first axiom? Could consciousness have effect on everything?

Consciousness cannot be an element that affect distinguishability, thus in context of the axioms, the outcome is independent of consciousness. However, the key feature of the axioms is that outcome can be distinguishable, but it must be identical, which is respected in the model described in this paper.

3. In the framework of this theory, indistinguishability is not equal to identicality. But instead in the ability to distinguish. Not the ability of consciousness (which will be problematic if no conscious observer is there) but the ability as in sense of possibility.
   therefore indistinguishability=ability to be distinguished.

4. Here are key differences between what my theory of consistency, and the many world theory offers:
   a. Deterministic Interaction as Source of Superposition: While MWI assumes that all outcomes of a quantum event exist in parallel branches, my theory attributes the superposition to an underlying deterministic mechanism: interaction affecting position in the most general sense, respecting symmetry of the system by consistency. The root of superposition is therefore the normal forces of nature(e.g electric, gravitational etc.)
   b. Objective Probability Distribution from Physical Constants:
      Instead of relying on the Born rule as a postulate (as MWI does), my theory explains probability distributions—like the $\cos(\theta)$ correlation in Bell-type experiments—as arising from fundamental constant distribution, acting as a time evolution operation, inherent to the nature of each force or interaction

   c. connect interaction more directly to the creation of entanglement, potentially offering a physical reason why entanglement occurs, which MWI lacks
   d. Collapse as Selection, Not Splitting: the collapse of the wavefunction is not a real event, nor a split—it's a subjective selection,outcome of “individuality”, of one of the “copies” of brain that are produced from

the interaction/forces which must be produced due to interaction There is no need for an observer or manyworlds to explain it.

e. better intuitive and more foundational understanding of, quantum evolution, entanglement, interference and decoherence.

5. **Testable ways of the theory in general:**

   Quantum mechanism as a product of position influence:

   to test my theory on quantum mechanics,It suffice to proove that interaction is behind quantum.evolution.therefore I propose the following.:
   Measure the quantum evolution of an isolated particld that is far enough from everything else.my theory claim to have little to no quantum evolution at all in such state.Note that it is insuffiscent to guarantee the equilibrium as It doesn’t equal "no interaction"(refer to the theory for clarification) but instead increasing space from other objects is much more efficient for that objective

6. Conclusion

This paper has proposed that the fundamental behaviors observed in classical and quantum physics, as well as relativistic phenomena, can all be derived from a single foundational principle: the *law of consistency*. By applying this law to systems of interacting causes, we demonstrated how the superposition principle, Newtonian mechanics, and key aspects of quantum mechanics naturally emerge. We also showed how scaling arguments and symmetry considerations lead to the linearity of motion effects and explain the directional behavior of physical interactions.

Moreover, by applying the law of consistency to force derivations, we explored how both gravitational and electrostatic laws can be formulated from consistent principles, with appropriate conventions and mathematical structures. This framework not only offers a coherent view of physical laws but also suggests that quantum behavior may be a superposition of classical interactions, offering a testable hypothesis about the roots of quantum phenomena.

Ultimately, this work presents consistency not as a mere constraint on physical systems, but as the very engine through which the universe expresses its laws — simple, scalable, and unified.

Author's Note:

This work has benefited from the assistance of AI-based tools for improving clarity, grammar, and phrasing. All scientific ideas, theoretical developments, and conclusions presented are entirely my own. The use of AI was limited to language refinement to ensure that the concepts are communicated more effectively and precisely.

references:

1- H. Goldstein, C. Poole, and J. Safko, *Classical Mechanics*, 3rd ed., Addison-Wesley, 2002.
2- Newton, *Philosophiæ Naturalis Principia Mathematica*, 1687.
3- Also covered in Goldstein's *Classical Mechanics*.
4- S. Weinberg, *Gravitation and Cosmology*, Wiley, 1972.
5- C. W. Misner, K. S. Thorne, and J. A. Wheeler, *Gravitation*, W. H. Freeman, 1973.
6- L. D. Landau and E. M. Lifshitz, *Quantum Mechanics: Non-Relativistic Theory*, 3rd ed., Pergamon, 1977.
7- J. J. Sakurai, *Modern Quantum Mechanics*, Revised ed., Addison-Wesley, 1994.
8- M. E. Peskin and D. V. Schroeder, *An Introduction to Quantum Field Theory*, Westview Press, 1995.
9- S. Weinberg, *The Quantum Theory of Fields*, Vol. I, Cambridge University Press, 1995.
10- T. M. Apostol, *Calculus*, Vol. I & II, Wiley, 1967.
11- E. A. Coddington, *An Introduction to Ordinary Differential Equations*, Prentice Hall, 1961
12- "monoticity on homogeneous space". Mathematics of control, signal or systems.vol 30.
13- "Introduction to Electrodynamics" by David J. Griffiths.
14- David J. Griffiths — "Introduction to Quantum Mechanics"
15- Albert Einstein – *Relativity: The Special and the General Theory