

SPECIAL ISSUE 65 JUNE 19 JIM SCHOFIELD

10 YEAR  
ANNIVERSARY  
SPECIAL

# SUBSTRATE THEORY PART TWO

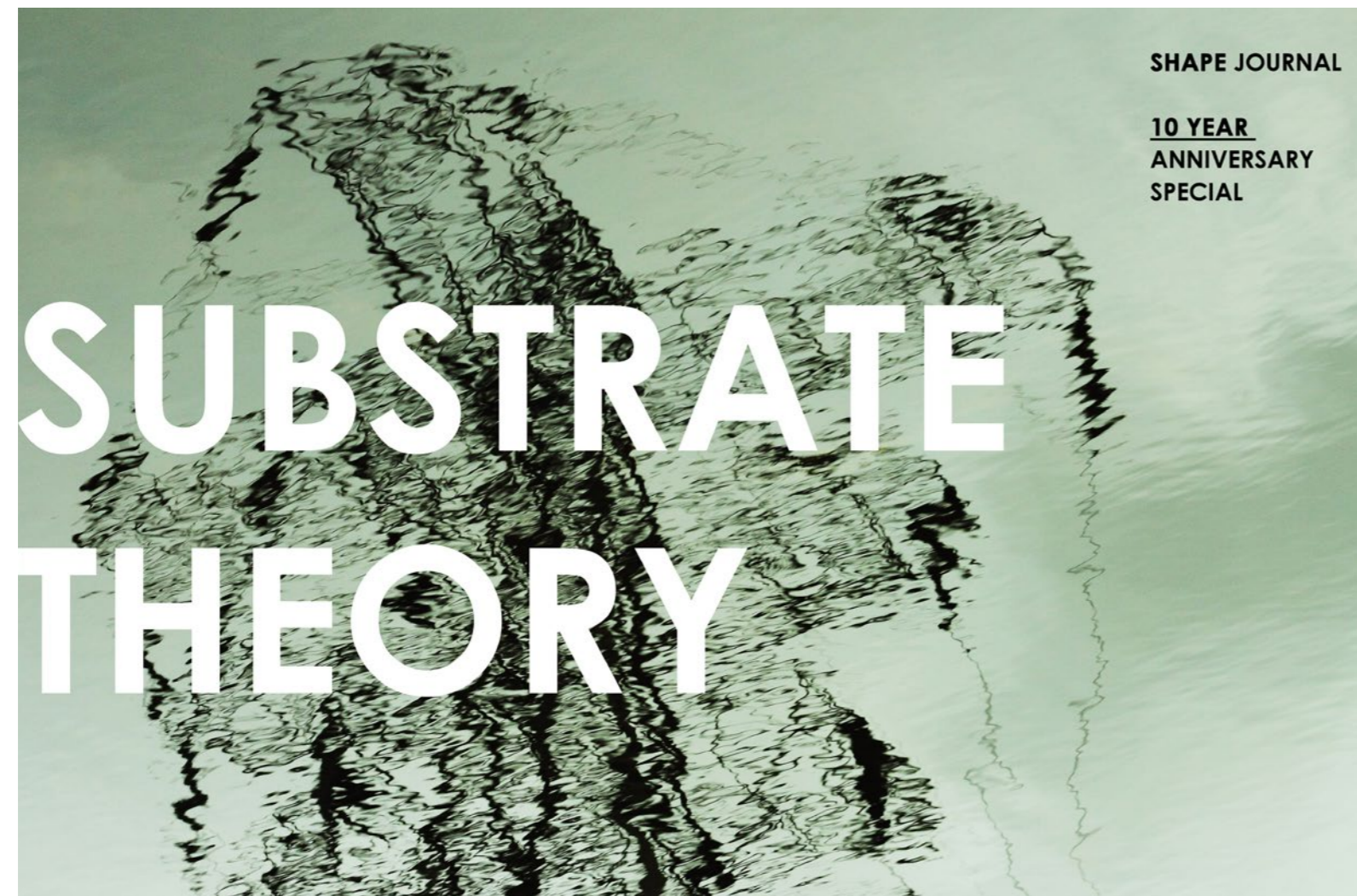
**SHAPE JOURNAL**

**TOWARDS THE NEW PHYSICS**

RETURNING TO MATERIALISM / THE SPACETIME CONTINUUM AND THE UNIVERSAL SUBSTRATE  
VIRTUAL PARTICLES / TIME CRYSTALS / VORTICES AND STREAMS / SUPERFLUIDS

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This issue of SHAPE Journal is the second in a two part bumper edition on Jim Schofield's Substrate Theory, curated to mark the 10 year anniversary of this publication, and to finally bring together all of the crucial materials for this burgeoning physics.

Both issues feature photography series *Alternating Current* by Michael C Coldwell

## Towards the New Physics

Special Issue 65 / June 2019

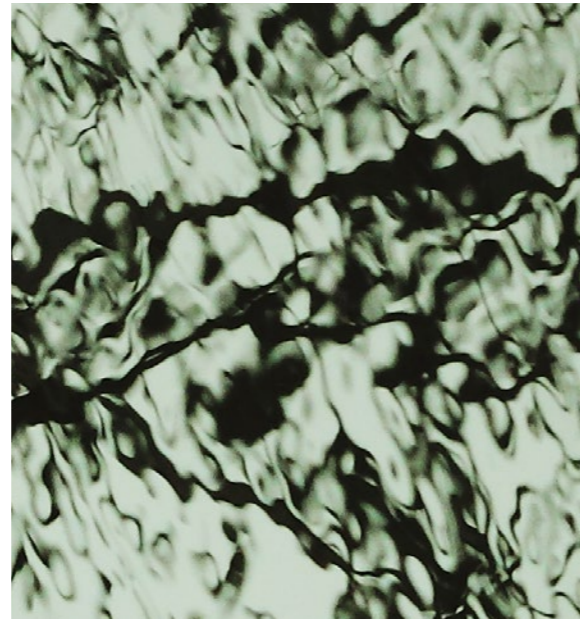
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## The Substrate

### An Introduction

by

**Jim Schofield**



Welcome to Special Issue 65 of SHAPE Journal, the second in a special two part series on Substrate Theory, compiled to mark 10 years of this journal. This selection of papers constitute more recent additions to this burgeoning theory and many of these have never been published before. Increasingly, I no longer feel like a lone voice in this. Other physicists are starting to move in this direction - Lee Smolin and Frank Wilczek are joining a growing group of dissenters in mainstream Physics, unhappy with its infinite descent into the Idealist wormhole, away from materialism and realism.

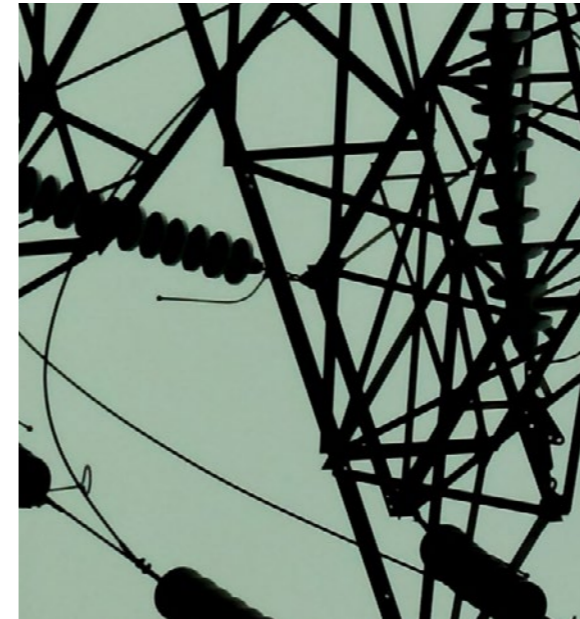
This series is a significant celebration of both the Journal's (and its principle theorist's) 10 years spent in theoretically addressing the current ever-deepening crisis in Modern Physics. This is represented by the now consensus position embodied in the premises of this subject as they are brought together in The Copenhagen Interpretation of Quantum Theory, which has steadfastly taken Physics away from physical Explanation of reality, and instead towards a wholly idealist stance, that assigns full causality only to the set of formal equations, primarily derived from High Speed Accelerator Experiments, primarily conducted at the Large Hadron Collider at CERN.

To dig Modern Physics out of this ever-deepening hole, we must look back to *the* key philosophical period, a considerably long time ago, when the universally lauded Greek Intellectual Revolution occurred in the 5th Century BC, and set the foundations for all Science.

For, at that crucial stage in its History, Mankind had only just got to the point of attempting to construct the very first Inrelectual Discipline, which they achieved by inventing and employing a wholly new form of Abstraction.

And, as is always the case in such a History, all profoundly significant Gains-in-Reasoning, not only deliver the vitally important empowering Turning-Point-Tools, but also, and inevitably, they are coupled with crucially restricting and misdirecting wrong-turnings, which always accompany such breakthroughs - but do so invisibly.

For previously, right up to the magnificent Neolithic Revolution, some 10,000 years ago, Mankind had only managed to survive in small, wandering family groups, by living a Hunter/Gatherer existence, having spent the previous 180,000 years developing very little, apart from changes in the "knapping of pieces of Flint", into very primitive tools and weapons. The Neolithic Revolution changed Everything! Initially, in small groups, human beings began to exchange the Hunter/Gatherer existence, for one of tilling-and-planting the ground and purposely growing crops, and, in addition, domesticating crucial animals to establish Farming, as a clearly much better way to both live and prosper. And, to succeed in this new form of production, they proceeded to live together-with-others in defencible spaces, where frequent daily interchanges with a larger number of others swiftly



developed shared knowledge, and a greatly expanded language.

Nevertheless, it still took several more millennia, before they had developed sufficiently to also attempt to establish Thinking in a truly productive way, because previously they had used primarily Pragmatism in their physical investigations - namely "If it works, it is right!"

The Greeks finally developed further the established idea of *abstracting* Names to identify Things into a new means of also identifying processes by using simplifying relating abstractions, both in spatial and other formal reasoning, which identified the fixed abstract, relatable conceptions involved in such unchanging processes, and thus enabled the systemisation of the whole area of Geometrical Shapes and Forms, via what were termed Theorems and Proofs, and into an ever-expanding and broadly usable Discipline, which ultimately became Mathematics.

This development not only greatly empowered Greek Thinking, by using Mathematics in solving quantitative and spatial problems, but the enormous enrichment of means delivered in such New Thinking, so enchanted the Greeks, that they exported the same sort of thinking to both Reasoning and "Physics", in order to also greatly empower those too as other New Intellectual Disciplines.



And that was the mistake! The key, in creating Mathematics, namely the simplified relating abstractions, were always quite naturally fixed-and-unchanging - they quite legitimately conformed to the Principle of Plurality, which gave the New Discipline of Mathematics its enhanced powers! BUT, neither Everyday Reasoning nor Scientific Relations conformed to that implied Principle: they instead addressed much richer and developing areas, so they essentially required *Qualitative* Changes, by their very natures, and hence conformed, instead, to the very different Principle of Holism, namely: "Everything affects everything else"

This wrong turning was to plague both Logical Reasoning and Science, right up to to the present day, and inevitably cause associated and always unresolved crises - including the one we see in Sub Atomic physics today.

In addition, ever-since, the perennial problem of Continuity versus Discreteness, also constantly generated innumerable different problems. Early in the Greek Intellectual Revolution, Zeno of Elea revealed in his Paradoxes the consequent anomalies when considering such concepts in relative Movement. Later, in Physics, the very same problem raised its head in comparing situations wherein *discrete* entites interacted, with each other, or when they, instead, interacted with a seemingly *continuous* background Substrate.



Initially, scientists got around the problems by treating the two cases differently: particularly by treating substrates or media as capable of propagating disturbances via waves-in-the-medium.

And, this worked very well, analogistically, until the Michelson-Morley Experiments failed to find any evidence for the presence of an Aether - the supposed continuous Universal Substrate in Empty Space.

As scientists delved ever deeper into Reality, the problem recurred also at the Sub Atomic Level, with similar Wave-like phenomena, but with NO evident Substrate to explain them.

Now, in Reasoning and Philosophy, these difficulties were not addressed for millennia until Hegel made his dialectical corrections to Formal Logic. But, in Science NO such solution was found, and the aberration of Copenhagen was almost universally instituted throughout Sub Atomic Physics, as a set of formal tricks for dealing with the missing Substrate - papering over the cracks of these waves in nothing.

Elsewhere, in my book *The Real Philosophy of Science*, these philosophical problems have been tackled, but here we must *physically* also tackle the real possibility of an undetectable Universal Substrate - look at why it might have escaped detection and how we might prove its existence.

#### METHOD:

Finally, as a crucial part of the objective of establishing a Holistic Scientific Method, various techniques will be adhered to, which differ from the normal Pluralist Scientific Method. The approach must be Holist rather than Pluralist!

The usual Experimental Method of a Data-First Approach will be replaced, wherever possible, by a Theory-First Approach (à la Maxwell), that will have been instituted to bypass the unavoidable distortions inserted into the usual methods, due to the domination of both Plurality and Idealism.

Clearly, the objective is NOT to arrive at the usual target of "situation-driving" eternal Natural Laws, in the usual form of idealist Equations, but primarily to deliver Explanations with maximal Objective Content.

Finally, neither traditional Formal Reasoning, nor the pluralistic Reasoning implicit in Mathematics will be consciously employed. The tasks will attempt to be undertaken Dialectically (not merely idealist Hegelian, but indeed materialist Marxian).

## Quantized Electron Orbits within Atoms but without Copenhagen

In the previous instalment of *Substrate Theory* (Ed - Issue 65), this physicist theoretically-established an extended Theory of a Universal Substrate, which has been significant in removing every single one of the many impasses evident in the whole range of Double Slit Experiments, without any recourse whatsoever to the Copenhagen alternative interpretation.

But, pressing onward with those emerging ideas, has required more than a purely theoretical description of such a possible physical entity: it, more and more, required, in addition, a detailed description of its actual physical components, their properties, and their necessarily-produced aggregated-structures, and also, their extensions to many other areas of explanation too, if at all possible.

And, the brilliant “Walker” Experiments, carried out by French physicist Yves Couder and his team, had also, and surprisingly, managed to produce Quantized Orbits of his Walkers, in one version of his standard experiment, in which they were produced in a situation that contained ONLY his chosen single substrate of a particular silicone oil, and absolutely nothing else!

Clearly, this posed excellent questions, to also be addressed by my own Universal Substrate model. If we can answer why such orbits occurred in Couder’s macro experiments, involving only a substrate, we have a possible explanation for how these phenomena might occur via a substrate at the Quantum Level too.

Being an experiment at the Macro level, the quantizations observed could certainly not be due to the suggested causes at the Sub Atomic Level, as in the Copenhagen Interpretation of Quantum Theory. Clearly, any valid explanation of Couder’s quantized orbits, might also be legitimately carried over to the phenomena at the Sub Atomic Level too, if, and only if, sufficient detailed information concerning the Universal Substrate’s

components, and their properties and possible structures, were available too.

It was assumed that the usual turbulent-processes always generated at the Macro Level, when an energetically-moving object was propelled through any substrate, might well carry over into the Sub Atomic Level, but there, produced by a currently undetectable Universal Substrate, with very different components.

Clearly, investigations would be necessary upon two very different Levels of reality, but to address, in addition to those available at the Macro Level with ordinary substrates, also those at the Sub Atomic Level. For then, detailed work would have to be carried out first at the Elementary Particle Level, to investigate just how undetectable-joint-particles might be possible as Substrate Units, yet also have properties able to produce similar turbulences as those known at the Macro Level, while also fulfilling a full set of requirements at the Sub Atomic Level!

Now, for the suggested Universal Substrate to even exist, it must simultaneously be undetectable, as such, but, at the same time, be able to both affect, and be-affected-by other visible entities occurring within it.

But, even that does not exhaust the full set of demands that have to be made upon any Universal Substrate, for the greatest inadequacies in current Physics are to do with the supposed properties of “entirely Empty Space”, in being able to produce Action at a Distance (as with all kinds of Fields), the propagation of disembodied Electromagnetic Radiation, and phenomena such as Pair Annihilations and Pair Productions. The constraints upon any undetectable Universal Substrate are indeed onerous! It is no wonder the problem was eradicated by assuming no such Substrate existed, and leaving all those questions left unanswered, “for now”!

## Path-memory induced quantization of classical orbits

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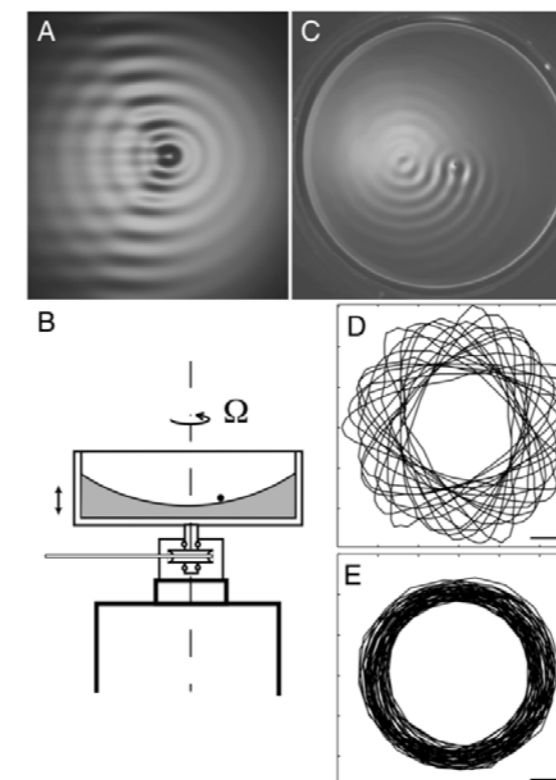
**A droplet bouncing on a liquid bath can self-propel due to its interaction with the waves it generates. The resulting “walker” is a dynamical association where, at a macroscopic scale, a particle (the droplet) is driven by a pilot-wave field. A specificity of this system is that the wave field itself results from the superposition of the waves generated at the points of space recently visited by the particle. It thus contains a memory of the past trajectory of the particle. Here, we investigate the response of this object to forces orthogonal to its motion. We find that the resulting closed orbits present a spontaneous quantization. This is observed only when the memory of the system is long enough for the particle to interact with the wave sources distributed along the whole orbit. An additional force then limits the possible orbits to a discrete set. The wave-sustained path memory is thus demonstrated to generate a quantization of angular momentum. Because a quantum-like uncertainty was also observed recently in these systems, the non-locality generated by path memory opens new perspectives.**

bouncing droplets | Landau quantization | pilot wave | wave-particle duality

a magnetic field. However, for technical reasons we chose a variant that relies on the analogy first introduced by Berry et al. (5) between electromagnetic fields and surface waves.

Its starting point is the similarity of relation  $\vec{B} = \nabla \times \vec{A}$  in electromagnetism with  $2\vec{\Omega} = \nabla \times \vec{U}$  in fluid mechanics. In these relations, the vorticity  $2\vec{\Omega}$  is the equivalent of the magnetic field  $\vec{B}$  and the velocity  $\vec{U}$  that of the vector potential  $\vec{A}$ . Considering a plane wave passing over a point-like vortex, Berry et al. (5) show that the phase field will exhibit defects as the wave passes on either side of a point vortex. This is the analog of the Aharonov–Bohm effect (6) where the presence of a vector potential generates a phase shift of the quantum-mechanical wave function. Although this effect is unintuitive in quantum mechanics, it receives a simple interpretation in the hydrodynamic analog where the phase shift is due to the advection of the wave by the fluid velocity. The hydrodynamic effect has been experimentally measured both in the propagation of acoustic waves (7) and in that of surface waves (8, 9) around a vortex.

In order to investigate circular orbits we use the same analogy differently. The associated forces also have similar expressions. A



$\lambda_F = 3.74, 4.75, 6.95,$  and  $8.98$  mm, respectively. The walker’s motion is recorded with a camera placed in the laboratory frame, and the trajectories in the rotating frame are reconstructed by image processing.

### Experimental Results

**The Path Memory.** First, we address the path-memory concept. In the absence of rotation, a given droplet forms a walker in the interval  $\gamma_m^W < \gamma_m < \gamma_m^F$ . The bifurcation to walking being supercritical, the walker’s velocity increases near the onset as  $V_W \propto (\gamma_m - \gamma_m^W)^{1/2}$ , then saturates at a value of the order of a tenth of  $V_\phi$ , the phase velocity of Faraday waves.

The global wave field results from the repeated collision of the droplet with the substrate. Each point of the surface visited by the droplet becomes the center of a localized mode of circular Faraday waves. This wave packet damps out with a typical time scale  $\tau$ . The transition to Faraday instability being a supercritical bifurcation,  $\tau$  diverges near the threshold as  $\tau \propto |\gamma_m - \gamma_m^F|^{-1}$ . By tuning  $\gamma_m$  we can thus control the time scale of this memory. Far from the Faraday threshold the waves are strongly damped and the wave packet has an approximately circular structure resulting from the most recent collisions of the droplet with the bath. In contrast, in the situation shown in Fig. 1A where  $\gamma_m$  is close to the Faraday threshold,  $\tau$  is very large and the wave field is widely extended and exhibits a complex interference structure. This wave field has an interesting relation to the Huygens–Fresnel theory of diffraction (13). The in-phase secondary sources left behind by the droplet can be considered as implementing in reality Huygens secondary sources along a wave front defined by its trajectory (14). For a rectilinear trajectory (Fig. 1A), the resulting wave pattern is thus similar to the Fresnel interference of light near the edge of a wall, the equivalent of the wall being the line of points that have not yet been visited by the

Fort, Emmanuel, et al. “Path-memory induced quantization of classical orbits.”

Proceedings of the National Academy of Sciences 107.41 (2010)



And also, the dumping of the concept of a Universal Substrate due to the Michelson-Morley experiments, has surely to be re-examined in the light of the Quantum, especially, if, as seems increasingly likely, EM Radiation is propagated bucket-brigade-fashion via an otherwise undetectable Universal Substrate.

I will not replicate the theoretical findings on producing an undetectable but fully functioning Universal Substrate here (please read The Lepton Substrates for more information), except to say that undetectable-joint-particles are composed exclusively of mutually-orbiting pairs of matter and antimatter versions of Leptons, with cancelling overall properties, either intrinsically within the joint entities, or population-wide via random movements. But, the crucial findings, relevant here, are to do with the possible various Substrate-aggregate-structures, or Phases, formed by the various Units, which turned out to be vital in delivering analogous turbulences to those occurring in normal substrates at the macro level.

To give one example: Neutrino units were shown to exist in a loosely-linked static Paving, which could be very easily dissociated into wholly free-moving individual joint-units, each carrying a quantum of internal energy (a Photon), and these could be driven along by high energy interlopers, into Streams, which in turn could produce Vortices.

Now, with a linear moving interloper these Phases would always be temporary, but if the moving unit was an electron in an atomic orbit, things would be very different! For, the electron would be regularly returning to the very vortices it had previously produced, and thus could supply extra energy, if required. Also, such a transfer would naturally reduce the electron orbit somewhat, so a transfer in the opposite direction could also take place

- from Vortex-to-Orbit. Clearly, there would be certain radii of the orbit wherein a stable balance of energy flows could be possible.

A "quantised" orbit would have been achieved!

Perhaps another example would be appropriate: A Magnetron (of which there are two mirror-image types), is always neutral, but has a Magnetic Dipole Moment, due to its mutual orbiting consisting of two differently-sized particles, which are normally still undetectable as the two forms are usually in constant random movement, but they can be affected by suitable initiators to instead form relatively static Fields (indeed with different initiators, they can deliver both Magnetic Lines of Force, and Electric Fields).

As each Copenhagen monolith falls to the ground, I am admonished with the dismissive taunt - "But, what about all the others, still standing?"

Read my philosophical bases: they also dismiss Copenhagen as Idealist, maths-based Plurality - its claimed-to-be-philosophical legs are already long gone!

## Returning to Materialism?

### Alternative Approaches to Reality: Wilczek's Materiality of the Vacuum

Frank Wilczek (in the 2017 Origins Event at Arizona State University) is beginning to consider, as he puts it, "The Materiality of the Vacuum". And, many of his arguments are similar to others (including my own) that find such a consideration totally unavoidable.

And, his brief excursion into talking about James Clerk Maxwell, and his ideas upon the presence of a Substrate - The Ether, also demonstrates his attitude to Analogistic Models with sufficient Objective Content to allow real progress to be made, even though the one Maxwell used to derive his world famous Electromagnetic Equations, was admitted to be a disposable, yet eminently useable construct, rather than a true and comprehensive representation of Reality.

Interestingly, though, exactly how such a question is approached is always based upon where these investigators are coming-from theoretically.

So, it doesn't take long before Wilczek is linking his "admitted speculations" directly to the current consensus positions in Sub Atomic Physics. However, he does seem to have left the Principle of Plurality behind somewhat, freely anticipating different Physical Laws in very different contexts. And, that, if true, is indeed a major development!

Indeed, this researcher, Jim Schofield, has long laboured to wrest Science, and particularly Sub Atomic Physics, from its contradictory mix of philosophical stances, evident right from its initial outset millennia ago, which involved not only Materialism, but also both Idealism (concerning the supposedly-causal-nature of its purely formal Laws) and Pragmatism - to practically reconcile this amalgam's inevitable consequent contradictions.

For many centuries, this almost "Post Modernist" philosophical amalgam seemed to suffice, mainly via a regular re-division of the studies of Reality into ever-more separate areas (or specialisms) - within each of which, the more glaring incongruities could be avoided, and between which, the "common coin" of quantified relations as purely formal equations, could act as generally agreed "articulations" apparently connecting disparate studies.

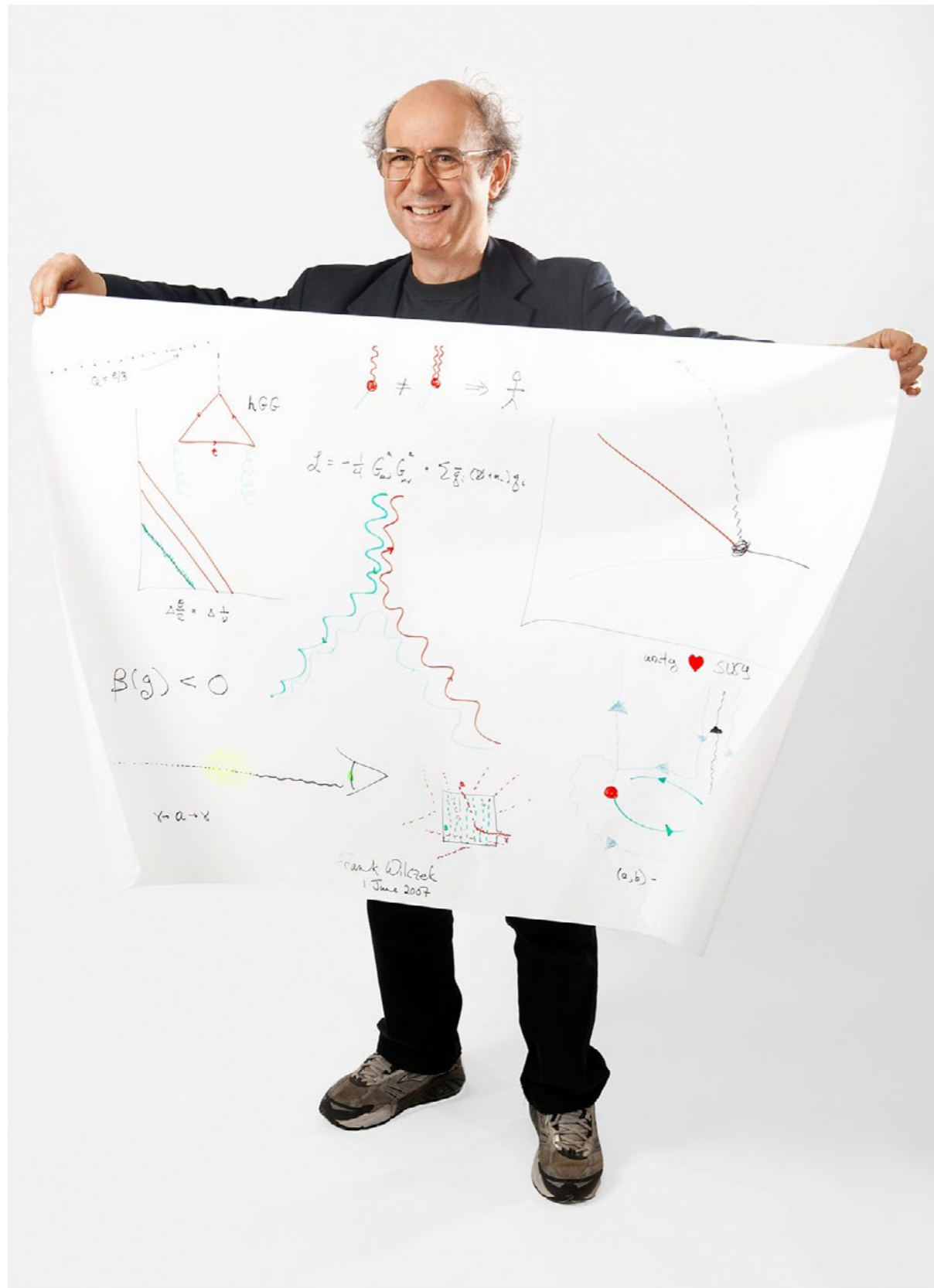
While Pragmatism still "ruled OK", and validated all contradictions, the underlying thirst for real understanding was constantly breaching these artificial boundaries and presenting scientists with just too many contradictions for them to to continue to cope with. Areas of Science were becoming increasingly philosophically bankrupt!

In 1927, at the famed Solvay Conference, Bohr and Heisenberg managed to convince the majority of their colleagues (in spite of the counter-arguments of Einstein), that the problem was this "Attempt-to-Understand", and what had heretofore been regarded as Theory, must be transferred wholesale to universally accepted Formal Laws and Equations alone - solving the aforementioned problem.

Explanation, in terms of physical relations, was effectively dumped, to be replaced solely with "Obeys this equation!", and thereafter regarded, at best, as only an accompanying (and distorting) narrative.

Idealism had thus become the foundation of Reality, for along with an implicitly-assumed Plurality, the extracted relations became seen as eternal Natural Laws - embodied, seemingly, both succinctly and accurately within those Formal Equations.





Frank Wilczek - Materialist?

But, of course, it wasn't actually true!

Indeed, it meant a switch from studying Reality-as-is, to only considering the formal extractions themselves, taken only from suitably modified "farmed" sections of Reality (experiments) in which any extracted Form was closest to being true. And, that arranged-for set of circumstances was certainly NOT Reality-as-is but Ideality - the reflected purely formal world of Mathematics.

Now, of course, such a dramatic about-face was NO Revolution, indeed it was actually a major Retreat, and the excusing Copenhagen Interpretation of Quantum Theory just had to be defeated, both philosophically - with a better underlying stance, and physically - with explanatory theories of implacable merit, compared with the Copenhagenist speculations - more Objective Content was required!

Now, Wilczek doesn't necessarily deliver on these requirements, but he is apparently moving back towards Materialism, and, at the same time, abandoning Plurality - both of which are, if true, definitely on the right track. But, problems still arise out of the absolutely necessary physical advances that must also be contributed. For, what are his suggested components involved in his return to a *material* "Empty Space"?

His general approach seems sound, but he can only turn to current Copenhagen Physics for his possible "material components". And, having won a Nobel Prize for his work on Quarks, that obviously suggests components for one of his many possible material Substrates. Echoes of his own Copenhagenist past become his source for "peopling" them.

#### A Necessary Muse

Now, The problem of components for a Universal Substrate has two major aspects.

First - that no evident Substrate has ever been detected!

Second - we cannot assume that currently-existing Elementary Particles have always been the same as now.

And, these severely restrict our search for appropriate Substrate Units. For, guessing what past Elementary Particles were, can only be predicated upon speculation derived from what has been observed in High Energy

Colliders, such as the LHC - but also involving assumptions of an initial Big Bang - which, presumably, involved very high temperatures and particle speeds, not, as yet, available in our current equipment.

The line that Wilczek takes is very general, and leaves a great deal of this area still unresolved!

However, this theorist, Jim Schofield, decided to "do-a-Maxwell", and get as far as he could with known particles from the Standard Model and List of Elementary Particles, BUT actually associated into mutually-orbiting pairs, in order to endow the resulting Joint-Substrate-Particles with the necessary properties, including, of course, undetectability, but also addressing E.M. Propagation, and particularly focussing upon a non-Copenhagen explanation of what occurs in the sub atomic realm.

Using Elementary Particles exactly-as-is, just couldn't deliver, so he concentrated upon possible mutually-orbiting pairs of diametrically-opposite particles one of which would always be of ordinary matter, while its opposite would be of antimatter. And, one possibility stood out - a mutually-orbiting pair, consisting of an electron and a positron. It may not turn out to ideally fit the bill, but it would enable the principles involved to be tested out, theoretically.

Clearly, as these sub-units were exact mirror images of one another, it couldn't be a case of one of them orbiting the other. For, as they are the exact same size, a mutual orbiting would involve them sharing the same orbit, occupying diametrically opposite positions. Yet, the resultant "particle" would seem to be totally-undetectable: all its properties would be completely cancelled out!

This pairing has indeed been observed, momentarily, in the Tevatron at Fermilab. It had been named the positronium, but then largely ignored - because of its apparent instability: but it had been seen only in a High Speed Accelerator. And, I had good theoretical reasons for investigating such kinds of particles, so I carried on seeing what it could possibly do.

Immediately, it was evident that by promotion of its internal orbit it could carry a quantum of electromagnetic energy, just like the Hydrogen Atom could. And, it could then pass that quantum on, by a demotion in its current unit, and the promotion of an identical as



yet unpromoted adjacent one. A sort of Propagation of Electromagnetic Energy was possible - bucket brigade fashion. And, if the insertion of energy was too high, it would dissociate the joint-particle back into an Electron and a Positron - as we see in Pair Production. And, also, if a free-moving Electron-and-a-Positron encountered one another with the right conditions, the result could be an invisible mutually orbiting pair - as in Pair Annihilation.

Things were beginning to look promising.

And, that wasn't all: an individual free-moving pair, carrying a quantum of energy, and as yet unable to unload it - would appear as a Photon! Clearly, there were still problems with these ideas, but it now had a name: it was either a Photon or an Empty Photon.

But, for it to be the actual propagator of electromagnetic energy, the individual units would have to be in very close proximity to one another, to make transfers possible, and this seemed highly unlikely as they were all lacking in any linking forces to deliver a connected-Substrate. Yet, that assumption too turned out to be mistaken: for, when extremely close together, such empty photons could be loosely-linked by the differently-charged sub-units affecting one-another across adjacent empty photons. Indeed, the inter-unit gaps would be constant and very small so that transfers would be eminently possible, and the speed of propagation,  $C$ , would actually be the speed of transfer of a quantum between adjacent units in this Connected Substrate, which I then called a Paving.

Indeed, things were going so well, I decided to rename my Substrate unit a Neutrtron, and, full of confidence, decided to tackle the ill-famed Double Slit Experiments, to see just how many of their anomalies could be explained by my Neutrtrons.

Perhaps surprisingly, all the anomalies introduced by the Copenhagen interpretation were immediately removed by the introduction of the proposed Neutrtron Substrate. Instead of Wave/Particle Duality, we had the electron acting as a Particle interacting with the Substrate to produce extended Waves within it. And these raced ahead and passed through both Slits, to together form a sustained interference pattern beyond. The "causing", but slower, electron finally reached the Slits and passed through one of them, only to encounter its own self-caused interference pattern and be deflected (or not) to produce part of the pattern on the detection screen.

And it doesn't even matter if this is not absolutely correct! Like James Clerk Maxwell's model of The Ether, it is a legitimate step forward, if and only if, it contains more Objective Content than what it replaces. If significant gains are made, it should indeed replace the less effective prior model - at least for now!

Do you require a clincher? How about the "Collapse of the Wave Function", when attempts are made to see what is happening beyond the slits? Well, with the new model it simply becomes the dissociation of the interference pattern in the Substrate due to the disturbances caused by trying to measure things in that area - a real physical and material explanation for this Quantum "weirdness"!

Let us be crystal clear: Copenhagen is the illegitimate transformation of the Statistics-and-Probabilities-of-Populations imposed upon a real and recursive interaction between a Particle and the Waves it causes in an existing, if usually undetectable Substrate! It is only ever fulfilled over a population of particles: that is why when considering a single Particle-at-a-time it can only give a Full Set of probabilities covering the whole possibly affected area! And, the Double Slit Theory does not exhaust the methods employed by this theorist. Using the same approach with other Leptons, it has been possible to explain the subtending of physical Electric and Magnetic Fields in so called "Empty Space", and following the brilliant experimental work of the French physicist Yves Couder on his "Walkers", it has also been possible to develop a non-Copenhagen explanation of Quantized electron orbits in atoms (see previous article).

Come on you physicists: this is real Explanatory Physics here! If it is wrong, please correct it, but also bury Copenhagen forever while you're at it.

Bring in Frank Wilczek, with his new outlook, Yves Couder with his revolutionary experiments, and the attitude of James Clerk Maxwell to Models and Theory, and, perhaps surprisingly, with the Dialectics of Hegel, but transferred fully into materialism, real progress is indeed possible...

It is considerably overdue!



## Frank Wilczek and the Universal Substrate

What was remarkable about Wilczek's Origins Project lecture, was that much of what he had to say resonated, very markedly indeed, with Substrate Theory, but, nevertheless, came from a very different place; namely the more usually accepted consensus positions of today's Sub Atomic Physics. Despite my reservations this lecture has dramatically altered my assessment of him, as both a scientist and indeed, a philosopher. By alternate, indeed diametrically different means, he has arrived at very similar conclusions to those I postulate, and this delivers a very different slant upon valid pathways towards the Truth that we, as physicists, always seek!

Indeed, the situation delivered far more than that: for he was introduced-by, and afterwards disagreed-with Lawrence Krause, who seemingly from the same theoretical stance as Wilczek, also demonstrated how that seemingly identical basis, was indeed diametrically opposite in various extremely important premises. For Wilczek is a physicist: while Krause is, at heart, a mathematician!

And, as it became clear, Wilczek and myself, though arriving at very similar positions on Empty Space (he even mentions the word "substrate"), were nevertheless getting there, on the one hand, due to conforming to the same basic premises, still managed to do it, in spite of using very different means and sources for our theories. And, the subsequent presence and disagreements of Krause, also confirmed that his differences, in spite of working in the very same areas as Wilczek, put him in a very different position indeed. Krauss is an idealist, whereas Wilczek is closer to being a materialist.

Now, by far the more important revelation for me was the possibility of arriving at similar conclusions from very different experimental evidence and theoretical bases. It clearly confirmed both for myself, and for him, that we, as scientists, did not either seek or expect to find Absolute Truth, but, on the contrary, what I term shared Objective Content - that is aspects or parts of that never-to-be-reached Absolute Truth, but which supply the best view of Reality we currently have: and which would always be open to improvement by new Objective

Content, if it proved to be closer to that ultimately unobtainable objective.

In addition, Wilczek made absolutely clear what were legitimate theories in such Objective Content, citing, as I often do, James Clerk Maxwell's Aether - a fictional Analogistic Model composed of Vortices and Electrical Particles, from which he directly derived his Electromagnetic Equations - forms with enough Object Content that we still successfully use them today.

And, this also says something quite profound, and generally not understood, about how equations are derived.

For, most equations are what I term Pluralistic Equations, derived initially from intensely pluralistically-farmed experiments, and thereafter wedded to Pure Equations from Mathematics by adjusting the Equation's constants to make them fit. And, that is very different indeed from Maxwell's Holistic derivation of an equation direct from a Physical Explanatory Theory.

Indeed, elsewhere, and at another time, working with the mathematician Jagan Gomatam, I was able to use equations he had developed directly from theory to do with the beating of the Human Heart, which in contrast to equations as a consequence of experimental data, actually were able to demonstrate both Fibrillations and Heart Attacks.

But, how many modern day physicists do things that way round, and thereby actually knowing why it gets closer to the Truth?

Now, Wilczek certainly doesn't define Empty Space as I do - filled with an undetectable Universal Substrate of various Lepton pairs. But, he does insist that Empty Space is filled with something *material*. The vacuum cannot be empty in any meaningful definition of the term.

His current model uses Quantum Fluctuations, but both theories are identical functionally in how they

explain both Pair Productions and Pair Annihilations: and crucially Wilczek clearly admits to having the same stance upon the necessity of such currently-valid Analogistic Models!

Now, as to where Wilczek and this theorist differ, it is certainly in exactly what materiality, which actually fills the vacuum, and is both affected-by what is happening to it, and consequently what those effects upon it do to things contained within it. With literally only directly undetectable Quantum Fluctuations, we can commend any attempt for The Theory to directly determine any subsequently arrived at formulae, but at the same time, it is almost impossible to theorise as to what that form is likely to be.

While, in contrast, with this theorist's known Universal Substrate Units, both aspects can be adequately and correctly carried through to completion - that is for the full-detail, Analogistic Model (à la Maxwell) from which to generate the necessary Equations, as Maxwell did from his Model of the Aether.

There is much more in Wilczek's lecture than I have dealt with here. Some of his philosophical points are particularly powerful...

Clearly, the replacement of Quantum Fluctuations, and, of course, my Analogistic Model of the Universal Substrate, has yet to be achieved.

But the stance is right!

The image features a background of water with gentle ripples. A central square inset provides a magnified view of the water's surface, showing intricate, dark, and light patterns of the ripples. Overlaid on this inset is the text "NOTHING IS EMPTY" in a bold, white, sans-serif font.

**NOTHING IS EMPTY**

## The Dialectics of Wave Particle Duality

We can resolve the contradiction of wave-particle duality using the Substrate. The erroneous assumption which lead to this dichotomous pair was that one entity was behaving in two contradictory ways. Once the assumption that this is a single entity has been removed, the contradiction disappears.

Let us explain the Double Slit Experiment in a purely holist-materialist and physical-theoretical way. Let us imagine the experiment is taking place within an invisible, but everywhere-present Substrate, so that our significant moving entity, a Particle, say an electron, or even a 'photon', is energetically moving through this medium causing continuing disturbances within it, as a constant emanation of waves, travelling in all directions outwards from that persisting causing interloper. The waves in the Substrate will be travelling ahead of the particle at C.

Ahead of this everywhere-spreading wave, and, of course, of the causing, following moving Particle too, is a screen totally impervious to both, except where it is punctured by two closely-situated Slits, which alone allow a passage through. The constantly being-produced, and much faster-moving wave arrives first, and passes through BOTH of the Slits. So, with defraction at their edges, both Slits will each produce their own fan-shaped, diverging Wave, on the other side. And, these two will necessarily cross one another, producing a constantly maintained Interference Pattern in the previously undisturbed Substrate beyond the Slits.

Finally, the causing Particle duely arrives at the Slits and passes through just-one-of-them: and depending upon its path through the Slit will, itself, be variously defracted upon one of many possible subsequent paths. Here it will encounter the produced Interference Pattern in the Substrate - which it had itself caused, and be directed by it, or not, depending upon its passage, to ultimately produce a single point upon a provided detection screen.

Interestingly, further following Particles, arriving one-at-a-time, will take slightly different paths: BUT, overall, the full collection will together produce the observed Pattern on the detection screen, determined by both the Interference Pattern and the defraction spreads at the Slits, affecting the particles' paths through the system.

Even more interestingly, any attempt to detect anything at, or beyond the Slits, will cause the delicate Interference Pattern in the Substrate to totally dissociate - due to the intervention's disturbances, so that a moving Particle, at such a time, will pass straight through totally unaffected.

It isn't the usually-claimed "Collapse of the Wave Function", or some idealist nonsense about observation, but merely the Dissociation of the Particle's self-caused Interference Pattern in an otherwise undetectable Substrate.

The real question has to be "Why was this missed?" And the answer has to be because physicists were besotted with pluralistic, mathematical equations: they had ceased to be real Materialist Physicists, and had, instead, become total Idealists.

Now this dialectical thought experiment was so successful compared with the now universally subscribed-to Copenhagen Interpretation of Quantum Theory, that it precipitated a whole raft of further similar investigations, which were also similarly successful, and hence demanded a detailed definition, in terms of what we already know, as to exactly how such an undetectable Universal Substrate could be defined - yet capable of producing all these previously anomalous phenomena? So, this was undertaken too, based upon a series of mutually-orbiting pairs of diametrically-opposite Leptons, and slowly at first, but with increasing pace, a multi-unit set of components with the right properties was eventually devised, consistent with the defined objectives.





## Charge and Force:

### What on Earth are they?

#### Charge:

Let us assume that a particle really is a local concentration of matter. And, that it could also include a Charge, either Positive or Negative, which are in some sense opposite properties.

Surprisingly, a stable union of two charged particles, with one of each kind, is possible, which depends upon their mutual attraction, but NOT requiring any intrinsic merging into a merged and neutral result. [see the later comments upon the Neutron]

In fact, the classic union requires that they are prevented from even touching one another, by the presence of another different effect opposing that attraction, which is usually provided by the relative motions of the two particles involved. For, the most general case will NOT involve an opposing repulsion, but only an affected momentum, heading elsewhere. Then, any attraction due to differing charges will be countered by that directed-elsewhere momentum. On coming close enough together, their paths will be attracted towards one another, which still could result in them missing one another, but thereafter carrying on with diverted paths. Yet, if they actually get too close they could actually collide.

Finally, with the right approach and relative speeds, they would mutually orbit one another. And that sometimes-possible result (very rarely observed) is surprisingly common, when the various effects balance one another and various different orbits turn out to be both possible and stable.

But, this only happens either in isolated encounters, or within a population with all pairings having the very same kind of orbit.

Yet, any close approach by a similar union, and one whose orbit is at a much lower energy level, then that union could receive a part of the other's energy, by the demotion of the donor orbit, and the promotion of the receiver orbit. But, there will be a base orbit below which it cannot go!

Now, this account also poses various questions: the most evident being, "What happens in collisions?" Clearly they are unlikely normally to be at the Elementary Particle level. And that poses a problem: are they really opposites, as we assume, or merely different things that act as opposites in certain circumstances. Solving the merging problem could be crucial!

While in other circumstances the most likely components will simply add towards meteors, moons or planets, though they could end up as parts of stars, and that would be a large and pretty energetic mix of all types!

The basic problem in an elementary Particle with a single unit of charge, is to do with where the charge resides, *within* the material Particle. Is it somehow intrinsic throughout the entity, or localised?

The effects, that it has, appear to indicate that an assumption involving such a charge fits in with believing it to be at the centre, or somehow distributed equally over its surface. Yet particles with multiple charges, though common as atomic nuclei, with only positive charges, but are unknown with negative charges. While in atoms the positives aggregate in the nucleus, with the negative electrons are all occurring as individually orbiting satellites.

That, to me, sounds as if they are NOT simple opposites at all!

And this is supported by the major role of Electrons in both Electricity and Magnetism!

This seems to imply that the negative charge is often the inclusion of an electron (along with its charge) in something else (and hence the orbiting solution), while the positive charge is somehow different. and can allow some kind of merging.

The (around) 100 atoms seem to confirm this remarkable conclusion, as the increasingly positive nuclei involve merged positive units, but also seem to require neutral Neutrons as well to make such a nucleus stable: though Neutrons are completely unstable when alone!

As mentioned earlier, this reveals something vital about context. For the Neutron is stable in a given context, but not as an independent unit. And seems to also explain why the version of the unstable positronium can, nevertheless, become stable, when in the context of a Substrate Paving, and hence is renamed there as a Neutriron.

Clearly, the directly-opposite supposed nature of Charges is a man-made simplification! And there must be other, as yet unknown, features involved.

Indeed, this demonstrates, very clearly, that the analogues that we choose to represent certain classes of interaction, are rarely the full Truth, but just a pragmatic, useable assumption, for now!

An interesting, initially-purely-theoretical-construct, was developed, by this theorist, in devising an undetectable Universal Substrate. For, the necessary Units of such a Substrate were initially only capable of being produced by mutually-orbiting pairs of diametrically opposite Leptons, which always contained sub-units, composed of one of matter, and the other of antimatter, as well as of opposite charges.

Now, these would be usually said to mutually-annihilate one another to produce a Photon of Pure Energy, but instead seemingly produced undetectable joint units capable of containing energy in the promotion of their mutual orbit - but perhaps this is what a Photon actually is. A Photon could be a Neutriron in motion, or just a ripple of energy through the Paving.

So, an interesting paradigm began to suggest itself.

The many stable units at the bottommost level of Reality, may NOT be the famed Elementary Particles, for some may well be largely unstable, but also capable, as either via mutually-orbiting pairs of opposites, or by cancelling populations of opposite and separate particles, or even both of these together, which are stable, deliver vastly wider possibilities than what they were originally produced from, and can even be totally undetectable!

Some of the more confusing features in Reality, might well be due to secondary re-combinations of unstable fragments along with amenable new partners, different from their original unions, and presenting wholly new possibilities.

Remember, Stability, with a Holist perspective, is NOT an intrinsic property, but always a balance of opposing forces, so such wholly new combinations could indeed be stable!

Such fragments might even explain such anomalies as Charge and Matter-type themselves! After all, the most creative processes in Reality are NOT obvious Lego-like builds, but the absolutely crucial and creative Emergences - always involving a total dissolution of a seemingly eternal Stability, followed by a wholly new-and-stable, created System.

#### **Force:**

Now Force has three components.

Amount  
Direction  
Delivery

The amount is the easiest because it will be ultimately determined by the size of the initiator, the distance from it, and the geometry of the surrounding field.

The direction was more difficult as in had to somehow be contained along with the amount of energy required, within the precise field element providing it. And in the more difficult cases, it was provided by the Magnetic Dipole Moment of the actual field element at that position.

The Delivery will again have to reside in the field element decanting its energy load from its promoted orbit, but of the right size and direction to affect the interloper,

somehow, with an actual physical Kick! The problem of “sense”, in such a “kick”, as in either Attraction or Repulsion, is difficult because a “suck” isn’t possible, so it will always be a kick, but from the unit on the appropriate side of the interloper.

Attraction will be a kick from the unit beyond it.  
Repulsion will be a kick from the unit inside it.

Now, that isn’t as arbitrary as it sounds, because Dipoles have two opposite poles and the interloper has just one of two possible charges, so as long as only the appropriate pole delivers in the field units adjacent to the interloper the above condition will be fulfilled, and the “holes” in the Field will thereafter be replenished either internally by the other redundant “kick”, or in the usual way from elsewhere in the Substrate.



## The Spacetime Continuum and the Universal Substrate

Substrate Theory certainly has the potential to unify Physics if it can answer the key questions in both Quantum Theory and General Relativity, with materialist explanations.

The crucial flaw in Einstein's idealist Spacetime Continuum, turns out to also be its "justifying" link through to concrete Reality. For it is, of course, the effect of *Mass* upon a purely formal Reference Frame, and, thereafter, that Frame's consequent effect back upon moving material objects within such a supposedly distorted environment, and which is therefore supposed to deliver the clearly evident results.

However, such a purely Formal Reference System can neither be so affected, nor can such a "supposed environment" ever itself affect back upon its contents.

Spacetime is a four dimensional, and totally abstract, *Graph*. It doesn't actually exist as such in concrete Reality... So how could it possibly affect real things, and be affected by them?

The problem arises for very good reasons: as Einstein, along with literally all other physicists, finding no concrete causes within a particular context in Reality, attempted instead to find purely Formal causes for what actually happens. And that is always impossible! For, all real causes must be physically existing; and will be present in Concrete Reality. So, Einstein found a very clever, yet purely formal way of getting the right results, via a Mathematical Invention, to which he has also given physical effects and susceptibilities.

Now, this interests me because I am currently investigating a totally invisible, yet universally-present, material Substrate, which, I believe should replace Einstein's "abstract/concrete" construct, while also, at the

same time, disposing of the Copenhagen Interpretation of Quantum Theory, currently dominating Sub Atomic Physics. And, in addition, I have also recently dealt with Heisenberg's Uncertainty Principle in a similar way (see the following paper).

Both impositions, as I see it, were necessarily invented formal inserts to Physics, taken from idealist philosophy, to deliver what appeared to be insupportable by currently explicable concrete means.

Now, such idealist/materialist amalgams have become increasingly resorted to, as the usual conceptions of the nature of Reality have regularly proved to be more and more inadequate. Initially, such workarounds were not overtly admitted, but ever since the openly-declared Positivism of Henri Poincaré and Ernst Mach, such moves have become generally acceptable.

Interestingly, Hegel's major criticisms of Formal Reasoning in the early 19th century were focussed upon the impasses in such Reasoning caused by Dichotomous Pairs of contradictory concepts, which he traced back to flawed or omitted premises, on which those concepts had been based - and, by the correction of which, he managed to turn such impasses into negotiable forks in the Logic.

And, as a previously essential feature of Reality had fairly recently been universally dumped by Science, following the Michelson/Morley Experiments, which had found absolutely no trace whatsoever of the then usually assumed Universal Substrate - The Ether (or Aether), physical alternatives seemed unavailable.

Now, such a stance wasn't really new: it had been the unadmitted default-case, ever since the flowering of Intellectual Disciplines delivered by the Ancient Greeks

(around 500 BC), and so, in the later development of Science, no problems were envisaged in the assumption of an Ether, as the means by which many things occurred, in an otherwise Empty Space. But, the dropping of that Universal Substrate left many real phenomena (propagation of light, magnetic fields, gravity, for example), which certainly occurred in the void, totally unexplained.

Now, this physicist/philosopher always rejected the Copenhagen Interpretation of Quantum Theory, precisely because it finally dropped any real attempt at materialism for an idealist stance, and, hence, à la Hegel, he commenced to look for flawed or omitted premises as the causes for the many anomalies in the “Copenhagen-defining” Double Slit Experiments, as the cause of the problem: and it dawned upon him that the demise of the Universal Substrate might well be the crucial missing premise.

Of course, such a premise had been rejected, as it couldn't be detected, so any re-instatement of it would also require a full physical explanation of why such a materially-existing entity had never been detectable.

So, as a theoretical precursor to such a difficult task, it was decided to institute a “theoretical try-out”, to see what could be achieved by such a re-instatement. The result was a 100% success: every single anomaly was removed without difficulty, and with full physical explanations! Clearly, if a naturally-undetectable Universal Substrate could be established, then both Copenhagen and the Spacetime Continuum would be revealed as unnecessary idealist rigs, designed to circumvent this missing premise, and Sub Atomic Physics could, perhaps, be re-established upon a sound materialist basis.

The solutions to Einstein's Spacetime Continuum, and both Heisenberg's Uncertainty Principle and The Double Slit Experiments, were all crying out for some kind of Universal Substrate, with appropriate components, and having the right properties to replace the idealist constructs with physical causes and effects, which could be affected by other entities, and which themselves could affect the behaviours of those same entities.

The Substrate would act as an intermediary in the more complex, multi-stage and even recursive processes that would be involved, and hence, far-more-clearly reveal a division of labour, with the particle being particulate-

only, while the wave effects were being delivered by the surrounding Substrate, and not the particle itself.

Of course, the majority of these theoretical achievements, required a comprehensive revelation of the natures of all the physical components of this Universal Substrate. And, as it turned out, from small beginnings, with the definition of the undetectable Neutrion, the door was opened upon a rich, new underworld, with at least three levels, involving Neutrions, Magnetons and Gravitons, in a rich and hierarchical world, delivering Propagation, Electromagnetic Fields and indeed, Gravity - doing it all via different Units, composed of mutually-orbiting-pairs of various Leptons (see The Lepton Substrates, Issue 65).

What will first be sketched out here will be the consequences, with regard to Spacetime, as everything else is covered in prior published papers.

Clearly, the objective must be to explain what Einstein ascribed to the effectible-and-affecting Continuum, as being entirely due to the presence of that undetectable, yet material, Universal Substrate.

So, instead of ascribing known Light phenomena to effects upon this purely abstract construct, they will actually be due to effects of Mass upon the underlying Lepton Substrates and their interactions, which can then, in turn, have effects upon Light propagated from sources beyond-and-behind the causing Mass, and delivering the exact-same observed effect.

Of course, there can be no local “Time” element in such a Substrate, as occurs in the purely formal Continuum: the distortions occur in physical-space-only, but the results, when they occur, can, and will, have effects later in time, and even elsewhere in space! But NOTE: By coupling Time/Space as an extra dimension, Einstein indirectly enables wave-propagations in Time as well as Space, as if both are qualitatively the same sort of thing: but that is most definitely NOT true! For one thing, The Arrow of Time is never reversible.

So, all the nonsense Einstein enabled about “Time Travel” via “Wormholes in the fabric of Space Time”, are clearly impossible in this materialist view, as are all the complex Mathematics concerned with those Wormholes.

But, also, and far more significantly, the universal application of Mathematics as the Lingua franca of

Modern Physics, both by Einstein, and also supposedly admissible as a simplified and idealised Abstraction in Copenhagen, are entirely *pluralist* and hence cannot truly reflect a Holist Reality!

#### Postscript:

The crucial point about Plurality simply must be strongly coupled with its consequences within the universally-adopted Scientific Experimental Method. For, in its extensive modifications and maintained-control, considered to be absolutely essential in all such Experiments, they are assumed due to a subscription to that premise, and that the aimed-for Natural Law within that situation is NOT changed in any way.

But, it most certainly is!

And, even more significantly, that distorted data is then used to tailor Perfect General Forms, brought in from Mathematics, “to fit” that data. Now, though within a limited range, physically maintained by replicating the exact conditions of extraction, for subsequent use, such effective use is indeed possible, but any deviation from that required context will cause the Equation to fail...

And we haven't finished yet!

Such methods isolate single-relations-only: yet all real world conditions are always complex contexts of many simultaneous factors!

So, how do we handle such situations? We assume, incorrectly, that the supposedly eternal Natural Laws, obtained as above, work together “in-sum” without in any way affecting one another - another flawed and hidden assumption

Now, these may seem to be mere “Give up now you'll never do it” negativities, but that is not the case! The inelegant solution must be to employ the opposite Principle of Holism, and its philosophic consequences as exemplified by Dialectics. together with re-instating the missing Universal Substrate.



## Heisenberg's Uncertainty Principle and an Undetectable Substrate

This research is now at a very late, yet crucial stage, in a major philosophical and physical critical assault upon the Copenhagen Interpretation of Quantum Theory, but from a steadfastly materialist standpoint, involving a very different philosophical position, and also the inclusion of a currently undetectable, yet fully-defined and explained Universal Substrate. This model works well, but there still remains one last piece of the jigsaw:

Heisenberg's Uncertainty Principle!

The purpose of this essay is to debunk Heisenberg's excuse for the Copenhagen stance, which dispenses with the Classical assumptions about Reality, but only within the special Sub Atomic Realm, where he insists determinism no longer applies, and only an assumption of indeterminism allows Mankind to deal with the phenomena we find there.

And, consequently, in such circumstances, NO Causal Explanations were possible, and the only methods capable of delivering anything useable were Statistics and Probability.

But, this opponent of Copenhagen, having already managed to theoretically explain many currently "physically-inexplicable phenomena", by assuming the universal presence of a currently existing, yet passively-undetectable Substrate, which can be, both affected-by and affecting-of, any encountered physical entities, and thereafter, even widening that body of explanations, both extensively and successfully - it suddenly struck me how-and-why the Copenhagenists get away with their entirely formal descriptions.

The reason is Heisenberg's Uncertainty Principle covers for the incorrect omission of the Universal Substrate as an absolutely crucial premise, within the Sub Atomic Realm

in Physics! What does the Copenhagen Interpretation smuggle in to even make a formal description possible?

It is, of course a *Wave Equation*!

And, where do such equations usually apply?

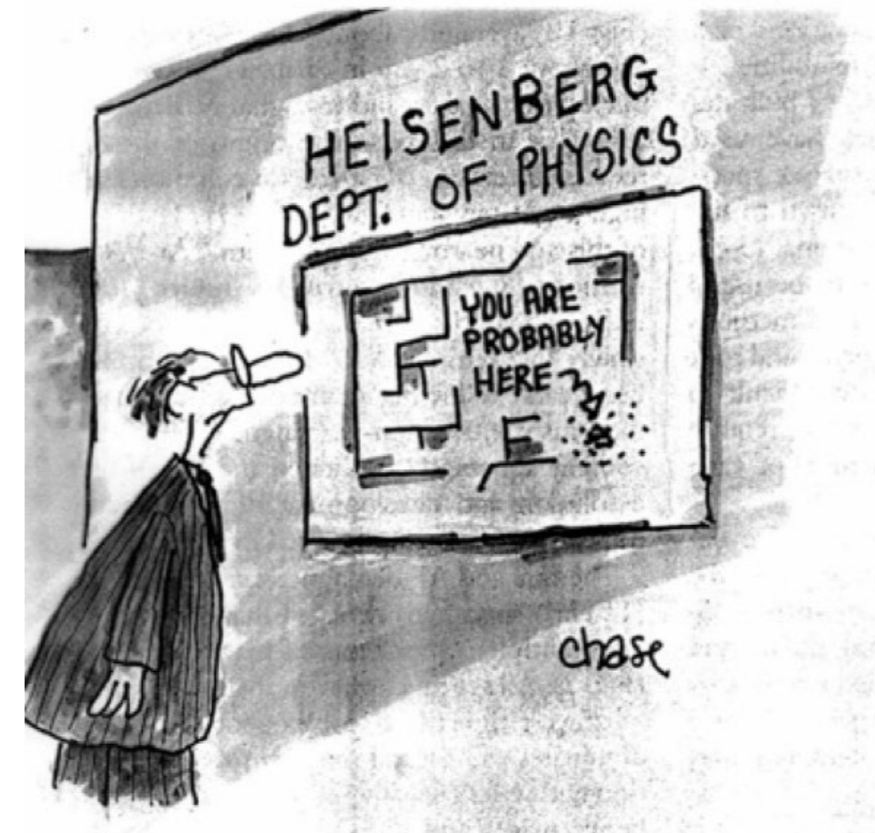
They apply to phenomena in Media! How can you have a wave without a medium?

Certainly, the presence of such a Universal Substrate cannot currently be detected, so, in spite of its omission causing innumerable problems, it was still dropped permanently as a necessary premise... And a lot of difficult maths took its place.

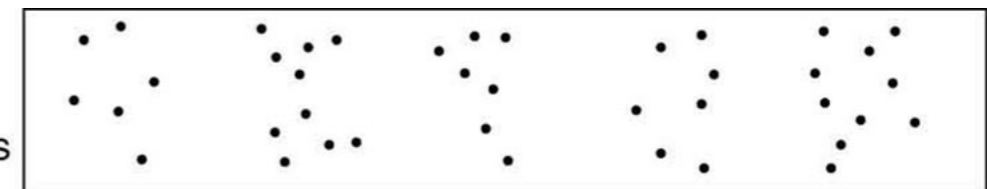
Now, local incidents can cause non-local (extended) effects in such substrates! And, in addition, such effects can then affect not only local entities, but also by propagating to wide areas of the substrate, hence affect more distant entities. They can even affect the very entities which originally caused them - in reflected-and-recursive interactions, as in the Double Slit Experiments, and in various kinds of resonance.

There is new evidence to consider from current Very Low Temperature Physics - soon to be imminently extended to Gravity-Free conditions in the Space Laboratory in orbit around the Earth - plus it is also abundantly clear from my own researches into Substrates (composed of undetectable joint-particles) that these are not only several in number, but also diverse in their achievable aggregate Phases, presenting very different conditions and possible phenomena to traversing interlopers.

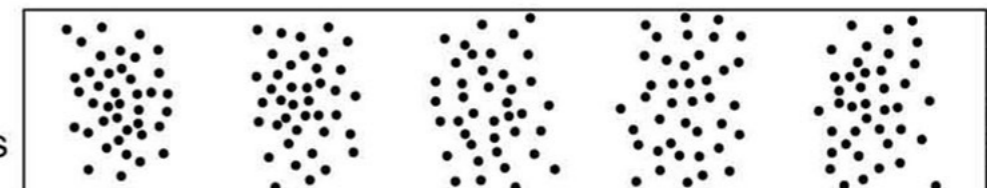
How on earth do you deal with such influences with NO detectable substrate?



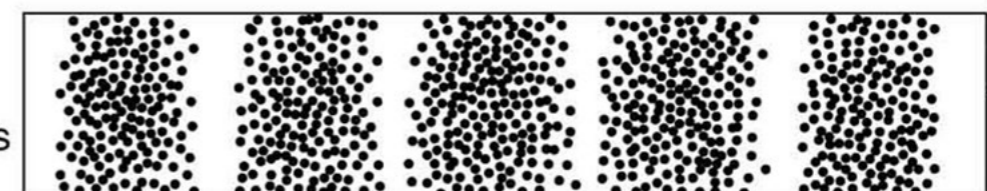
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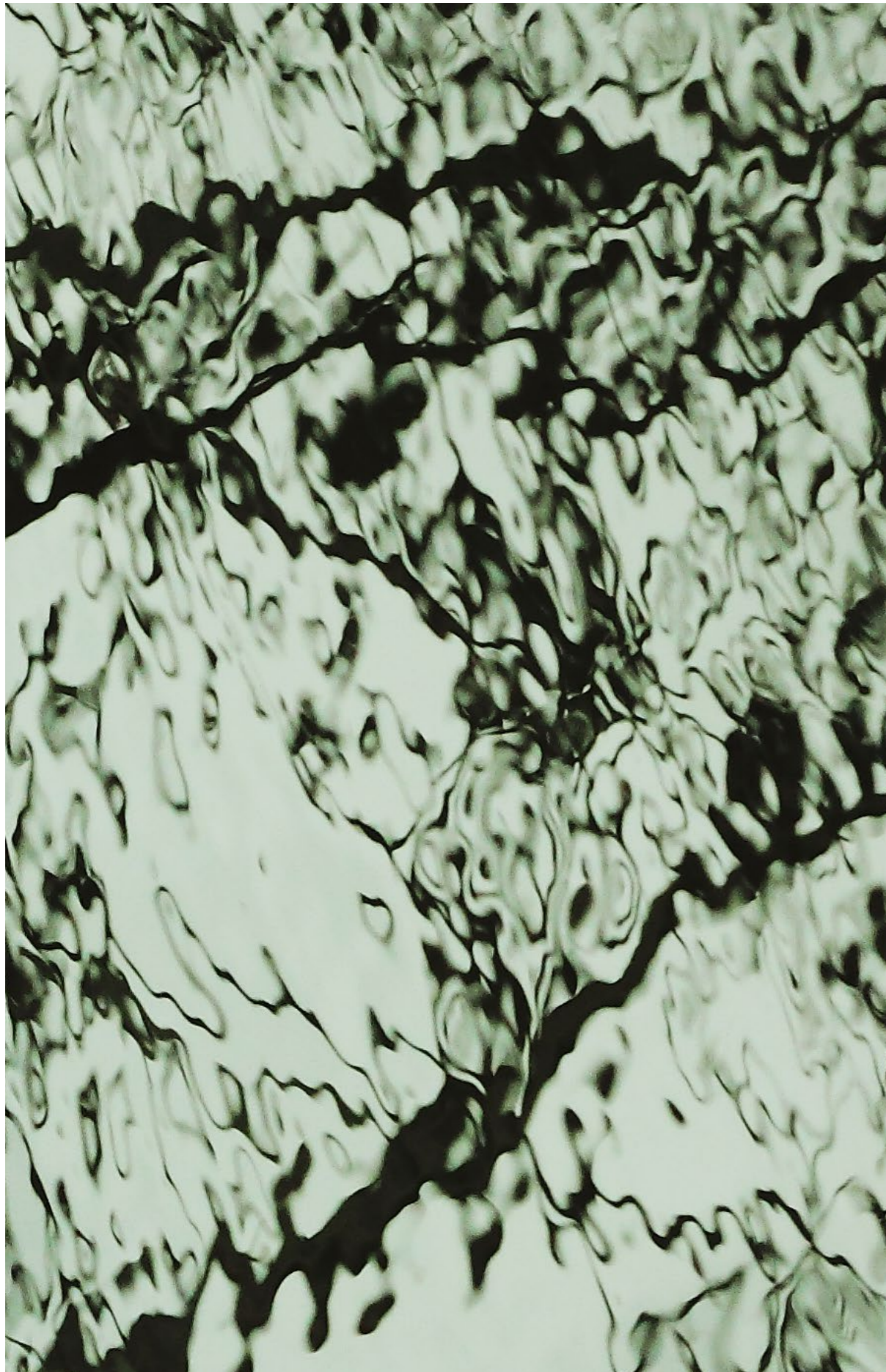


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*Physically*, you can't!

So what did they do?

By using forms derived from Mathematics, and previously used with phenomena in observable substrates, you can, with difficulty, also FIT-UP-TO real data, just such formulae, even with no detectable Substrate, BUT never deterministically!

All sorts of workarounds are necessary, both formally and philosophically, to achieve, and then use, these formulae. The formal tricks are no problem, as scientists have been using such rigs throughout their History. But, the philosophical contrivances are more difficult, so the New View would have to take on Philosophy - a very well established discipline! They had to remove, "physically", the bases assumed by the philosophers. And, this was achieved via the Heisenberg Uncertainty Principle - for "At the bottommost levels determinism no longer holds, indeed, a kind of indeterminism holds instead."

Plurality strikes again!

The very principle, which, along with Pragmatism, allowed all the many contradictorily-established disciplines to exist simultaneously, was again brought to bear in this incredible anachronism.

Now, quite apart from the assertions being made here, the whole Philosophical Basis for the usual range of intellectual disciplines, has already been established by this philosopher-physicist, in his analysis and description of the whole trajectory of intellectual development of Mankind, from their Hunter/Gatherer beginnings, to the present time, which have made various past and present Amalgams of contradictory premises appear "legitimate" via that usual banker premise of Pragmatism - "If it works, it is right!", which, of course, does no such thing, though it can deliver a workable basis for technological gains and productions.

Indeed, Philosophy itself is also one of these disciplines, whereas it should be the measure of them all, and provide the means for dismantling such false separations of disciplines, intellectually at least.

But, the Amalgam of contradictory premises underpinning all the Sciences, was unavoidably adopted, historically, as the only way Mankind had discovered to

Control-and-Use many contradictory aspects of Reality to their benefit. It was suggested, initially, by Abstraction, which allowed some sort of discussion of things, achieved by both simplifying and naming them. Then Abstraction began to be used in Descriptions, by simplifying observed shapes into Perfect Forms, and studying those in place of their naturally occurring sources: they began to idealise as well as simplify, and both of these greatly increased what could be done in studying them, and what might be done with them. From this we arrive at Euclidian Geometry, and the developable power of its Theorems and Proofs. This became a kind of standard for all other intellectual disciplines, and in particular, for Formal Logic, and therefore all the others in which Reasoning was applied too.

But the Mathematics into which Euclidian Geometry grew, was also entirely pluralistic - in that all entities involved were assumed to be *separable*, and always exactly the same - that is totally unchanging qualitatively - indeed they were considered to be eternal! All of these disciplines were hamstrung by this totally false limitation.

Now, this imposition of Plurality onto all of these disciplines, including their common Lingua Franca - Formal Reasoning, made absolutely certain that they would always be limited to situations in which nothing ever changed in any profound or qualitative way, so when applied to anything real, it would necessarily only apply to stable situations involving such things. So, anything involving real qualitative development, would necessarily be totally excluded.

This was a crippling restriction, so when Science began to be developed upon the exact same basis, such a Principle implied that no Natural Law (which would necessarily be eternal) would be affected by any changed context. And this tenet both severely handicapped, and yet also enabled a warped-version of Science for many centuries! It hamstrung it by banning all Qualitative Change to any extracted Laws. And, it enabled a version of it, as long as the severely-constrained Context, necessarily arranged for to get such Laws extracted in the first place, was identically replicated for its subsequent effective use.

In addition, this also meant that though such "eternal Laws" could be effectively and productively used, they were not those acting in all circumstances, but only those in the single contexts that alone validated its use. What is generally termed Classical Physics, was actually

entirely so crippled, that it should have been termed Pluralist Physics, usable only in very limited constrained circumstances, so that any supposedly General Theory based upon that Law, would always be wrong. And, thus all findings would be both simplified, and also idealised, by taking a pluralist mathematical formula, and fitting it up to the data collected from that pluralist single situation.

Theoretically, as in generating an explanation, that formula would also be wrong: it could be legitimately be used pragmatically, but never theoretically. Indeed, a thorough-going analysis of such a "Law", would reveal it as an illegitimate Amalgam of a Materialist Stance, along with an Idealist stance, and one crippled by Plurality, so would be useless for both explanation and use within any normal natural situation.

And crucially, this was the Physics that failed to cope with Quantized Phenomena: it neither would, nor ever could, cope with such phenomena adequately in any method of experiment in a real world - which also included an undetectable Universal Substrate.

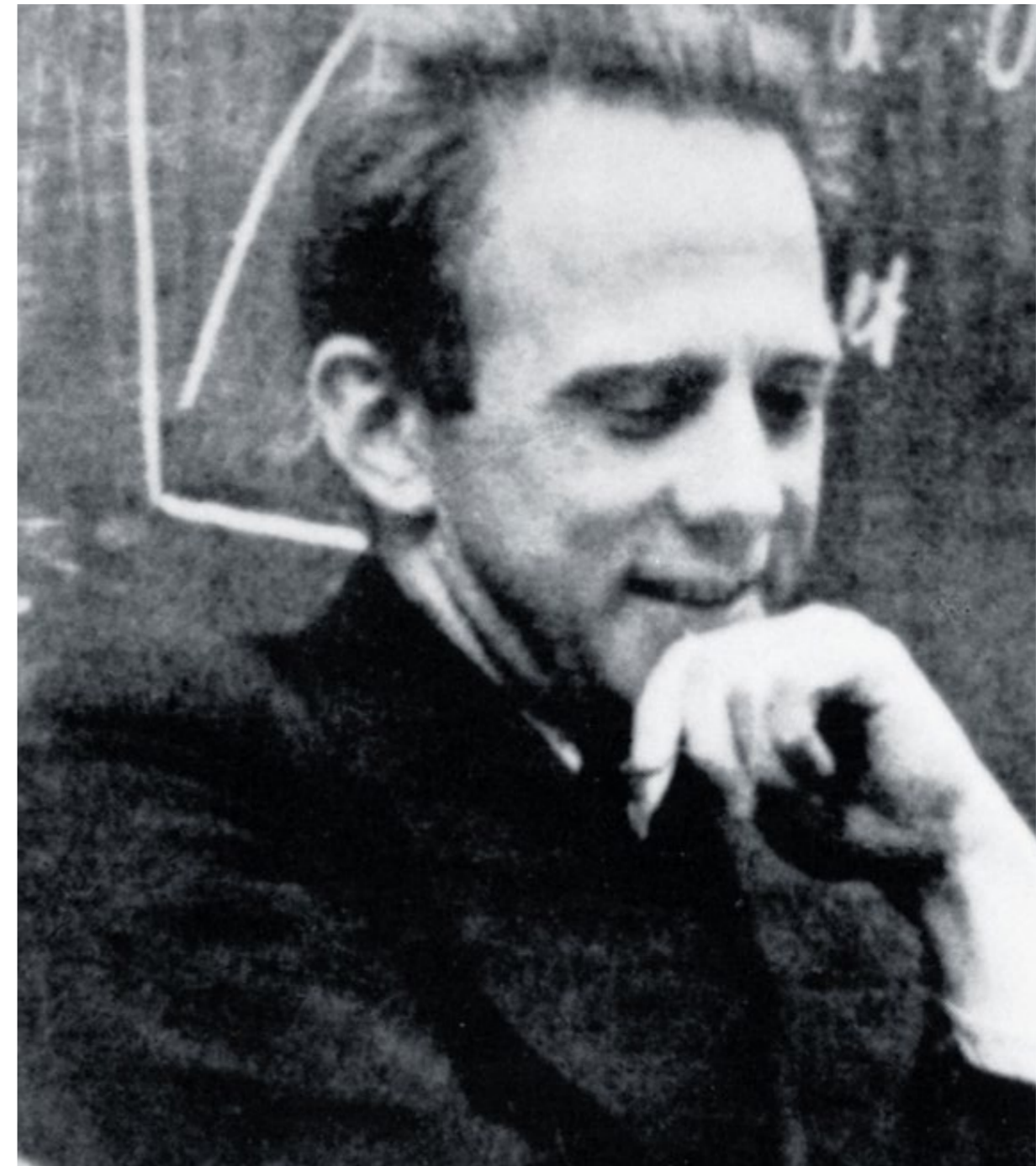
The perpetrators of the Copenhagen Interpretation did not even know of its built-in disabilities - so they kept all the errors of Plurality, and decided instead to throw out Explanation as totally impossible, due to the Sub Atomic Realm being a different world, changed by the Principle of Uncertainty formulated by Werner Heisenberg.

Clearly, the usual assumptions were indeed adequate above a certain size of the participating components being studied. But, according to Heisenberg, once that size was left behind, and a World of the extremely small was entered, the rules of Physics changed dramatically! We had entered the mysterious World of the Quantum,

where things just behaved very differently. Below that level, things became indeterminate - acting within a range of possibilities, and the old determinate Physics could no longer be used.

Indeed, a particular Wave Equation actually delivered that range, but in a very odd way! It delivered only the probabilities of a particle being in each of the whole range of locations covered by that Equation. BUT, we already have detailed knowledge of such phenomena! Long ago, scientists conquered similar situations when they were happening within an affected and effecting visible Substrate. Some material interloper could both disturb, and, in special circumstances, be recursively affected by that disturbance. Could such methods be appropriate in this area too?

The assumption of a currently undetectable Universal Substrate was included, theoretically, in every single one of the Double Slit Experiments, and every single anomaly was physically explained without any recourse to Heisenberg or the Copenhagen Interpretation whatsoever. It seems that, as with so many of the strange anomalies of the Quantum world, and the subsequent 'idealisation' of Physics, this crucial missing premise is to blame.



Heisenberg's Uncertain



## A Mirror of Reality at the Quantum Level?

Throughout the history of science, the attempts at explaining things correctly have been unavoidably stymied by who, and indeed what, we, the human interpreters, actually have access to, and how we interpret that knowledge.

For example, there isn't, nor could there be, any intrinsic human capability for addressing such questions - for Mankind was, initially at least, merely a clever ape, which for over 97% of its existence, as *Homo sapiens*, never got beyond the purely pragmatic tenet of "If it works, it is right!", as their only "intellectual" tool. Indeed, all of Mankind's congenital capabilities were selected-for only by Evolution, and, therefore, determined solely by Darwinian Natural Selection, involving just those capabilities enabling the species' overall survival and effective reproduction. Everything else has been only very recently attained - entirely socially - which only began within that last 3% of Mankind's total existence, and which could never be based upon the Full and Real determining Truth of the situation, as it wasn't then, and still isn't now available!

How on earth could this species of ape actually access such things? They only, and very-slowly, invented just a subset of the necessary words, and even that only over the last 1% of their existence, and as the History of Human Thinking, since then, has shown, every single gain has been, at its very best, approximate, and certainly never wholly sufficient. Nevertheless, though the bulk of their socially-created-language has always been exclusively descriptive, attempts at Explanation have been gradually improving, especially since the advent of Science.

But, the engine of Explanation has, unavoidably, always been Description. They could only start with Analogy!

For, though it does NOT deliver why things behave the way that they do: it does deliver how things behave, and in very different contexts that can at least begin to move the task towards common or similar causes.

Even thereafter, they could only proceed with natural and evidently-connected sequences of events. But, the actual reasons, or causes, for those connections were not usually evident.

So, in the early stages, such conceived-of causes were initially invented! And, it was only with the advent of a scientific search for actual, physical causes, that the process could be improved beyond the supernatural and the purely speculative.

Now, this contribution is evidently NOT an adequate treatise upon such questions, though they have been, and will continue to be, addressed fully elsewhere.

But, the above few points were clearly going to be indispensable here, if only to demolish the myth, that we already have all we need to Understand Reality: we are still a long, long way from that!

After all, it took almost 2,300 years for the more significant of the errors initiated by the Ancient Greeks, to at last be addressed by the German Philosopher Hegel. And, we still have, a further 200 years later, to comprehensively extend those crucial contributions to materialist Science - for they were in Hegel's hands entirely idealist!

So, in this paper, I will limit my objectives to a celebration, as well as a critique, of a certain PBS Space Time release on YouTube, which, I believe, shows where we are at in Modern Sub Atomic Physics at the present time!

Its topic is Virtual Particles.

And, it is remarkable how both that idea, and the alternative one that I have been pursuing (an undetectable Universal Substrate), perhaps surprisingly, actually appear to resonate-analogistically with each other, as attempted explanations of Reality at The Quantum Level!

First, the presenter tells of phantom particles appearing and disappearing in Space “literally in-and-out of nowhere” - the famous cases of Pair Productions and Pair Annihilations, involving one Electron and one Positron, present, perhaps, the best examples.

Now, elsewhere, similar virtual matter and antimatter pairs are also said to be created out of nothing, by “cheating the Universe”, achieved by borrowing sufficient energy to do this, and paying it back by their almost immediate annihilation! And the Source for the energy required?

“It is the invisible Quantum Field!”

And also, near Black Holes, virtual matter and antimatter pairs of units are said to be split by the surrounding Event Horizon, to leave one IN, and the other OUT, consequently, overtime, delivering appreciable Hawking Radiation.

But, my own alternative explanation, for the former case, assuming an undetectable Universal Substrate, is achieved by involving, as crucial part of that Substrate, an undetectable joint-Unit, produced by the mutual-orbiting of the very same two sub-particles as are considered above. And, though these can absorb energy by the promotion of their inner orbit, too much energy will dissociate the union to deliver the two particles - free once again. Yet also, as part of that same stance, an appropriate encounter between two such free-moving, potential partners - of those same kinds - could cause their joint-capturing into a mutually-orbiting pair, and, therefore, become undetectable, apart, of course, from their effect as an energy-supplying Photon.

Indeed, all the Units of the undetectable Universal Substrate are conceived-of in that same, mutually-orbiting-pairs form, so energy can be internally held, and so will be generally available throughout the Substrate, from the promoted orbits of all such Units.

With such ideas, many problems consequently vanish!

And, with regard to the latter case, the suggested undetectable Universal Substrate will be absolutely Everywhere, and will both be affected by, and itself-affect the situations it encounters, including majorly transforming ones, where Substrate perturbations will cause all sorts of very different structural Phases, along with their differing consequent Effects.

Now, the main purpose of this paper is to compare Virtual Particles (particularly as described in the video from PBS Spacetime) with the Units of a suggested undetectable Universal Substrate.

For, the video’s presenter describes Virtual Particles as - not being physical, but, instead, being our simplified and idealised mathematical representation of the quantum mechanical behaviour of Fields.

This is clearly the crux!

For, as physicists, we always have to explain things physically. The clue is in the name!

And, the Universal Substrate as defined by this theoretical physicist is entirely physical. The natures of its Units are such as to actually physically supply Fields as useable energy, both held-within and delivered-from, various structural re-organisations of the Substrate’s mutually-orbiting-pair type units. Though, these Units, all of which being such mutually orbiting pairs of exactly opposite matter and antimatter Lepton sub-units, deliver either individually or over-local-populations, no obvious means of passive detection, they, nevertheless, are both effecting-of and being affected-by, conducive interlopers within their various different physical Phases or “Fields”



## Problems

Now, the problem for consensus physicists has always been the clear existence of Wave-like effects when no Substrate capable of producing them is considered to be present.

The infamous Double Slit phenomena caused by, say, moving particles seems to be totally inexplicable.

So, particles were given Wave/Particle Duality to explain such phenomena.

But clearly, another alternative could be to re-instate a Substrate, like the Aether, but for it to be wholly undetectable due to its unique, though still entirely material, composition.

And, such a Thought Experiment was conducted, and surprisingly solved all the various anomalies of the full set of Double Slit Experiments. Undetectable or not, it would still both affect situations, and itself be affected by occurring phenomena within it.

But, physicists rather liked Totally Empty Space! It greatly simplified, and also made possible, all kinds of experiments - for attaining a vacuum, which was eminently possible, also “delivered” Totally Empty Space too. The presence of such a Substrate, especially as it wasn't detectable, would greatly complicate ALL experiments! For, all the usual perturbations as of other detectable substrates would occur here too.

And, in addition, the initial assumption of Plurality, at the very beginning of Mankind's intellectual concepts, had forced the absolutely essential, pragmatic farming of experimental situations, to greatly simplify, as well as select-for a particular targeted context with a single dominant factor, that would both clearly display, and then allow-the-extraction of that sought-for relation. And this was best achieved by pragmatists, who had learned how to do it effectively over a couple of millennia.

The theoretical physicists thus left it to their experimental colleagues to achieve the appropriate conditions, and, sometimes, to even extract the necessary data! Only then, did the theoreticians move in, armed increasingly with their “solve-all” discipline - Mathematics, to then find-a-form which they could fit-up to the acquired data.

So, with generations of such processes of simplification and idealisation, no-one wanted to reverse direction, and have to holistically juggle with multiple simultaneous varying factors, which had prevented development so completely in the distant past.

And finally, this technique had been justified by the assumption of the Principle of Plurality, which made the so-extracted relation into an eternal Natural Law-which isn't ever true!

Plurality may hold in Ideality, but never in unfettered Reality.

There are also many fundamental areas of Reality, which are still totally unexplained, particularly to do with Charge, Direction and Energy in Fields!

Now, the ever-present, yet never-explained properties of Attraction and Repulsion (usually linked to Charge) are clearly the major problem, for both my alternative explanations, and those based upon Virtual Particles.

They must attempt to provide the bases for a substitute to those non-physical, entirely-formal descriptions, at the very heart of the whole Copenhagen Interpretation of Quantum Theory.

For, that is a very old trick, indeed, and uses not a single causal explanation, but, instead, a whole range of probabilities, including counter-intuitive cases, to smuggle-in outcomes as selections from that range.

NOTE:A related argument is often proffered to counter supposed direction in the Evolution of Living Things, by purely random damage to Genes, certain cases of which, counter-intuitively and by-chance lead to development.

NOTE 2: To counter such “fixes” requires a philosophical discourse upon the opposing Principles of Plurality and Holism, which has been exhaustively pursued elsewhere, but would deflect us here from a more reachable and understandable, yet important objective for this paper.

Now, I will not pretend to be able to fully explain Attraction and Repulsion, but, once given an evident Force and its clear Direction, obviously evident by its



## Movement Effects the Substrate

affecting of a given entity, but I will deliver a full detailed Field, composed of of physical particles, with every single one containing, both the exactly correct amount of energy along-with-its-direction, sufficient to power the Field Effect at that point onto the affected interloper. and absolutely nothing will be taken from either the usually-supposed cause, or from the affected recipient: for they will both be totally unaffected in their prior-properties, by the actions of the Field! So, the active agent in establishing the Field, and supplying all the requisite energy, and its necessary direction, will be entirely due to the Units of the Universal Substrate alone.

Now, we must compare this with the Quantum Mechanical “explanation” supplied here as the consensus alternative, by this video.

Let us also attempt to deliver that alternative.

It is very different!

It involves an infinite number of possible amounts and directions, which are involved literally everywhere in the assumed Field, and are even simultaneously-present in every single, individual position, but this set includes every single possible option, including both Directions, but unlike this alternative Substrate version, the Copenhagen versions all have no physical container, nor are they specific: they instead are an immaterial infinite set - present everywhere!

And this appears to be an underlying vibrational(?) set of possibilities throughout the Quantum Field.

BUT, a real Physical Explanation can never really be even attempted: the best that can be delivered is a description of a kind of parallel universe, in purely mathematical forms!

In abandoning Explanation, these theoreticians are also abandoning Reality, for a parallel, merely-reflected world of Ideality- the realm of Pure Forms and absolutely nothing else.

They can use their Mathematics, along with pragmatism - based upon experience - to deliver usable predictions, without any idea of what is actually going on, and why!

This is termed Technology! Science must attempt to actually *explain* phenomena. In working with Mathematics, they are exploring the truly infinite world of Forms available in Ideality, hoping to find appropriate patterns for everything that occurs in Concrete Reality. But, of course, that is impossible, as Reality is holist and consists of many sets of simultaneous factors all acting together, and influencing one another, in many different situations.

But, Physical investigations of these can be, at least partially, uncovered - that is what real investigative experiments are for!

In Ideality, you can't possibly know which of them: so you substitute, mathematically, all possibilities and hope, by a very different kind of experiment, to get enough multi-possible sets to pragmatically confirm, in each case, a particular probabilistic formal model.

But it will deliver useable Predictions ONLY.

It is, of course, an admission of Defeat for their chosen version of “Physics”, and will only be ousted by the Creation of a Holist Physics to replace the dead-theoretical-end of current Pluralist Physics.

On listening to a lecture at Conway Hall by Canadian physicist Laurence Krause (an exceptional modern physicist), I was driven into a more profound understanding of the true nature of Mathematics, and its distorting role both in Basic Philosophy, and in Modern Sub Atomic Physics.

The key new revelations were about the role of *Movement* upon what we investigate! For, this clearly changes things profoundly - and the appropriate question must be, “Why should this be so?”

In this lecture, Krause delved very deep, and was finally “revealing” what was behind the Higgs’ Particle, and its role in the illusion of Mass! It required a *Universal* Field, termed the Higgs’ Field! And, from what I have said before, where is that Field? It can only be in the Pluralistic realm, where Pure Form Mathematics dwells - in Ideality, but never exactly as such in Reality.

So, is there a real material Substrate in Reality, for which there is a Pure Form analogue in Ideality? Probably!

I realised that only a material Substrate could explain why Movement changed things so profoundly here, for Movement would definitely affect it, and change its structural nature and properties: those observed were clearly consequent effects upon the transformed Substrate, acting back upon other observables in Reality!

Indeed, in Substrate Theory, all of these effects are fully explicable via Magnetons - which are mutually-orbiting pairs of diametrically opposite Leptons of different sizes, so that they naturally-involve Magnetic Dipole Moments.

That New Theory had already explained the Electric Field initiated by the static presence of a Charged Particle, as the response of the Magnetons in the Substrate was to aggregate around that Particle in concentric shells, this delivering that Field. While it has also explained the Magnetic Field, this time initiated by the static presence of a Magnet, as the response of the Magnetons, in this case, was to form magnetic Lines of Force as continuations of the aligned Dipole Moments of the atoms within the Magnet.

But now, the question was how could movements of one of these initiators actually cause Effects of the Opposite type?

A: For example, a moving Charge causing a magnetic effect,

B: And instead, a moving Magnet causing an electrical effect!

In A: the Magnetic Dipole Moments of the Magnetons in the Substrate moved to align themselves with the Dipole caused by the loop of current in the wire.

In B: the MDMs within the moving magnet affected those in its surrounding magnetic field, which in turn affected electrons in the loop of wire to move to form a corresponding Magnetic Moment Effect.

The crucial link, in the Theory of the Universal Substrate was that all Electrical and Magnetic effects could be achieved by the very same Magnetons re-arranging themselves into very different structural Phases!



## Phase and Locality

### How Context-Form can Change Outcomes

In entirely theoretical researches into the Neutrion (a stable version of the Positronium, a mutually-orbiting Electron and Positron), a series of possible alternative Phases, or organisations of this particle, emerged as possible under particular conditions, and these allowed various different behaviours to also be possible, thereby explaining various phenomena, which, prior to these investigations, were completely unconsidered as being possible.

Now, of course, different Phases of matter-in-general are well known, and very well researched, for many common substances upon Planet Earth - the most obvious being Water (H<sub>2</sub>O), which occurs regularly as a Liquid (Water), but also as a Solid (Ice) and as a Gas (Water Vapour) and even as Clouds (suspended tiny droplets in Air), and finally as a kind of “terminating Skin” surrounding a volume of liquid (as in a Droplet), but also covering vast areas of liquid Water in Lakes, Seas, Oceans, and even moving Streams and Rivers.

In addition, the effect of solid objects moving through Liquids can produce active Streams, within the body of the Liquid, and even localised spinning Vortices. And, versions of these latter effects can be associated with Liquid surfaces too, though obviously modified by the two-dimensional boundary of the Liquid, and involving Surface Tension Effects too.

Now, these Standard Phases are usually associated with general temperatures, but what appeared in the researches mentioned above was that they could also be brought about by other kinds of energetic disturbances too, as well as by certain initiating presences and their effects.

The point of mentioning all these well-known effects is that some similar things appear to also occur with Neutrions. And Neutrions are also being considered as units of a currently undetectable Universal Substrate, which, if true, would affect literally ALL phenomena!

Now, Neutrions are totally invisible, being composed of a mutually orbiting pair of one Electron and one Positron, so that the opposing properties of these components, cancel each other out. Yet, surprisingly, these same entities still form different Phases, with different overall properties.

In minimally disturbed situations, these Neutrions could form a loosely-linked “solid-like” structure termed a Paving. While the energetic passage of any moving particle, through such a structure, could very easily dissociate it back into individual Neutrions, and then, either drive them into Streams, or into something like an energetic “Random Gas”.

For, another theoretically-investigated joint particle, (again a possible Unit of a Universal Substrate) there is the Magneton, which was composed of a mutually orbiting pair of a Tau and a Muon, which also became endowed, because of their asymmetry of size, with a Magnetic Dipole Moment, allowing two very different physical Phases to self-assemble in different circumstances.

One was a relatively dense, close-packed, 3D form, somewhat like a “solid”, and effectively delivering an Electric Field, while the other formed 1D “strings”, in closed loops producing Magnetic Lines of Force.



And, in Yves Couder's Bohmian "Walker" Experiments, the same sort of Phases, which appear to be caused Streams and Vortices, upon the substrate surface, which produce the observed Quantised Walker orbits. And also, within the body of the Substrate, are different Streams, caused by the absorption of energy from the Substrate to power one Walker's movement, and produce under-the-surface flows, which cause the in-line, following by other Walkers.

It was Couder's discoveries, which allowed this theorist to explain Quantised orbits of Electrons in Atoms, by exactly the same model, but there taking place in a Neutritron Substrate, and caused via its internal Streams and Vortices created by the orbiting Electron.

Clearly, to begin to design a Holistic Experimental Method, these experiments, and the consequent theories developed from them, should deliver an excellent starting point! Indeed, Couder's method of removing everything from his experiments except the Substrate was an excellent starting point, because as soon as other entities are multiply- involved, they would affect each other, and everything else, to deliver a then unanalyse-able complex of processes.

So, Holist Experiments should always, as Couder did, only meagrely bring in new elements, one at a time! I call this the Holist-Constructivist Experimental Method!

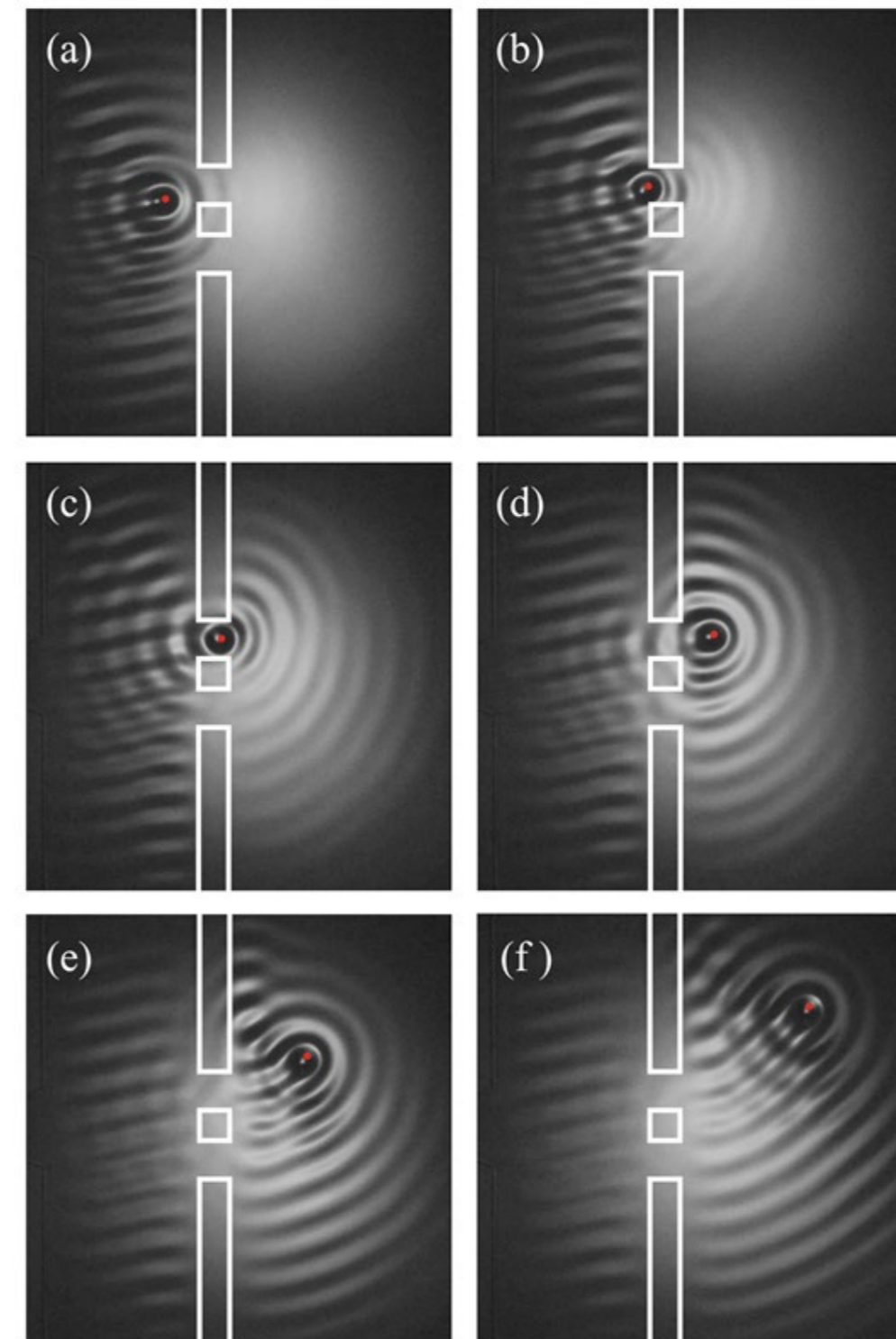
NOTE: Such an alternative approach must be seen as a means of correcting the problems caused by the now universally accepted Pluralist Experimental Method, which, because of the Principle of Plurality, infers that absolutely no changes are imposed upon the targeted Law, by the major filtering and tailoring controls imposed upon the Experimental Situation, to both clearly display it, and allow its extraction - for those assumptions are clearly erroneous.

The new Constructivist Method, as initiated by Couder, and developed theoretically by this writer, attempts to deliver a route by means of which, from the simplest possible start, the mutual effects of individual extra factors, both upon the receiving situation, AND also by that situation upon the new factor, may be revealed! And, crucially the understanding so achieved on a given added factor, could inform the analysis of the next stage, when another factor is included.

For, the two methods start from opposite premises:- 1. The Standard Method is from Plurality, where eternal Natural Laws are totally unaffected by Context, and 2. The Constructivist Method from Holism, where everything affects everything else. Clearly, the former of these two was adopted both because it is easier to manage, and because the Laws obtained could be predictably useable by ensuring the exact same context for use as was delivered for extraction.

But, it had major flaws theoretically, for all Laws were assumed to be eternal and unaffected by context, so absolutely none of the actual changes caused by differing contexts were ever even considered, never mind understood. A Parallel World with certain similarities to Reality, but lacking not only the full, real wealth of actual relations, but also, and crucially, NO explanations of why-and-when all such relations eventually FAIL!

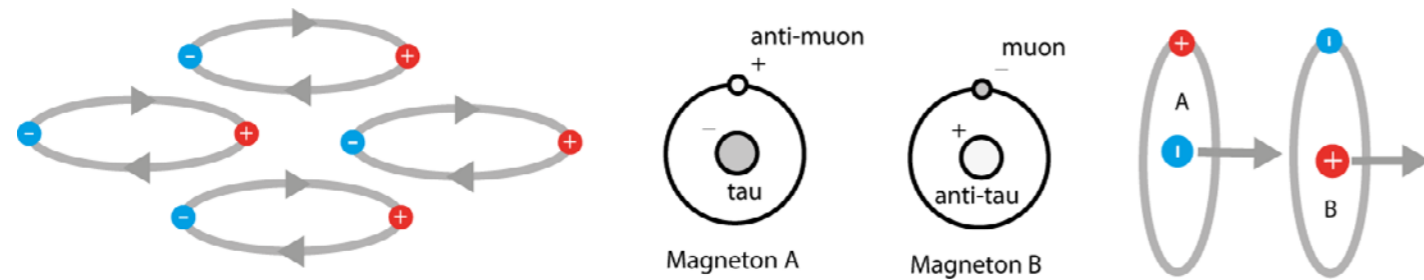
Pragmatically, prior experience of real world situations had enabled such failures to be got around, and what replaced them, to be indicated by certain variables passing recorded thresholds. but absolutely no reasons were delivered by such pragmatic means.



*Couder's "Walker" experiments provide supporting experimental evidence that the presence of a Substrate (in this case Silicone Oil) can re-produce all Quantum anomalies.*

## Streams, Vortices and Electromagnetism

Physics rather than Mathematics  
Reality rather than Ideality



This discussion has turned out to be about how orbits or equivalent local circular movements can Absorb, Store and Release Energy. For this area turns out to be very extensive, because the same involved processes are applicable to such a wide range of structures - with a Vortex at one end of the diversity, and an orbiting electron at the other.

We know that orbiting electrons within atoms can indeed do this, while vortices created within a substrate-flow can do so too, but the causing energies, so captured, are very different - in the atom the source being the translational energy of the electron w.r.t. the capturing proton, to actually originally form the resultant Hydrogen atom: while a vortex gets its energy from a traversing particle, transferred initially to the substrate as an energetic Stream of dissociated substrate units, and with a preponderance of energy inflow to thereafter form associated individual rotating vortices.

In contrast, a Magneton, as one of its components, can also play various roles within a Universal Substrate, as active constituents of both an Electrical Field or even Magnetic Lines of Force.

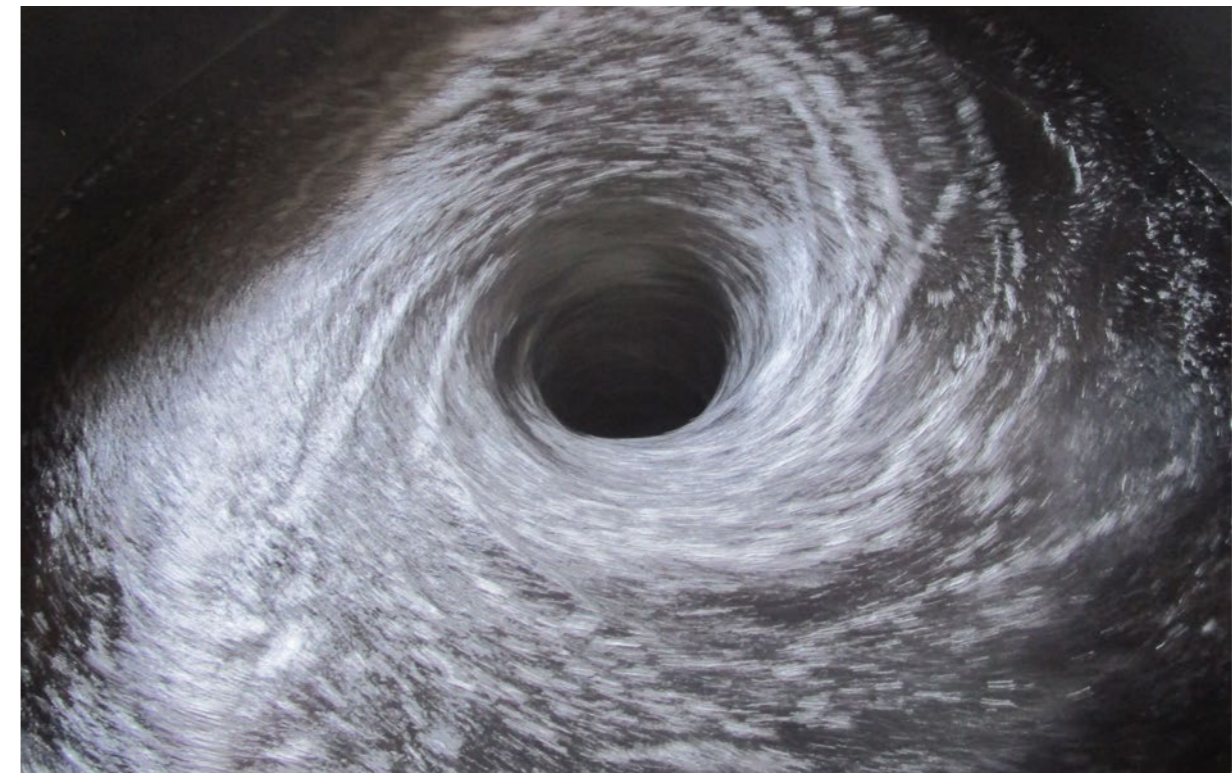
Things can also get more complex with an established electron orbit, as transfers to-and-from vortices in the Substrate, from-and-to the electron orbit, which settles unavoidably into one or another of the so-called Quantized orbits, due entirely to persisting stabilised balances between such energy flows.

But, if the electron "orbit" is in a loop of wire the orbital radius cannot change, and its energy will have come from an electrical Potential Difference generated elsewhere.

But, if the movement involved is that within a Vortex, it is clearly part of the substrate-itself, which had been driven into a set of interlinked-nested-circles - how on earth does that work?

Is it like a whirlpool or waterspout, and if there is such an outflow, is it at the centre and perpendicular to the plane of the rotation, as the inflow into the vortex is always at its periphery?

NOTE: In 3D (rather than the usual 2D in surfaces) the vortex can be in the same form as a Smoke Ring, or like an inverted Toroidal Scroll, so any outflow will be at the periphery, and backwards.



The general problem gets ever bigger, when resonances are transferred across substrates and natural in-built resonant frequencies get their energy from elsewhere, yet can destroy what they ultimately affect.

Clearly, this is an important area and worthy of further study.

Often, the question of the involvement, or not, of any intervening Substrate, greatly changes our explanations of what is actually happening, and the assumption of "no substrate present" as we currently assume for Cosmic Space, just shelves adequate explanations completely, and makes even more likely the replacement of physical explanations generally by purely formal descriptions alone!

And thus, Physics heads off into idealist speculations, justified only by there being "formal descriptions available", whether the "phenomena" actually exist physically or not!

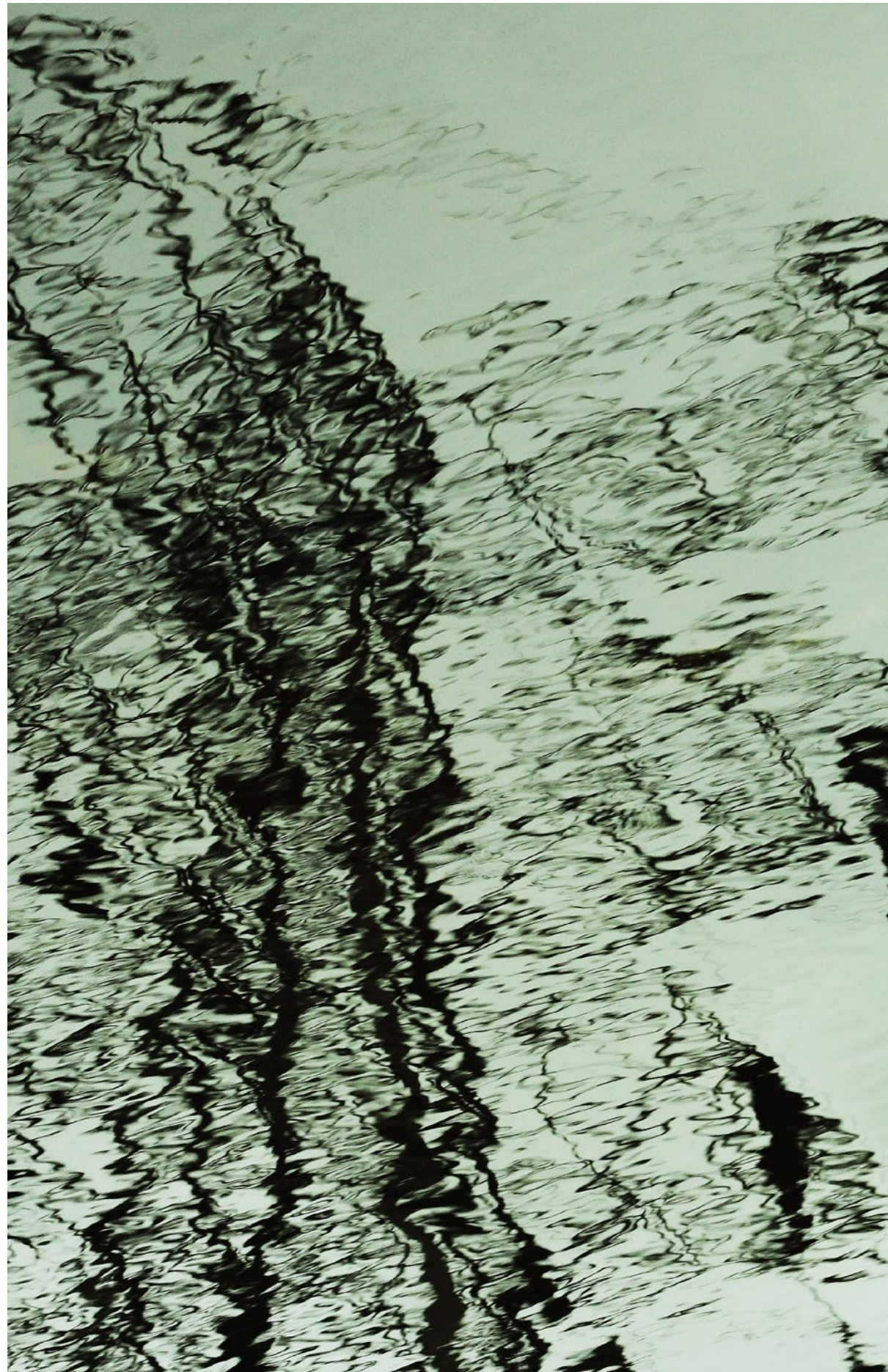
This exposes the ultimate danger of such a development: for Mathematics is not the same as Reality!

It is both pluralist, which Reality is not, and idealist, dealing exclusively only in Perfect Forms, so it is both LESS than Reality, by excluding all of its real messiness, while also considerably MORE than Reality, by including vast amounts that do not exist, solely on account of them conforming to the formal definitions of Mathematics.

Indeed, as a competent mathematician myself, I both know its limitations, and have too been seduced by its beauty and grandeur!

I switched from descriptive of the perfect, the elegant, to explanatory of the real, in all its messy forms: I swapped Ideality for Reality.

And, hence I require explanations FIRST!



## Substrates and Media

After a substantial period of research into Substrate Theory (work which is still by no means complete), the many problems and solutions encountered could not but suggest possible solutions for some of the as-yet unresolved questions elsewhere too.

The reader, if generally familiar with the Equation and Mathematical basis of expression, used almost everywhere else in Physics, may be surprised at the approach used here, that considers Physical Explanations of Phenomena of Primary Importance, and hence will restrict his theories to that idiom alone. There is a sound reason for this, which is explained at great length elsewhere, but here, I will only mention the conclusions of it.

Mathematics is a pluralist discipline resident only as such in Ideality - a World of Pure Forms alone: whereas Physics should be about concrete entities in Reality. And, they are different worlds: Ideality at best is only a pluralist reflection of a real and holist Universe, and hence deals only in eternal Natural Laws, and consequently can never deliver the essential driving causes of that Real World, its qualitative changes and its actual continuing Development.

The main problem that I encountered was always in the actual general distribution of such a Substrate, especially as it might involve a co-existence with other substrates occupying the same space, or even possibly acting as a solution of one in the other.

Clearly, certain cases ought to be well understood by now - as, for example, those involving various substances dissolved in a liquid, and quickly distributed throughout,

to apparently effectively enhance the properties of the underlying liquid.

Problem One was always just how complete in coverage (or occupation of Space) would something have to be to be classed as a Substrate or Medium.

And, was there an underlying Space that was incompletely filled?

An important aspect just had to be the relations between the units of a particular Substrate, as functions like the Propagation of Energy would clearly involve strong inter-connections, as a situation that was mostly Empty Space seemed an unlikely candidate as a effective active Propagator! Yet, even a reasonably rare kind of unit might manage to spread to cover a whole planet, depending mostly upon its general integrity to survive such a long-winded process of various kinds of contingent interaction.

By far the most surprising revelations of that research, were in the vast difference in *sizes* of alternative Units theoretically devised for the Universal Substrate. For, no single Elementary Particle could be found (or conceived of) to deliver, for example, all the various properties that were evidently required of "Empty Space", to explain current phenomena, and also surprisingly, how the differences in size of the devised units somehow went along with their differences of function.

All the devised units, produced in this theoretical research, were based upon the known pattern of the Positronium - an unlikely, mutually-orbiting pair, consisting of one Negatively-charged Electron of Ordinary Matter, and

one Positively-charged Positron of Antimatter. And, though in its discovery-environment within a High Energy Accelerator, which was the Tevatron at Fermilab, these were obviously unstable, I decided to take a leaf out of the Neutron's Story, and consider that when coupled with many others, of the same kind, in a particular way, they might well be stable (and neutral / invisible).

Further theoretical reseach revealed that this could be true, as large numbers of these Units, in very close proximity to one another, though overall neutral in every way, could still form a loosely-linked, but non-touching, solid-like structure, due to the inter-Unit reactions of their internal charged components, which I termed a Paving: a structure that could also propagate quanta of electromagnetic energy, bucket-brigade fashion, and at a fixed speed, due the the constancy of their separations! And, these Units were very small indeed, only about 1 Mev each, so in looking for other similarly-formed Units I had to step up quite a bit, to the Taus and Muons.

Appropriate unions of both the ordinary Matter and the Antimatter versions of these were investigated, and TWO appropriate joint forms were indeed possible, each involving a much smaller Muon orbiting the larger Tau. These could also be totally-neutral, but only in a random mix of equal numbers of both types! Though, individually, these had opposite Magnetic Dipole Moments, and could therefore in appropriate, though very different circumstances form closely-linked structures to deliver both Electric Fiemds and Magnetic Lines of Force.

The sizes of these units were about 2000 Mev, and I termed them Magnetons. Also, they were considerably larger than the first Units, which I had termed Neutrित्रons. The remarkable thing about the Magnetons, was that apart from being able to hold the required energy for their function in the Field, via the promotion of their internal orbits, they also delivered a necessary single direction via the axis of the Muon orbit and of the Magnetic Dipole Moment, thus delivering everything that was need in that precise area of Substrate functionally, as part of a Field.

Something similar would be required for the still undefined Gravitons (Neutrinos?), which would provide the Gravitational Field.

And these provided the biggest problem theoretically!

For while the various neutrinos could, indeed, be paired in similar ways to the other Substrate Units, they did not provide the necessary *directions* as were, in the Magnetron, delivered by the Magnetic Dipole Moments!

So, here, an assumption was made. As the Gravitational Attraction had various features in common with the Electromagnetic forces, it was suggested that the units could involve a Gravitational Dual Pole Moment, effectively providing the required Direction, when delivering the Field! Now, these would involve mutual orbiting of pairs of the Neutrinos, and in fact delivered THREE possibilities, with overall sizes ranging from 20 ev to 20 Mev, and considering the overall vast range of both sizes and functions apparently involved, their overall, mutual integration, or even a lack of such, is surely brought into question.

The range is clearly shown below:

Neutrino	Graviton	Neutrित्रon	Magnetron
20 ev	1 Mev	20 Mev	2000 Mev
	10,000x	20x	100x
		20,000,000x	

...where the latter two lines show the proportional jumps in relative sizes, with an overall range of 20,000,000 between the smallest and the largest!

And, remember, all of these are measurably-invisible, and hence also usually passively undetectable, due to internal or aggregated cancellation of their crucial measureable properties, yet they can be indirectly revealed by their both being affected, and in turn themselves affecting what happens within them.

And, the conclusion, that I am bound to draw, is that though they are all occupying the same space, they, like different macro world media, could include one another in hidden ways.

And the conclusion that I am bound to draw is that though they are all occupying the same space, they like different macro world media could exist in very different Phases with differeing properties and consequent effects upon contents.

And, these currently hidden and indirect interactions appear as phenomena, which classical Physics, with its flawed premises, just cannot cope with, and the only solution that was embraced in Modern Sub Atomic Physics, has been to abandon Explanatory Physics totally, for a purely descriptive, reflected power available in Abstract Mathematics.

Reality has been abandoned for the more amenable world of Ideality! But, of course, it necessarily brings the explanatory power of Physical Theory to a halt, and delivers only unexplained Pragmatism. and idealistic Mathematics as an indulgent alternative.

As a real materialist I am bound to deliver a physical explanation for the quantized orbits of Electrons in atoms.

Briefly, the Neutrित्रons, as well as providing loosely-linked Pavings, could also be fairly easily dissociated-back into separate Neutrित्रons, by the disturbing passage of energetically-moving particles, and the dissociated Neutrित्रons would then move about relatively independantly, like a random Gas! But, in the presence of moving particles, these could be driven into Streams, and hence affected whatever they encountered somewhat differently. They could even affect other Neutrित्रons, to drive them into Vortices. Now, both of these latter Phases were generally temporary, and the Units would soon re-organise back into the default Paving, EXCEPT if the disturbing particle constantly returned - as in an orbit! For then, the Vortices could regularly receive energy from the moving particle, to maintain them, or even return some of it back to that particle, to ultimately deliver a balanced situation - a Quantised Orbit.

It even explains the existence of Quanta of such energy, as what would be produced by demonation between such Quantized Orbits! And, how these are propagated bucket-brigade fashion by passages through the default Paving of the Neutrित्रons in the Substrate.

And of course the Magnetons also were able to fully explain both Electrical Fields and Magnetic Lines of Force as properties of the Substrate, delivering ALL its properties in the circumstances of the presence of a charged or magnetised initiator completely.

POSTSCRIPT:

This paper was originally meant as a much more general definition and investigation of Reality from the position of the Universality of Substrates and Natural Media, at all levels from the very small to the very large.

And, hence, deliver what has been banished from scientific study since the Michelson/Morely Experiments to establish the presence of a Universal Substrate, "proved" its non existence, and in so doing left a vast wedge of real phenomena, without any known means of support.

But, because the re-instatement of such ideas has become so Revolutionary, I had to include some concrete gains to legitimise the approach, so this will only be the first of such papers as this -the Universe awaits!

## Energy Landscapes

### Further Revelations From Couder's "Walker" Experiments

Perhaps, one of the most perplexing phenomena, displayed in Yves Couder's Walker Experiments were those that seemed to indicate pathways within the entirely liquid Silicone Substrate, which seemed to be caused by Walkers having passed that way, and somehow, had left not only a persisting route, but also a necessarily-followed path across the medium, for any other Walkers occurring in the vicinity to follow.

Now, what made these experiments perplexing, was that there was absolutely-nothing-else but that single substrate involved: even the Walkers themselves were composed only of that very same substance - oil. Yet, they acted as if they were completely distinct entities, and affecting-of the "left behind" substrate-path, "as ground" for another to follow.

The most puzzling phenomena of all happened when multiple Walkers were involved, and also affected one another, via that substrate, in various ways. When a given Walker moved about upon the surface of that substrate, another Walker, in the immediate vicinity would "fall-in-line" and follow the exact same path as traversed by that first, "path-defining" Walker. The second would slavishly follow the path, laid down in that liquid Substrate, by the first!

The question has to be, "Why?" What has actually happened?

The only other "ingredient" in the experiment was the constant vertical oscillation of the tray containing the liquid substrate. So, obviously, that oscillation was powering all that happened, for literally everything happening must be powered by that oscillation - from

the Walker itself, and its own complex structure, to its translational path, and hence its effect back onto the substrate, leaving a change there that could cause another nearby Walker to "follow the exact same path!"

Now, if we were talking about Rain falling unto Soil, we would have no difficulty of a drop cleaving a tiny path in the surface of the soil, which would naturally draw in other drops along the same path to form a tiny rivulet and ultimately the whole landscape would be transformed: but that is by an actual physical redistribution of soil to deliver that path.

Yet, in the Walker Experiments, that "ground" is a liquid, as is the Walker itself, and neither could have been physically re-organised, in the same way as with the Rain-and-Soil analogy.

But, what will have been changed, locally, can only be in the geographical available-energy-distribution, and consequent flows-of-substrate, within that wholesale vertical oscillation. So, energy extracted from that Substrate to power the Walker and its movement, would leave behind a lower energy consequence, which would be replenished by energy flows from, elsewhere, which would influence other Walkers in the vicinity, and merge their sustaining energy flows geographically, this causing the observed phenomena.

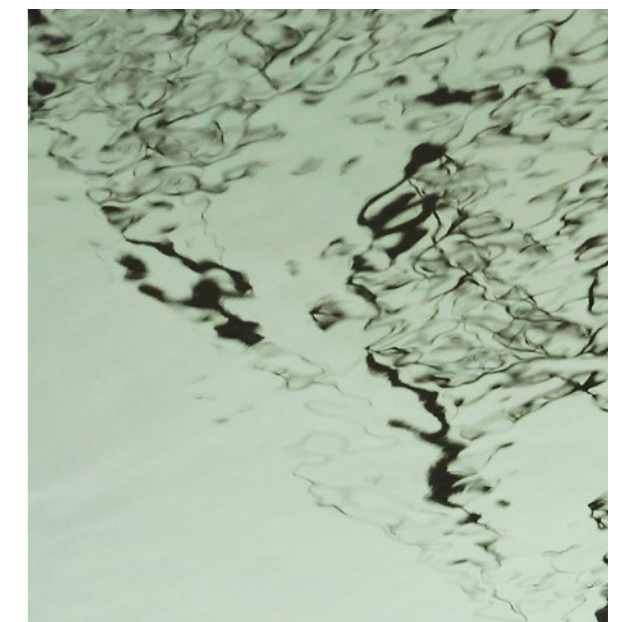
Other phenomena include the addition of multiple extra Walkers, forming themselves into "serried ranks", and maintaining their positions, and is pulled into those positions by changes or even directing streams of energy transfers within the medium.

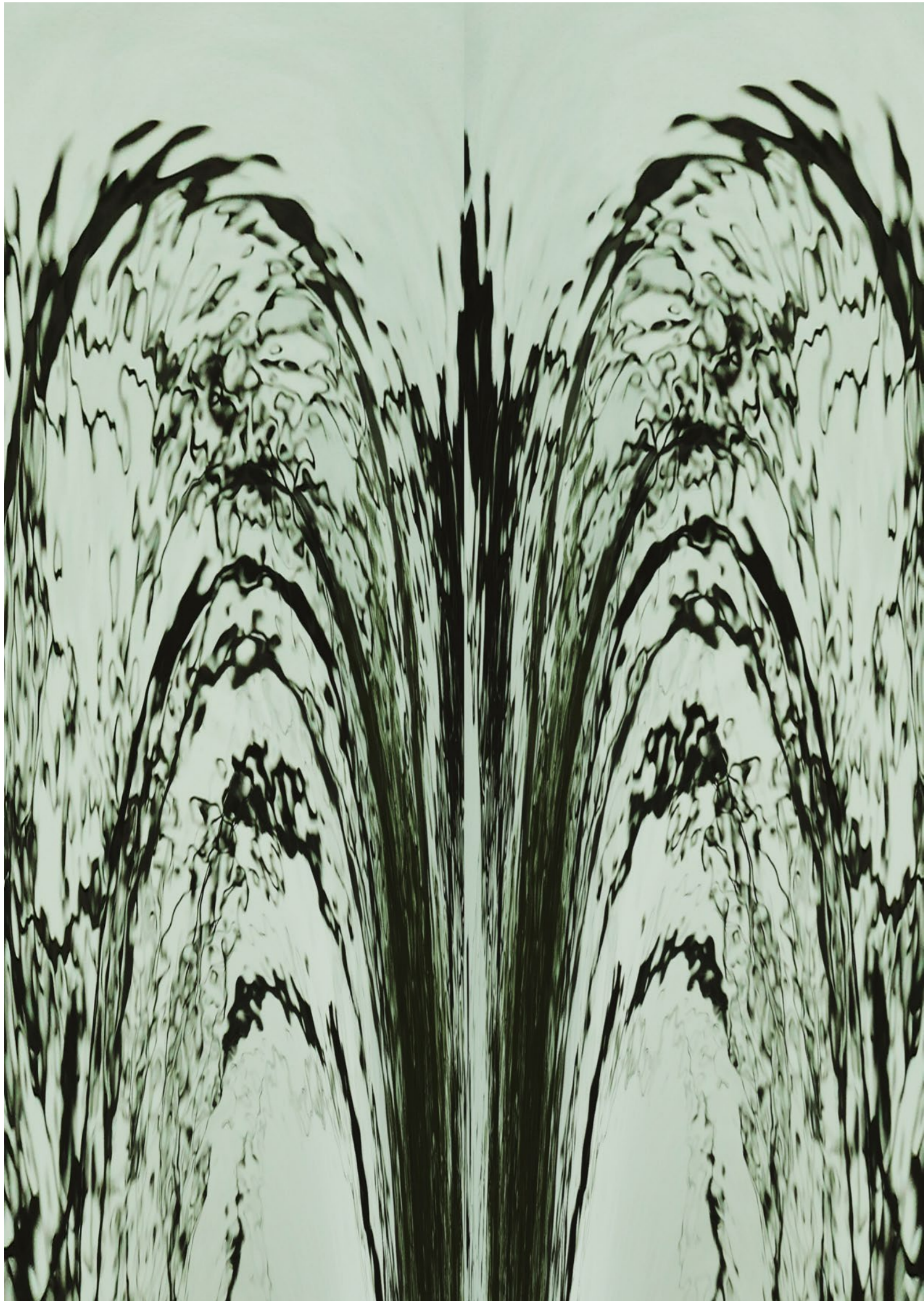


When a rotation was imposed upon the carrying tray, and the Walkers formed themselves into what seemed to be a series of Quantized orbits, which is fairly easily explained as being due to "vortices", caused by similar cyclic flows, set up in the substrate around the orbit, which, because of the oft-repeated cycles involved, allow a stable-energy-balance between substrate-to-vortices, AND vortices-to-substrate, via energy transfers.

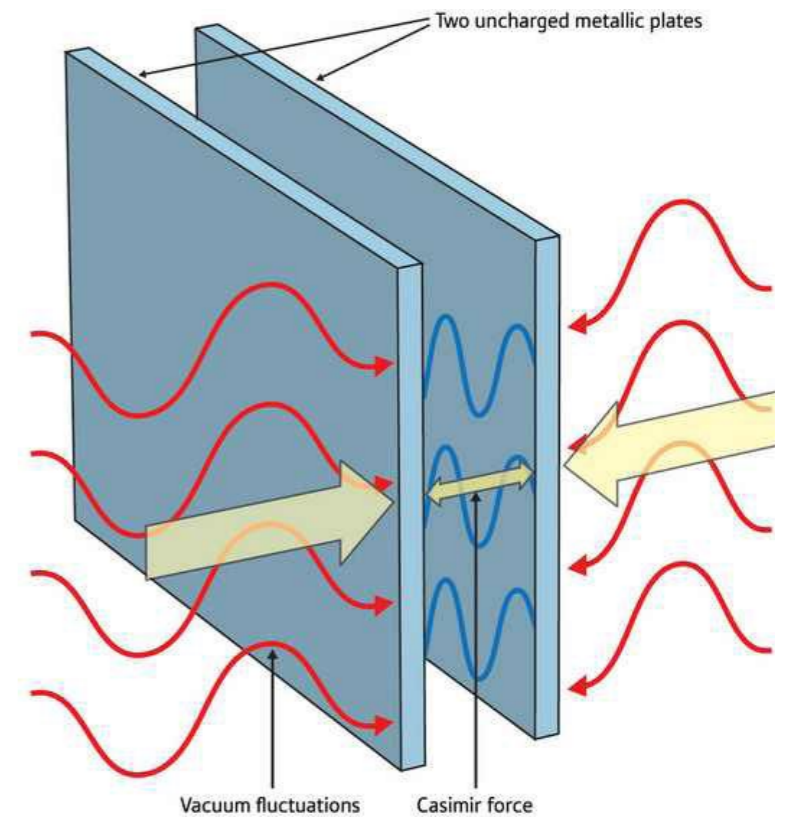
And, it was from this example that the analogous quantised electron orbits in Atoms were also explained, via the Neutritron Substrate, without any reference whatsoever to Copenhagen.

Indeed, if that Couder-type set up was, it is clear to me, the one used as a basis for further detailed investigations into Substrates as such, then, as with Couder's Walkers, all sorts of new features will be revealed, no longer demoted to a mere entirely-predictable stage, as is the usual case, when all the emphases are on what is happening to what significant large objects are doing, at best considered to be only marginally affected by the Substrate.





**Casimir Effect  
and  
Substrate Theory**



“Any *medium* supporting oscillations has an analogue of the Casimir effect.

For example, beads on a string[3][4] as well as plates submerged in noisy water[5] or gas[6] illustrate the Casimir force” (my italics)

The quotation above is significant, even if it is just from Wikipedia! It allows us to consider a very different explanation to the consensus one usually adopted for the actual Casimir Effect, and it allows us to compare them.

**Key words:**

Physics, Quantum Field Theory, Quantum Mechanics, Substrate Theory, Dialectical Materialism, Holistic Science, Philosophy of Physics

The Casimir Effect (between two conducting plates in a vacuum) presents an excellent phenomenon for contrasting Copenhagen Interpretation of Quantum Theory with a new alternative account, suggesting the effects of an undetectable Universal Substrate composed of units consisting of mutually-orbiting pairs of Leptons (Substrate Theory) which replicates the idea in the quote in the exact circumstances of the actual Casimir Effect.

Clearly, that quote makes such a comparison absolutely necessary, for it immediately suggests an undetectable *medium* (though extremely fine-structured perhaps) as potentially delivering exactly what we observe, rather than QT’s disembodied “vacuum fluctuations”.

If composed of appropriate Leptons, these joint-units could be completely undetectable (cancelling-out all observable effects), while delivering the necessary properties of such a medium, and possibly also being capable of the propagation of electromagnetic energy, and fluctuations required to deliver the observed Casimir Force.

Such an invisible and connected medium has been fully theorised by this researcher - termed a Paving and formed from Neutrinos (units composed of the mutual-orbiting of two Leptons - one Electron and one Positron)

it presented significant suggestions that, in spite of the neutrality of such joint-units overall, that they could on very-close-approach, produce an affecting oscillating effect of alternating attractions and repulsions created-entirely due to cross-influences between the sub-units in different adjacent Neutrित्रons, which would loosely-link the joint-units together, to form that Paving, with the involved overall units constantly oscillating about equally spaced positions, and thus enabling a means of EM propagation, due to the demotion of energy from the orbit of one unit, and its promotion to the orbit within the next, immediately adjacent unit, thus delivering a bucket-brigade-transfer, and consequently propagating a quantum of energy, at a fixed speed - giving us C.

Now, if such an undetectable Substrate permeated the universe, especially as it is composed of oscillating units, it could also be a real alternative to the so-called Quantum Field of empty space. It would, for example, be capable not only of propagating energy, but also of holding and delivering it in appropriately conducive contexts. And the point about the Paving also shows how at tiny separations similar linkages with the orbiting-electrons and relatively static nuclei in the atoms of a sheets of conducting material, would also be possible in the same sort of way.

Now before the vast majority of Physics academics succumb to damaging heart attacks, may I inform them of the alternative explanation of Quantized Electron orbits in atoms?

As soon as even the remote possibility of an undetectable Universal Substrate was suggested, its necessary composition and consequent properties were required. Particularly as the sole composition by Neutrित्रons had already been able to remove every single one of the anomalies of the full set of Double Slit Experiments, without any recourse whatsoever to the Copenhagen Interpretation of Quantum Theory.

And, an extension of the Theory of the Universal Substrate composed only of Neutrित्रons immediately revealed that the devised Paving was by no means a stable form. For fairly low applied energies would dissociate the Paving into individual units, and they could either thereafter act like a released random gas, or be driven by moving energetic interlopers into streams, or even into vortices, and though forms like the latter would usually be temporary - that would not be the case when caused

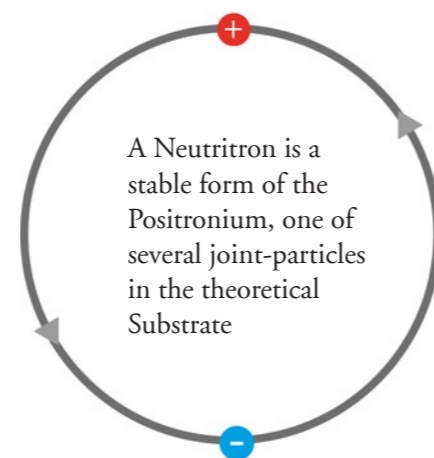
by orbiting Electrons - for the orbits would cause the Electrons to constantly traverse the very-same-route, so the Vortices could be maintained by the returning electrons. And, remarkably, energy could also be passed back to the orbiting electrons by these vortices! For the overall energy available, only certain orbits would be possible: a physical explanation for quantization.

It soon became clear that if appropriate different extra Substrate Units were available, Electrical, Magnetic and even Gravitational fields could all be features of a heterogeneous Substrate.

After all, it would explain why the supposed causes of the Fields were never diminished by the energetic actions of those Fields.

The required new units appeared to also be possible as mutually orbiting pairs of Leptons, but now with differently sized components, so that Magnetic Dipole Moments would be unavoidable. And the involved Units could both propagate and indeed subtend actual Fields, due to retained energy in the Units' internal orbits.

Even the required undetectability could be achieved by equal numbers of mirror-image joint units, which as a "random gas" would be undetectable, but as statically formed areas, associated with their initiators, could easily subtend the appropriate Fields.



Following is another quote from the Wikipedia page on Casimir Effect, roughly describing the consensus view of this phenomenon. I insert it here for comparison with my alternative explanation using Substrate Theory.

“The causes of the Casimir effect are described by quantum field theory, which states that all of the various fundamental fields, such as the electromagnetic field, must be quantized at each and every point in space.”

Now comparing this with the idea of a Universal Substrate reveals a one-to-one mapping with the energy in each unit of the Substrate stored as the promotion of the internally shared orbit. While the base energy when not promoted, maps onto the zero point energy.

“In a simplified view, a “field” in physics may be envisioned as if space were filled with interconnected vibrating balls and springs, and the strength of the field can be visualized as the displacement of a ball from its rest position.”

The vibrating balls of this analogue become the actually vibrating units of the Universal Substrate itself. And the strength of the field by the promotion of its internal orbits.

“Vibrations in this field propagate and are governed by the appropriate wave equation for the particular field in question. The second quantization of quantum field theory requires that each such ball-spring combination be quantized, that is, that the strength of the field be quantized at each point in space. At the most basic level, the field at each point in space is a simple harmonic oscillator, and its quantization places a quantum harmonic oscillator at each point. Excitations of the field correspond to the elementary particles of particle physics. However, even the vacuum has a vastly complex structure, so all calculations of quantum field theory must be made in relation to this model of the vacuum.”

All of the relevant points made above are easily delivered physically by the Universal Substrate, while the rest is unnecessary idealist packing.

“The vacuum has, implicitly, all of the properties that a particle may have: spin[citation needed], or polarization in the case of light, energy, and so on. On average, most of these properties cancel out: the vacuum is, after all, “empty” in this sense. One important exception is the vacuum energy or the vacuum expectation value of the energy. The quantization of a simple harmonic oscillator states that the lowest possible energy or zero-point energy that such an oscillator may have.”

All of the above maps onto the units of the Universal Substrate without much difficulty - they actually offer a better explanation for all these phenomena whilst still presenting as “empty”, in that they also “cancel out”.

“Summing over all possible oscillators at all points in space gives an infinite quantity. Since only differences in energy are physically measurable (with the notable exception of gravitation, which remains beyond the scope of quantum field theory), this infinity may be considered a feature of the mathematics rather than of the physics.”

Yes, except that it is all a feature of the Mathematics: *real* physical fields in a Universal Substrate cope with all of the above without recourse to fictitious infinities!

“This argument is the underpinning of the theory of renormalization. Dealing with infinite quantities in this way was a cause of widespread unease among quantum field theorists before the development in the 1970s of the renormalization group, a mathematical formalism for scale transformations that provides a natural basis for the process.”

Give us strength!

Is Substrate Theory not a better model than this?

## Superfluid Substrate

In a recent Youtube video, it was suggested that Dark Matter's supposed effects could be embodied in it being a universal superfluid in the cold of Space. But that surely would infer the presence of some kind of Dark Matter Universal Substrate?

Now, this resonates well with this theoretician's ideas upon an undetectable Universal Substrate, and, in particular, with his idea of a loosely-linked Neutrion Paving.

The suggestion was in a very brief contribution by one of the prestigious panel of physicists, so it wasn't presented as a coherent theory. But, nevertheless, it did have other significant resonances with the somewhat more developed theory of the Undetectable Universal Substrate, by this theorist, so further investigations were considered to be necessary.

For example, the objection was made to the contributor that there is no evidence for such a superfluid in the very much more accessible parts of Empty Space, as distinct from where he had suggested it to exist, and of course, if it were to be constructed in the same way as it is in Liquid Helium, it would certainly be detectable there.

But, the suggested units of a Neutrion Paving are very different from atoms, such as the Helium kind of superfluid. They are, in contrast, composed of a mutually-orbiting pair, consisting of one Electron of ordinary matter, having a negative charge, along with one Positron of antimatter, having a positive charge.

Now, though initially theoretically-conceived-of by this theorist, these pairings do indeed exist: they have

been observed in the Tevatron at Fermilab, and named Positronium, where they certainly didn't last very long! But, that was in a High Energy Accelerator, and occurring only as single events, so I assumed literally colossal numbers of them in the "cold of Empty Space", and assumed that there they could be undetectable and stable (rather like the unstable Neutron, becoming stable when in an atomic nucleus), and especially when in close proximity to one another, where it was theoretically established, that they formed with others into a loosely-linked Paving, with some very interesting properties - this turned out to be one of several Lepton Substrates, this one was named the Neutrion Substrate.

The criticisms aimed at our panelist, with his superfluid, elicited from him, an alternative Phase of these units, which in less conducive circumstances behaved more like an ordinary Gas!

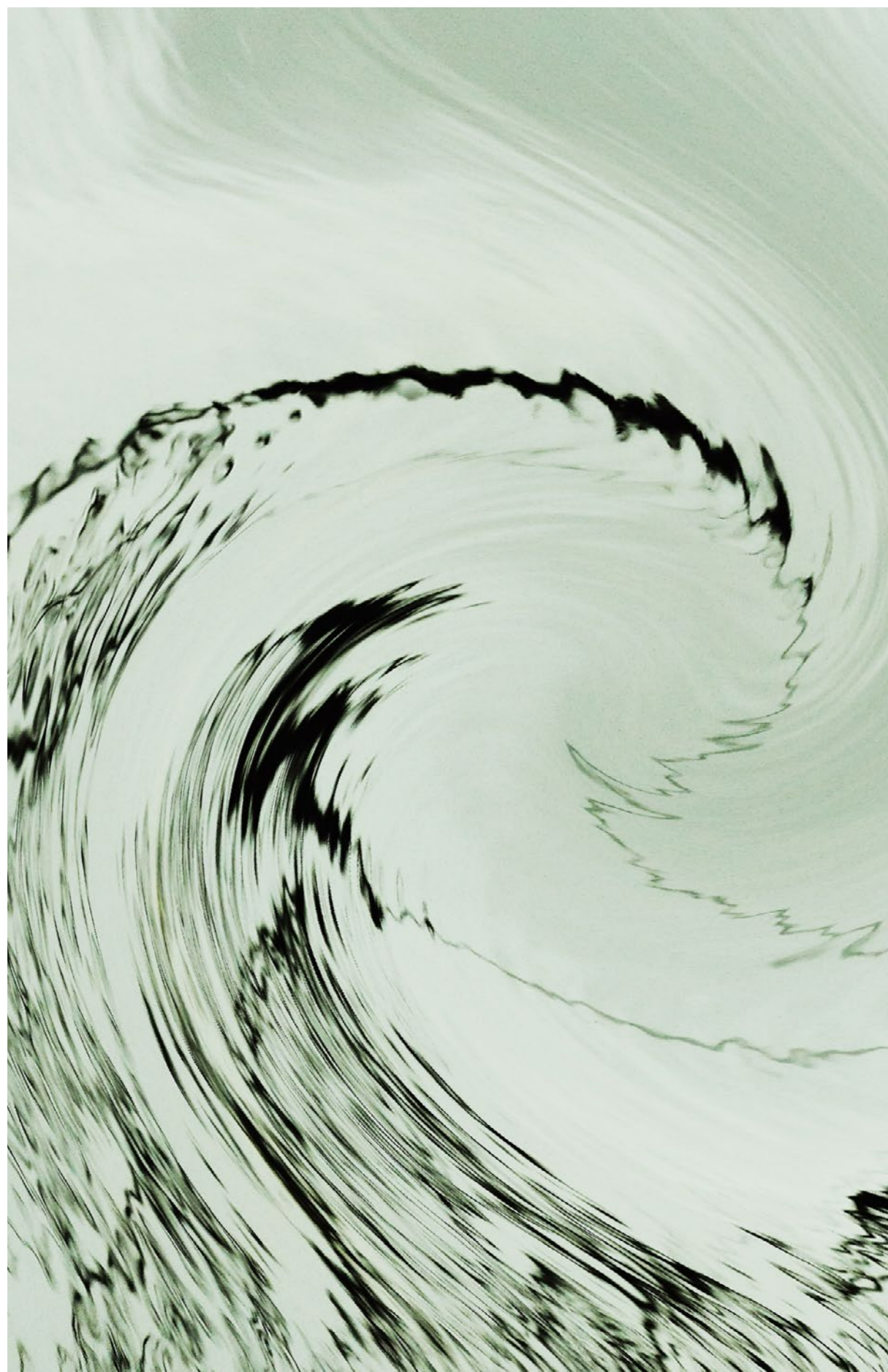
Now, in Substrate Theory it had also been necessary to describe alternative Phases of the Neutrions, constituting one of the Substrates, in various different circumstances.

For example, it wouldn't take much energy to dissociate the Paving back into a Gas of separated Neutrions, which would then also move about "randomly". Any suitably energetic material interlopers could drive these into Streams, or even Vortices. While sufficient energy would also actually dissociate the individual Neutrions into independent Electrons and Positrons (Pair Production).

The key idea behind this Theory, was that mutually-orbiting pairs of Leptons, such as these, would provide







a Substrate, which though undetectable (the joint-units having no electrical or magnetic properties) could interact with interlopers on various ways - both themselves being affected, AND also actually affecting interlopers - especially as their joint-orbits would allow the absorbing, holding and delivery of individual quanta of electromagnetic energy (photons)!

NOTE: It has to be inserted here that even this crude first attempt at defining an Undetectable Universal Substrate (containing only Neutrinos), was sufficient to remove every single anomaly from the full set of Double Slit Experiments, without any need for Wave/Particle Duality, or the Copenhagen Interpretation of Quantum Theory. Yet it was also entirely consistent with Quanta of Electromagnetic Energy. While, perhaps surprisingly, also explaining Quantised Electron orbits in atoms - again without reference to Copenhagen.

Indeed, these results were so exciting, that the research was extended to involving other Leptons in the construction of new mutually-orbiting joint particles, namely the Magnetons and the Gravitons to entirely deliver Fields, also as properties of the Undetectable Universal Substrate too.

NOTE: Indeed Hegel's discovery that the solution to Dichotomous Pairs of contradictory concepts resided in incorrect or even missing premises (though he was speaking only of Human Thinking), could also be applied to concrete Reality too! And, there the crucial missing premise was the total rejection, along with the Aether, of any kind of Universal Substrate, by the Michelson/Morley Experiments.

Indeed, literally everywhere I looked the inclusion, theoretically, of course, of such a Substrate, solved the difficulties!

Now, before anyone has a fit, may I explain. All our theories are bound to be inadequate: we don't know enough to count anything we have discovered, as being the Absolute Truth. Our knowledge of Reality's Absolute Truths is NIL! But, we can find fragments or aspects of that Truth as Objective Content: and the purpose of Science is to constantly replace current Objective Content, with ever better versions.

Indeed, most Explanatory Theories turn out to be actually Analogistic Models taken from elsewhere in

Reality, where our knowledge is more complete, and thereafter using that to construct a placeholder, much closer to representing the actual Truth than our current ideas do.

One who understood this very well was James Clerk Maxwell, whose Theory of the Aether was never meant to be the Absolute Truth, but the best Analogistic Model he could construct, from what was known from other features elsewhere in Reality, His vortices and electrical particles took him closer to the Truth, and ultimately enabled his still-used Electromagnetic Equations. And notice, he got his equations *from* his Theory, and NOT his Theory from experimental Data alone! A placeholder Analogistic Model was essential - we wouldn't have these accurate equations without it.

And when Jagan Gomatam was using Van der Pol's modified Electrical Theory to model the beating of the Human Heart, he was doing the same thing! And his treatment enabled the extraction of both Fibrillations and Heart attacks. I know this for I provided the physical Possibility Spaces which actually delivered those results for him.

Physics has been on an unavoidable and long period of decline, ever since the advantages of keeping contradictory stances to enable alternative routes to real solutions, gradually changed into the source of ever more contradictions, that were unavoidable logical Impasses, due to a wholly pluralist Form of Reasoning! Hegel revealed all this 200 years ago, concerning Human Thinking, but he was an idealist, so the potential gains were NOT appreciated in Science, even when it began to increasingly undermine itself from the late 19th century onwards.

The reaction was not to address these questions, but instead to merely retreat. And where did they retreat to? To the pure world of Mathematics where these anomalies don't exist! For, Mathematics is the sole pluralistic Discipline: it dwells NOT in Reality, but in the World of Pure Forms alone, which we call Ideality. And, it contains only a distorted pluralist reflection of Reality, along with an infinite extension of that realm, with absolutely NO concrete sources in Reality.

## Time Crystals and the Universal Substrate

Space-time crystals, or Time Crystals, are a completely new state of matter first suggested by Frank Wilczek in 2012. These entities supposedly repeat in time as well as space.

This essay is not a definitive investigation of Time Crystals by any means, but yet another muse about the possible effects of a currently undetectable Universal Substrate upon a certain new and perplexing phenomenon, currently explained by means of Time Crystals.

For, if such a suggested Substrate is undetectable, it will clearly be impossible to remove, and when experimenters produce a necessary vacuum, in which to perform their experiments, they can only do it if they know what they are removing and how to do it. We clearly cannot equate establishing a "vacuum" with truly totally Empty Space, if any existing yet supposedly-undetectable Universal Substrate could still be there.

So, the question becomes, "Could the phenomena currently termed as being due to Time Crystals, actually be due to that effectible and affecting Universal Substrate instead?" But, before we consider the Time Crystals, we should, first, at least, describe the proposed nature of such a Universal Substrate, as it has been currently defined.

First, that definition was by no means a purely speculative exercise at all! Indeed, it was driven by a whole series of anomalies in experimental evidence, primarily from the famed Double Slit Experiments, but also from diverse inadequately explained phenomena over a wide range of areas. And, perhaps, most significant of all, the abundance of evidence that would, in the past, have

always suggested the presence of a Medium or Substrate - for example all those implying Wave phenomena!

But, with a consensus belief that no Universal, everywhere-present Substrate exists - because it could not be detected, a valid research effort was dedicated to investigating whether or not a fully-functioned material Substrate could exist and yet be currently wholly undetectable.

So, the main objective was to investigate the possibility of whether mutually orbiting pairs of directly opposite known particles could deliver such a Substrate. And, a considerable theoretical effort not only delivered such an hypothetical substrate, but used in successfully in removing all the anomalies of the Double Slit Experiments: and thereafter a whole range of other important phenomena too.

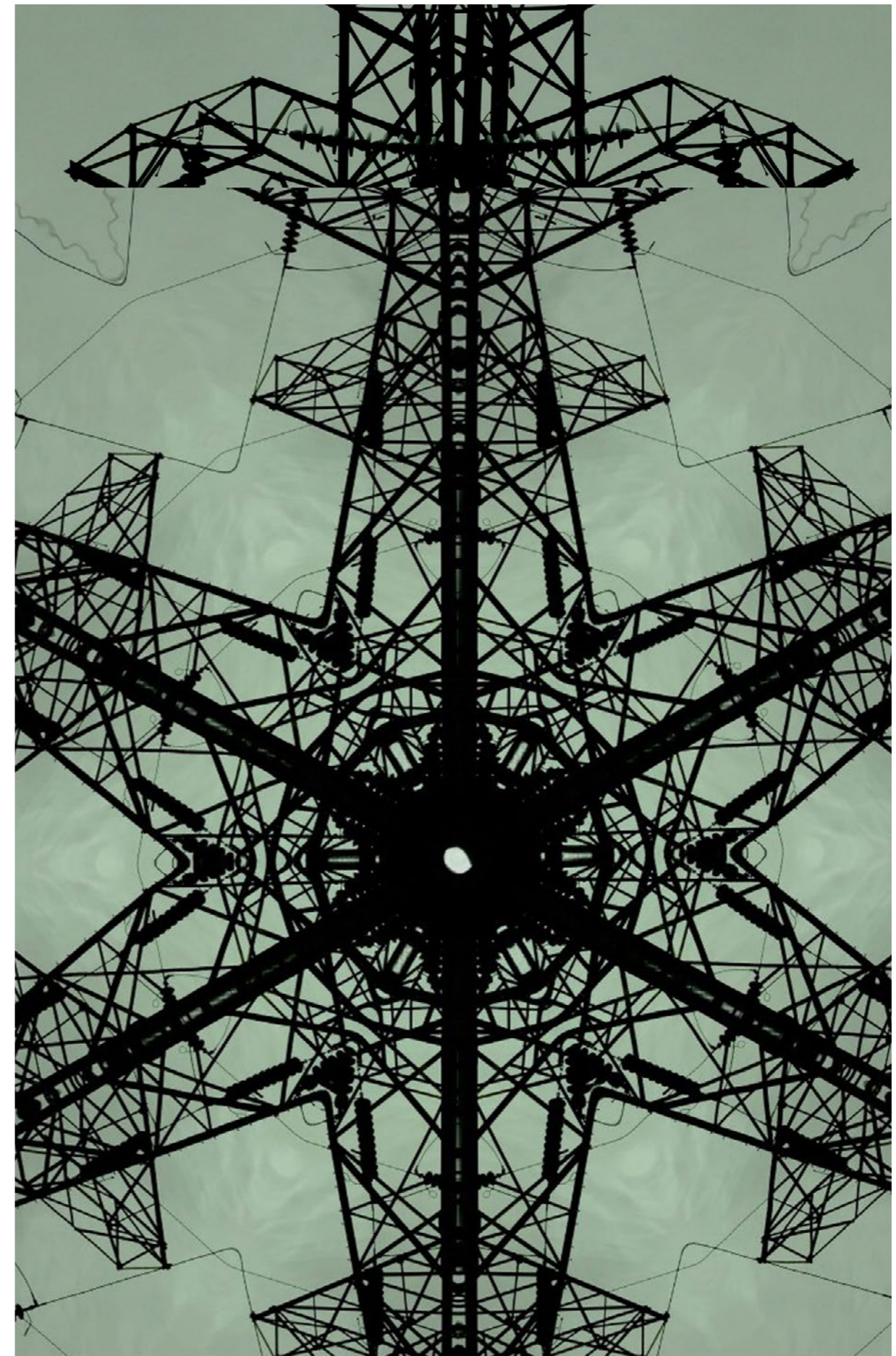
There have been three types, composed solely from known Leptons, so far described:-

**Neutrinos** - entirely neutral in every way.

**Magnetons** (x2) - neutral except for Magnetic Dipole Moments.

**Gravitons** (x2) - neutral apart from "Gravitational Dipole Moments".

The most important feature of all three types is that their internal joint orbits enable their promotion to make possible the holding and carrying of quanta of energy, and their consequent demotion to deliver such quanta to something else. It means that they can move energy about physically - exactly like Photons - or even pass such energy on, via alternative static-substrate-structures,





to deliver actual Propagation of that energy. And, in the current Theory of the Universal Substrate (by this theorist), energy is generally available, within literally all of the Units of the Substrate, which can be re-organised, and though necessarily enabled by the mere presence of initiators, into subtended Electrical, Magnetic, and even Gravitational Fields, these are actually achieved as by intrinsic self-restructuring of the appropriate Substrate Units, followed by the appropriate movement of energy to empower all parts of the Field, from elsewhere in the Substrate.

Now, this Substrate has already explained all sorts of phenomena, that appeared to take place in totally Empty Space - from Electromagnetic Energy Propagation, to Pair Productions and Pair Annihilations, and even the quantising of the orbits of Electrons within Atoms. And, the various Units of the Substrate, have been shown to re-structure into various different *Phases*, as they were both affected-by, and, in turn, could themselves-affect, any charged or energetic interlopers, and, subsequently, significantly change their behaviours.

Very clearly, the behaviours attributed to Time Crystal arrangements could also be easily explained by that Substrate, acting as an intermediary, just as other easily visible Media inflict upon interlopers in their occupied Spaces.

Now, for an accurate description of various examples of these Time Crystals, they are available via the publications of the discoverers and current investigators. But, while some theoreticians, still subscribing to the Copenhagen stance have published a paper proving them to be impossible, many investigators have proved their actual existence, but always requiring necessary initiators of some kind.

Before going any further, may I again emphasize the undetectability of such a Substrate? For, once it is included, it has been shown, in various crucial real-world cases, to not only become involved, both as an intermediary, but also recursively, returning previously-received energy, along with other effects acquired elsewhere!

That being said, the assumption that Time Crystal phenomena may be a new Phase of matter, may be undercut somewhat by such actions being due to that same undetectable Substrate, playing a very similar role

to how it has been observed to act elsewhere.

Various features of the examples of Time Crystal phenomena resonate particularly-well with at least one type of the Units of the suggested Universal Substrate, namely The Magnetons, which consist of two mirror image joint mutually-orbiting pairs consisting of diametrically opposite kinds of Taus and Muons, each combination of which will be neutral apart from its Magnetic Dipole Moment.

Now, one of the re-structurings of these Magnetons, in the presence of a magnetic initiator, results in Magnetic Lines of Force, consisting of chains of these Magnetons linked via N to S poles. Now, perhaps surprisingly, both types of Magneton can be linked in this way, for though they are opposites they present the same N & S poles merely by turning the opposite one around through 180 degrees.

Now, the flips involved in Time Crystals are exactly such switches-around. So, instead of them being the total reversing of the directions of the inner orbits, the same effect could be achieved by merely turning one around - much easier don't you think?

And, in a line of similar entities, in Time Crystals, including both types, the switching of one would be sufficient, by its changeover to flip the one next to it, and so on until they have all flipped over.

Then, all that would be needed is the right length of time delay temporarily stored within associated Substrate, to return to initiate such an initial switch! And the magnetons, in the Substrate, seem ideal to be a part of that.

ASIDE:

Also it has been revealed that Arthur Winfree talks about something similar to Time Crystals in his book *The Geometry of Biological Time*.

## Dark Matter and Galaxies

In a recent PBS Space Time video on YouTube, new evidence was described as finally establishing the certain existence of Dark Matter, which is based upon the recent observation of certain colliding Galaxies, that apparently seemed to have passed through one another unscathed, but yet had also been cleansed of any remaining Dark Matter. by that “process of collision”, which seemed for the visible entities composing them, as not so much a transforming collision, as a totally unaffacting mere passing-through of one by the other.

Yet, on close inspection, though it wasn't clear how they had achieved it (as Dark Matter is wholly undetectable), the conclusion was that the Dark Matters of each Galaxy had NOT been unaffected, had somehow interacted with each other, and had remained behind at the site of the Galaxies' collision!

Of course, such a case was certainly not totally provable, so the search was necessarily undertaken for other Galaxies in which their internal motions inferred that they also had NO Dark Matter involved - and two such cases were indeed identified. The rotational speeds of their composing stars did not infer the involvement of any necessary undetectable Dark Matter: all were consistent with ordinary gravitational behaviour, involving only the visible stars.

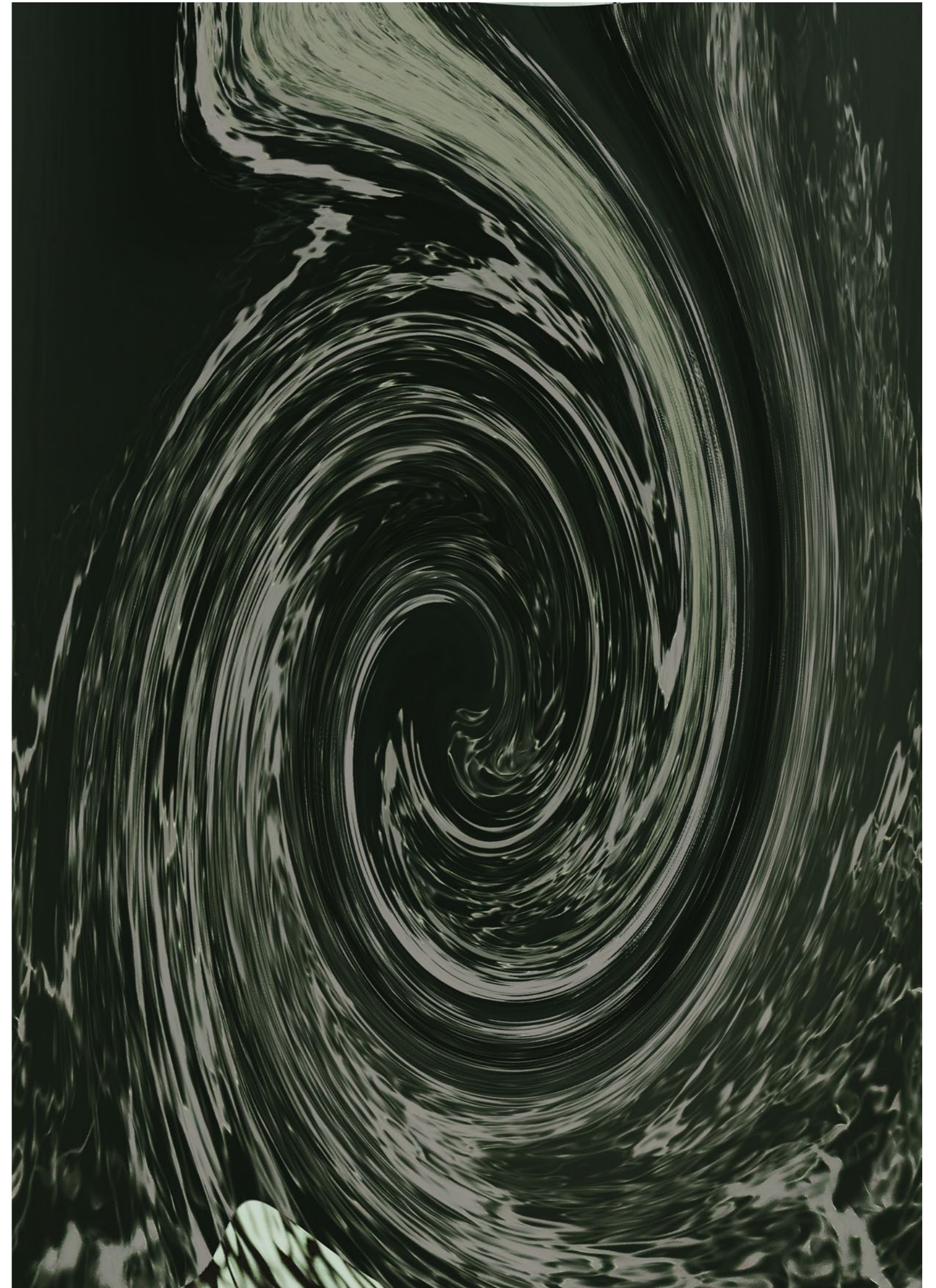
Now, in contrast, this researcher has been involved for some time in seriously considering the possibility of an undetectable, though definitely material, Universal Substrate, throughout so-called Empty Space, which, though consisting of discrete Units, these turn out to be sufficiently, mutually-effecting, of one another, to often act as if they constitute a “Continuous” Medium (in the

classical sense). So, the question obviously arising out of the above Dark Matter considerations, had to be whether, the presence of such an undetectable Universal Substrate, might fully explain that whole range of phenomena, by replacing Dark Matter with a particular mode of just such a Substrate - one carrying an appreciable amount of hidden Matter in the internal mutual orbits of its joint-Units.

NOTE: As the Units of the proposed Universal Substrate all consist of mutually-orbiting-pairs of sub-units (Leptons), and hence capable of holding transporting and releasing energy by the promotion of those orbits, it is clear that they could also be where the Dark Energy is hiding too!

Substrate Theory already provides an alternative explanation for the Double Slit Experiments, as well as fully explaining the Propagation of Electromagnetic Radiation through so-called “Empty Space”, and even the subtending of Electric, Magnetic and Gravitational Fields as properties of different Units of that Universal Substrate. Finally, the Units involved, consisting of Neutrinos, Magnetons and Gravitons, have been shown to exist in several Modes or Phases, delivering very different properties, in different circumstances, and even explaining quantised orbits of Electrons in Atoms.

But, the problem of Dark Matter is somewhat different. For, if the this matter is part of the Substrate, we seem to have the Universal Substrates within the two colliding Galaxies as “mutually-affecting” of one another, as if *they* “effectively-collide”, while the stars also within those Galaxies did not! This infers a connectivity within those Substrates, so that they act somewhat akin to





liquid substrates (such as water) and, on collision, cancel out their prior flows, to halt them both, and instead leave behind a locally turbulent, though no-longer translationally moving mix of both.

And this implies that the Galaxies themselves have, thereafter, been cleansed (temporarily?) of some part of the Substrate by the Collision Event. [Clearly if this was the case, the replenishment of the Substrate would thereafter be inevitable]

Now, this also makes the more general point that such Substrates may not be evenly spread throughout the Universe: for, being material themselves, they too may aggregate along with other material entities, such as that in Galaxies, Stars and Planets. And also, crucially, in particularly extreme circumstances, produce unique areas of a turbulent Substrate (as in the case described above), as well as others cleansed of Substrate.

Clearly, such a Substrate is NO mere Inactive Context, like Spacetime or some inert vacuum, but an effecting and affected "Medium" interacting with what happens within it, and what happens to it!

Indeed, it is not universal-and-inactive - like the usual conception of Empty Space, NOR is it a fixed reference system like Einstein's Spacetime Continuum (though that too is considered to be affected by the presence of Matter, so that might explain its effectiveness as an Analogistic Model in Relativity!).

Now, this is a very early response to the new evidence on Dark Matter, so it cannot as yet, include the various different Substrate Units and consequent very different Levels of both Scale, material content, and even diverse Functions, evident within the Universal Substrate as currently defined.

For example, if the above suggestions turn out to be true, then this undetectable Universal Substrate, as both the repository of most of the Universe's Matter, and all of its Dark Energy, becomes a truly Major component of the Universe, if not the primary defining element within it!

And, with the properties currently defined for it, it will surely be affected by the passage of large Material Bodies through it, especially in orbits (as has been investigated elsewhere), upon the sub micro scale, in explaining Quantized orbits of atomic Electrons.

Just consider the effect caused by Jupiter with its great Mass, and of course stars like the Sun, which too is moving and carrying the whole Solar System with it!

And it will also be locally dramatically affected by the highly energetic stars situated throughout its extent. And imagine the vast turbulences caused by Supernovae. and. of course its role within or due to the fabled Big Bang!

## The Substrate Universe

### The Consequences of an Effectible and Affecting Universe

When considering the infamous Big Bang, with its rigidly Non-Explosive Initiation, we are informed (by those addressing such questions), that it is the Universe itself that has been expanding, following that Event, BUT what that Universe consisted of then is not known, and hence why and how it was expanding is also not known, though as we have some idea of how it is now, we ought to be able to say something about it then!

So, as the Universe now consists of matter and energy, we can assume something related to those were even present back then.

But, that unexplained expansion has apparently continued, but not without some breathtakingly-inconceivable variations in Speed - from the fairly early, and truly mammoth Inflation, via an interim period of fairly constant expansion, to the, much later, General Acceleration in the whole process.

The evidence for concluding this expansion seems to have come from measured Redshifts in the spectrums of light from cosmic objects, but because of the constant Speed of Light, and the current vastness of the Universe, we also not only look into the far distance, from our current position, but also far Back-in-Time too, so the light arriving at us now, is coming from older and older times as we look ever deeper into Space!

But, as holists, and Dialectical Materialists, along with the evidence available from the past, we must assume that then, as now, there must have been similar past developments, to those we are aware of now, and crucially, that the changes that will have occurred, will be similar to those that we have ample evidence for, which will

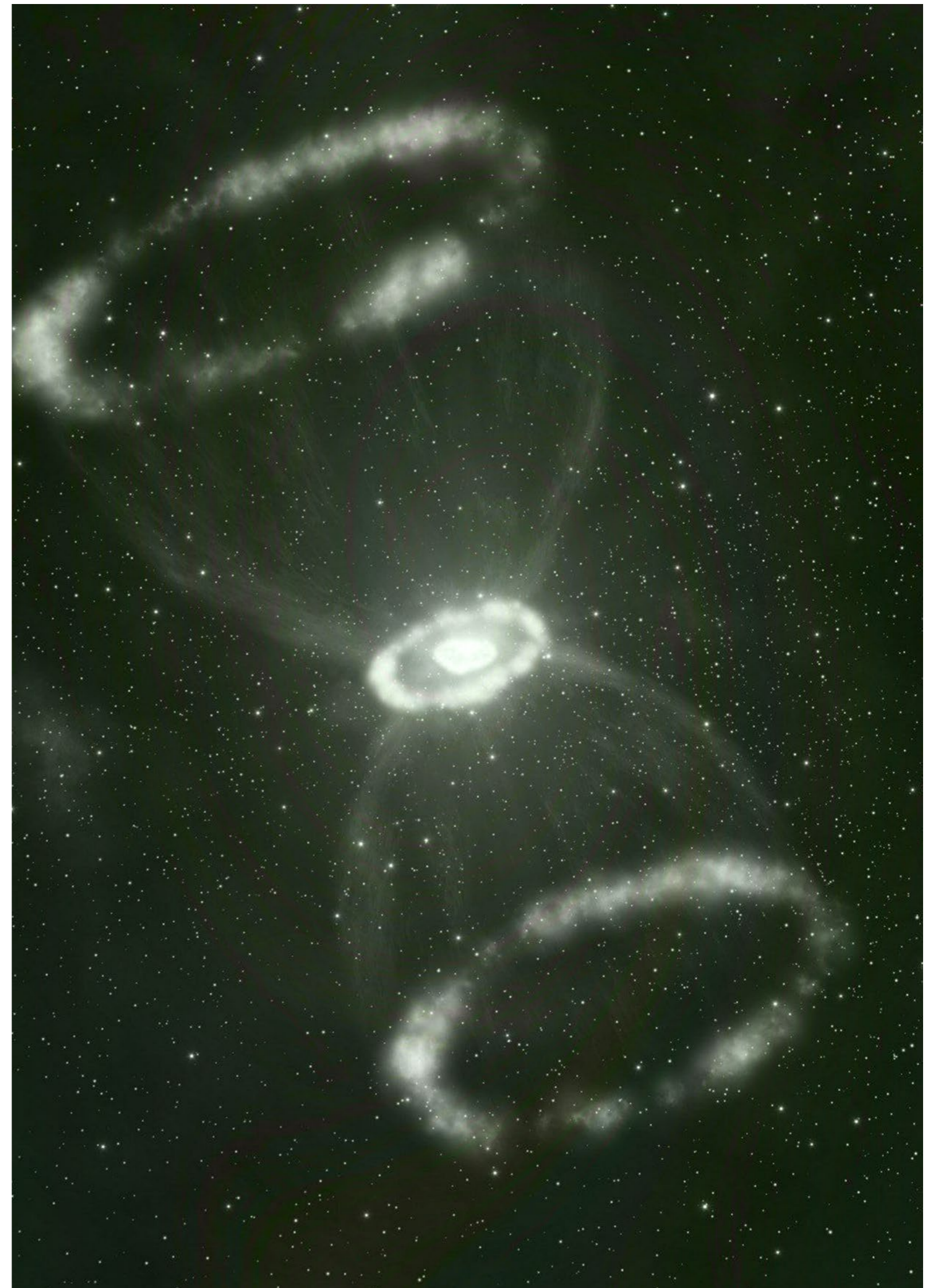
be the same kind of brief but transforming Emergences, always occurring in between longer periods of persisting Stability as have arrived within either totally-observable or historically-recorded examples in more recent times! So, we must assume that what we experience now are only the latest products of a long period of developments, so, what originally started the whole process, must both have been very different, but also capable of finally produced what we have now.

But, the only mammoth present day Events in the Cosmos, big enough to produce the simplest products are so-called Supernovae, which tend to both dissociate more complex forms, on the one hand, while also producing wholly new components by Fusion processes on the other!

NOTE: Certainly, there is evidence of Supernovae as far back as we are able to see, but the earlier ones may have produced different products than the later ones!

Now, clearly, all of this has not been given to us along with any kind of explanation, but merely as “descriptions-that-fit” current situations, and are surely-inconceivable without both an initial Cause, and also with something that such a Cause must actually be affecting!

Now, I have, as part of a more general undertaking, been addressing, for many decades, similar inexplicables within the Copenhagen Interpretation of Quantum Theory, and have managed to remove every single one of the anomalies of the famed Double Slit Experiments, merely by assuming the active presence of an undetectable, and hence invisible, Universal Substrate.



So, clearly, these currently inexplicable contortions in past Cosmology, might well be susceptible to the same sort of approach? And, especially if the same Holist, rather than the usual Pluralist approach is employed, which involves an affected and effecting Substrate, with one of these involving changes to the Substrate which later, in different consequent circumstances, could then affect the very same interloper that had affected the Substrate originally. And, clearly, such considerations are unavoidably holistic, and may not be evident until at a certain juncture, locally, where those changes finally produce the dominant causes in an observed situation.

Now clearly, these “cosmological features” are currently mere, unexplained inventions, with regard to Causes, and which were brought-in to accommodate otherwise inexplicable features of the Universe, as, of course, are all Man-devised theories (at least initially).

For, we, as merely naturally-evolved animals, can have NO direct access to Absolute Truth, as we were certainly wholly in-equipped, genetically, via Evolution, to even address such questions, and have had to painfully, and purely socially, devise always-necessarily-inadequate intellectual means to hopefully get ever closer to Reality, by revealing what is termed improved Objective Content (partial views or aspects) about our world - with the principle that any such alternative that explains more than the current theory, should replace that theory due to its being closer to the truth.

Now, the undetectable Universal Substrate of my alternative to Copenhagen, would, in addition, also surely be relevant to these cosmological questions as well, for it would supply, not only, to the thing affected, but also that which carries everything in the Universe along with it.

And, also, from that same prior research, it was shown that the Substrate could be transformed into several very different Modes or Phases - to, in addition, be itself structurally-affected, as well as clearly differently effecting those things occurring within it.

For example, the so-called Neutritron Phase of the Universal Substrate, could, in certain circumstances, form a loosely-linked, “solid-like” medium, delivering Speed-of-Light-bucket-brigade type Propagation: while, in very different circumstances, it could also have its composing Units dissociated into a kind of Random Gas, or even

a “liquid-like” driven Stream, or, maybe, multiple, persisting and rotating Vortices, enabling phenomena such as quantised orbits.

And, to cap it all, other Levels within that Complex Substrate have been shown to also deliver Electrical, Magnetic and even Gravity Fields, and even supplying the energy to make them effective.

Indeed, perhaps the most significant transformation was in the Causal Recursions between simultaneously-existing, different Phases within the Substrate, and even between coherent Levels within the overall multi-Level situation.

And, finally, the complete removal of an entirely inert “Empty Space” also significantly changes absolutely everything! For, there would be NO underlying “Stable Ground”.

Even the Universe, itself, could not be such, for though seemingly mostly stably expanding, it too, could suffer such inexplicable interludes as The Inflation, and the more recent Acceleration carrying all within it without any obvious explanation.

And, can we really terminate the currently assumed downwards sequence, of the multi-level Substrate, in the way that we currently do?

Having spent many years discovering, and then defining, the most general nature of Significant Qualitative Change, culminating in my *Theory of Emergences* (2010), as its most General Law, and thereby establishing an apparently generally applicable trajectory, to such changes, namely:- from Stability via Crises to a total Collapse, then to the Nadir of Dissolution Interlude subsequently delivering the Remarkable Creative/Constructive Phase which finally resolves into a wholly different and Higher Stability.

For, such a trajectory is evident in many, and perhaps ALL the Transforming Emergences - establishing Wholly New and hence Original Levels in Reality, all the way from the Life Histories of Stars to Social Revolutions in Human Societies!

Can we really terminate that downwards sequence, exactly where we currently do, and, in which all relations are eternal Natural Laws, and Emergences are seen as

mere summed complications of those fixed laws. And, nowhere is it accepted, that the creation of the wholly New, via such extendedly dissociative calamities could occur!

So, ALL the most important Transformations, such as the Emergence of Life, of Consciousness and of Human Societies, are wholly beyond the current pluralist stance and methods to explain.

Clearly, the three Phases occurring in the expansion of the Universe, are

- 1, The initial Inflation
2. The Normal Expansion Phase
3. The Accelerated Phase

And, they could be due to differences in how the Substrate was currently being exuded-from, and extended-after, the Big Bang, and with variations in both those emissions, and in the Substrate itself under varying conditions.

For example, the very emanations from a single origin, would unavoidably be into an ever increasing volume, and hence a diminution of density: while any included energy would be similarly diluted and perhaps cause changes in the form of the Substrate. While anything else being delivered outwards could also be affected or itself affect the differing forms of Substrate encountered.

Indeed, what has previously been revealed in theoretical considerations of such a Substrate, has been significant possible changes in the way energy is propagated by the Substrate in its various different forms. And, with the necessity of such a Substrate, in propagating energy, and a final boundary to that Substrate, which could involve Total Internal Reflection at such a real physical boundary, with consequent surface effects there, as well as others caused by the consequent reflections of Radiation within the Substrate.

For an interesting (yet early) musing on some possible repercussions of these ideas, watch our video *The Shape of the Universe* (2011)...

<https://youtu.be/b3lp0rLtcMM>

## The Possible Origin of the Universal Substrate

In thinking afresh about The Origin of the Universe, it seems to me to involve at least two contributory stages.

The non-explosive expansion into the Empty Void seems to be an entirely speculative starting point, and requires some profound physical-and-dialectical considerations of what we actually know exists today, and might throw at least some light upon what may have happened then - after all, there is no doubt that they are definitely related.

The two most important ideas which therefore must be addressed, have to be those concerned with early Propagations and subsequent Development: for, if it wasn't an explosion, the assumed Origin would seem to require some sort of enabling Substrate, to facilitate at least a part of the required Expansion. And, even more importantly, to involve a whole series of developmental Emergences to actually deliver the sequence of all the necessary initial processes involved. For, otherwise, you are limited to delivering everything cumulatively merely by those applications of the currently-assumed "Eternal Natural Laws", available by some magic, from the outset!

The reasons for these qualifications have emanated from my previous extensive researches into a sought-for invisible Substrate, in order to overcome the existential Crisis in Modern Sub Atomic Physics, caused by the retreat instituted by the Copenhagen Interpretation of Quantum Theory. So following extensive successes in that endeavour, it clearly then required a turn to address that crisis's consequences in Cosmology also.

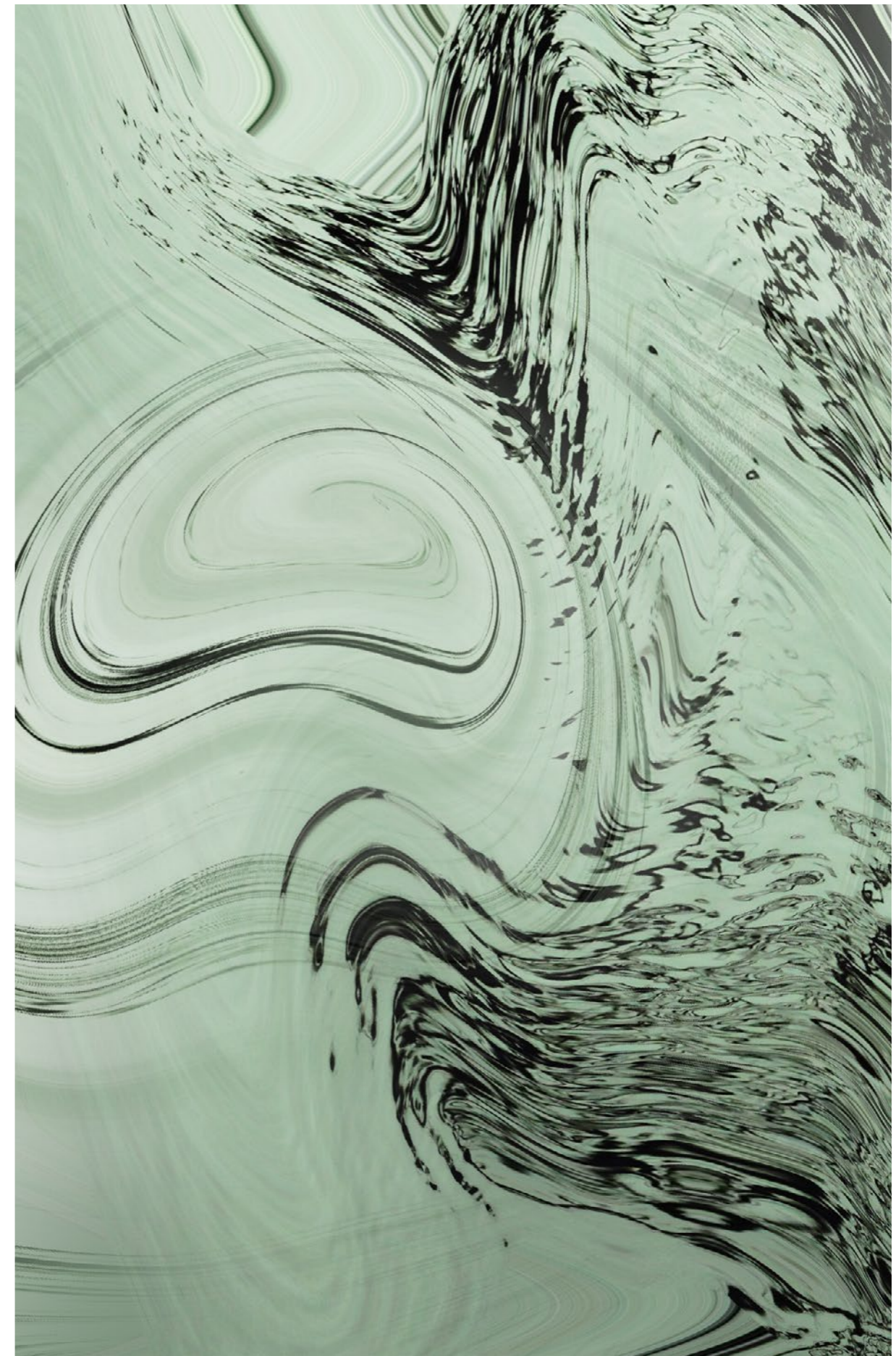
The previously enabling Substrate in Sub Atomic Physics could also be tested out and even perhaps improved in this demanding area.

It had been formed entirely from a variety of Units, all of which were composed out of two diametrically opposite and very tiny Leptons, mutually-orbiting one another, and thereby enabling the Propagation of Electromagnetic energy by Unit-to-Unit transfers of energy - involving the demotion of an elevated orbit in one Unit-pair, to then be absorbed into the promoting of the as yet unpromoted orbit in another Unit-pair. But, of course, the Developments involved in producing that initially, have still to be devised.

The reason for an interest in such Propagation is that there is no requirement for any extra facilitating energy: as, such a kind of energy transition is entirely self-energising, involving a simple downhill energy transfers, yet if repeated over a whole series of previously unpromoted units, would actually deliver a "potentially infinite" series of transfers at absolutely NO extra-energy cost, above that of the actual propagating quanta themselves.

Now, of course, this doesn't solve the problem of the mechanism of the supposed Big Bang, but let us run with it anyway for now! Let us, therefore, begin by investigating the propagation of energy, via some form of substrate, which, itself, might have been already generated by some prior Event.

The above described example was initially of a Substrate of Neutrinos, each of which was composed of one negatively-charged Electron of ordinary Matter, and one positively-charged Positron of Antimatter, mutually-orbiting one another! Such Unit-pairs, if sufficiently close together, would, in spite of their overall-neutrality, nevertheless, form a loosely-linked Substrate (The







Paving), due to the mostly-internal properties of one sub-unit, within its Joint-Unit, briefly-but-regularly, affecting those within the other Joint-Unit. And, thereafter, by the above described means, then propagating individual quanta, bucket-brigade fashion throughout a sequence of Units of The Paving!

NOTE 1: In a crucial investigation, to a point, very close-to and between, two of the Joint-Units, delivered at that point, two simultaneous, sinusoidal-oscillations - one magnetic and the other electrical, actually delivered by these cross-over effects, as the internal sub-units performed their orbits. The conclusions drawn, from these revelations, were that all the Units of such a Paving would oscillate-in-place in a complicated way about a position a fixed-distances-apart, both delivering the necessary stability, as well as the possibility of Propagation, and, indeed, also the fixed Speed of that Propagation determined by the regular gaps between Units.

Now, this suggested Paving not only propagates quanta of energy with ease at the Speed of Light, but is also composed of very small and opposite sub-units, and hence totally undetectable electromagnetically, and even “gravitationally” as their matter-effects, as a everything-containing universally present Substrate, would effectively cancel out.

So, such an initial emanation, of such a Substrate, before anything more substantial (and therefore energy-requiring), seems eminently possible, and effectively solves the conundrum of Propagation in Totally Empty Space!

If the involved sub-units - the Electrons and the Positrons, were the initial products of the Big Bang they would either form Neutrinos, and a consequent Paving, or mutually annihilate one another, producing Energy, and thus allow the very early flooding of Empty space with Energy held-in, and passed-between the promoted mutual-orbits within the Neutrinos. And, at the same time explain the energy-transparency of space physically.

Indeed, it should be also emphasized that all propagations and even Fields subtended in Space, are delivered by various other Substrate Units - all of which are built upon the same mutually-orbiting Lepton plan, but producing both Magnetons and Gravitons in addition to Neutrinos!

And, finally, it must also be mentioned, that all of these different Substrate Units, can actually occur in different Phases depending upon circumstances, which, in turn, deliver very different situations and phenomena!

Finally, the presence of an undetectable Substrate would also hide a vast amount of matter in Space, perhaps delivering some of the observations currently attributed to Dark Matter.

Substrate Theory is still at a very early stage in its development, but there is no doubt that if such a Substrate is proven to exist, the whole history of the Universe will need to be rewritten.

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