

SHAPE JOURNAL

RETHINKING PHYSICS

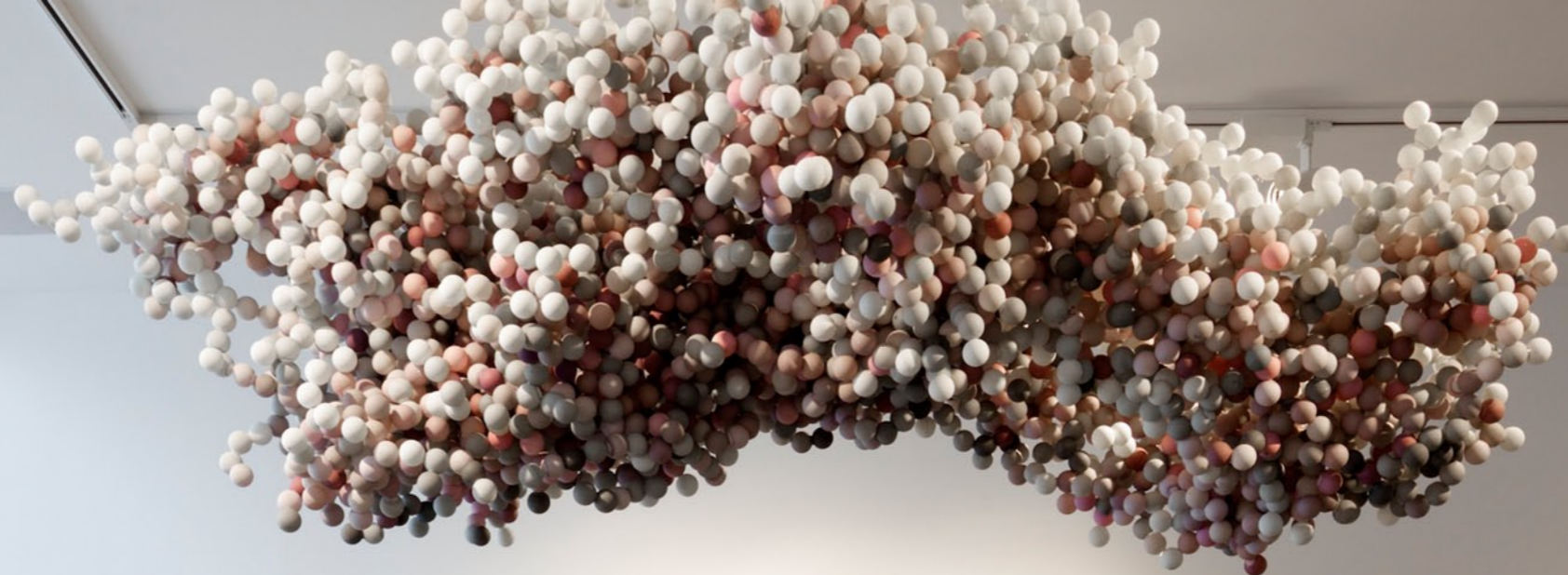
IS SCIENCE DYING? / IS SPACE AN EMPTY VOID? / IS COPENHAGEN A MYTH?

A NEW PARTICLE / RADIATION / BRIGHT THOUGHTS ON DARK MATTER(S)

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Issue 32

Rethinking Physics

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Introduction

Rethinking Physics



Welcome to Issue 32 of the **SHAPE Journal**.

Dear Physics Student,

You do PLURALIST Science.

You “farm” Reality in order to “reveal” and then extract what you assume to be eternal laws.

But Reality is not Pluralistic, it is Holistic.

What do you know about the Science that addresses the Origin of Life and Evolution? The Life Histories of Stars? Revolutions in Society?

Are you a real Materialist?

What came first, The Laws of Physics or Matter?

Did you know that the Copenhagen Interpretation of Quantum Theory is the biggest retreat back to Idealism in the history of Science?

Have you seen the non-Copenhagen explanation of the Double Slit Experiments?

Are you being sold a pup?

We invite you to read our Journal, a philosophic monthly published online. All papers are published with free and open access to all.

Its editors are Physics graduates who have both worked at professorial levels in Universities, but crucially Shape Journal rejects the current consensus position in Physics, the position you are currently being taught as fact.

It rejects the Copenhagen Interpretation of Quantum Theory and the Standard Model of Particle Physics.

Shape Journal has published original work on new theories on everything from the Double Slit Experiment, the Shape of the Universe, the Propagation of EM Radiation and on Emergence.

Shape Journal welcomes debate on all these issues and more.

Please join in this vital discussion, if only because you feel the need to shoot us down!

Jim Schofield Sept 2013





Is Science Dying? Is Perhaps The Greatest Discipline Of The Last Millennium Falling Into Terminal Decline?

What is the real motivation for becoming a scientist?

Politicians will tell you that by doing so you will help the country to compete in world markets, and thus propel it to prosperity, but that is never the real reason that young people choose Science. Some may say that by so doing you could make a unique contribution, and perhaps acquire personal fame and fortune, but truthfully, that is nearly as unlikely as winning the Lottery. Another encouraging favourite is that you may be able to discover things that will radically improve the nation's health, or so improve the technical means to production in general, so that future living will include a great deal more leisure, and a lot less work for everyone. But these are all, at best, myths, and, at worst, simply lies.

What motivates the dedication to Science in the young is very simply that it promises that you will begin to understand a great deal more about Reality. That is its greatest asset! And apart from this immediately understood potentiality, there are whole phalanxes of consequent possibilities, which extend the benefits beyond the individual, without merely lining the pockets of those pressing for more scientists. You may well go on to teach what you have learned and even discovered, and in so doing light up the possibilities for them too to take a similar path.

So, those are the best reasons for becoming a scientist.

But, of course, there are problems! Those with more acquisitive purposes are always uninclined to follow such stimulating and altruistic motives, and will even distort what is disseminated to quite other motives, and the real intrinsic benefits of what is usually termed "disinterested science" are not what people are told or even taught, but that is its true value.

For centuries, the qualities of scientific research have been transformed by other less objective motives, and not just how Science is used. The most damaging distortions have been within Science itself, with the importation of a standpoint much less objectively arrived at.

In Physics, for example, what could be called a Counter Revolution has taken place, which has effectively terminated its power to reveal ever more about Reality, and, instead, wedded it seemingly to quite other imperatives. An incipient crisis had been present, though relatively quiescent, from its very beginning, in that the performance of physical behaviours was not only displayed and

formulated in very usable Forms, but also interpreted as to its actual causes in various different ways.

The main bifurcation was between the mathematicians and the scientists.

For the former had been studying Form (usually derived from Reality, but not always) for literally millennia, and they tended to raise their encapsulating formulae to the status of prime movers – things behaved the way that they did because the determining factors were the Natural Laws, which they managed to abstract and concentrate into formal equations.

Now, it should be stressed that these early mathematicians were never scientists, they quickly turned their discipline into a study of Forms in their own terms alone, and, in so doing, managed to erect the most elegant and valid relations between all sorts of these purely formal patterns. They did not apply their discoveries in practical ways, but, on the contrary, moved deliberately and sure-footedly, into the world of Pure Form alone, and found its inter-relationships and even Laws.

But, the elements of this discipline were always "ideal forms". Straight lines were *absolutely* straight, of zero thickness and potentially infinite, and the same was true for all other extracted forms.

They were, necessarily, transformed by this process into perfect, and dramatically simplified versions, which clearly displayed revealable inter-relationships - something which could not be directly achieved with concrete versions of themselves in the complex and unfathomable "Real World".

Now, this defined and constructible World delivered many different and powerful theorems and properties, which the mathematicians interpreted as the causing essences of everything in the Real World.

Now, let us be clear, the actual processes of formal research were, nevertheless, extremely valuable.

For the first time in its history Mankind was able to reason based upon demonstrate-able laws, and, following on from these formal discoveries, the Ancient Greeks, who produced these gains, developed along similar lines, what came to be known as Formal Logic.

There is no doubt that these developments were of profound importance for Mankind.

But, importantly, though applicable, to an extent, in concrete Reality, the major error was to make these formal relationships the Reasons for Reality being as it was.

The mistake was in apportioning Cause to these Forms.

They had it the wrong way round!

It was Reality and its concrete physical properties that caused the Forms, and not their way of seeing it!

And even when the first scientists, who clearly made concrete Reality primary (they were instinctively materialist) began to extract patterns from Reality, via carefully arranged experiments, they didn't immediately dissociate themselves from the mathematicians, for their methodology did not counter the assumptions of the formalists. [The scientists and mathematicians were often the same people, who did both!]

In investigating Reality, it proved to be almost impossible to study it without major and helpful modifications to it. As many as possible of the non-essential factors were removed, until a "prime determinant" was clearly revealed in all its purity and power.

The scientists had in fact learned to farm Reality, to clear away all the multiple, "subordinate" and simultaneous factors, so that a single clearly dominating single relation remained. And this led to a belief that the purpose of Science was to discover, isolate and extract those primary essences, which could be encapsulated into the most succinct and perfect equations.

This was an idealist view of the World.

Concrete Reality was somehow thought to be driven by disembodied, abstract formulae that had always existed – they were the eternal drivers of everything!

But, the first real scientists were not idealists but materialists. So, though the gains of the very experienced mathematicians were invaluable to the scientists, their interpretation of the causes of all things differed tremendously from the position of the scientists. These two groups went from their jointly achieved discoveries in different directions. The mathematicians went one way with equations, which they could manipulate, and relate with other similarly abstract forms, to develop further theorems – the whole study always being of purely abstract Forms alone. The scientists, in contrast, did something very different, when finally in possession of an appropriate formula: they then had to start their real job, and attempt to relate the measurable involved in the equations to substances and their properties in the concrete World they could observe.

They had to construct a materialist narrative explaining why things behaved the way that they did. And, without any doubt, that view was usually the most important one among the very best of scientists: they called themselves *Natural Philosophers*, and that self-appellation was largely an accurate one, especially among the best practitioners and theorists.

And, perhaps surprisingly, these two contrary tendencies managed to work together for at least a couple of centuries in a mutually fruitful way. But, the reason for that unlikely alliance, was that both tendencies were looking for their own sorts of understanding, and even though they could markedly differ on what were the primary driving causes of the phenomena that they extracted relations from, they both required the sort of data sets that the scientists had discovered how to extract.

But, they were standing upon very different "ground", and the mutual benefits could only continue as long as what was being uncovered was sufficient, so the alliance could not but be increasingly undermined by the Industrial Revolution, and the increasingly demanding imperatives for **profit** from knowledge.

This pushed the mathematicians closer to the new breed of engineers, who did not want to know "Why?", but merely "How?", and in this endeavour constantly found themselves close companions of the mathematicians, rather than the scientists, who rapidly moved on to something else as soon as they had cracked the causality of the thing they were investigating.

Both of these groups did not want to know either why things behaved the way that they did, or how such understanding would be invaluable in for ever widening their studies. Pragmatism was the credo of the of the new breed of engineers, and though they had to address Reality all the time to be able to produce the necessary physical Domains, in which the scientists' laws applied, they were uninterested in knowing about the real causalities involved.

NOTE: Their position was epitomised by an electrical technician I knew, who once made me an amplifier, which worked perfectly well, but who could not tell me what any of the components were doing in the thing working as it did, nor could he use the exemplar of his own-produced amplifier to design anything else. He wasn't a scientist!

For in the defined appropriate Domains, the equations fitted to experimental results were exactly what were required for Production. And, these engineers became experts at constructing not only single Domains, but also whole series of them – each one appropriate to a given law, and some required outcome, and hence ideal for successfully producing what was needed to ensure that they would end up with the required end-product.





Each Domain delivered what would be required for the next one, and the whole series, termed a Factory, was the means by which useful and indeed saleable products could be made. Exactly why each and every process worked was not important. The key thing was for each domain and its process to deliver the goods.

NOTE: This way of defining these “technologists”, also covered famous inventors like Edison, for example, for they made their names by using what the scientists had originally established, but also varied what they used to optimise the efficiency and cost - to make something ideal for sale.

Gradually, and unjustly, the status of the scientists declined, while that of the Engineers positively soared. For, though it was always they who originally produced the Laws, they would not spend any time at all upon refining their use to produce the very best applications. They left all that to the engineers, as they had more important work to do elsewhere. As always their imperatives were for the extending and deepening of real understanding.

[In case the reader is not convinced, may I throw in the current example of Dyson, with his wonderful vacuum cleaners: did he do the necessary original Science?]

Yet, in spite of all this, the standpoint of the scientists was not perfect by any means. They could not bypass the self-inflicted difficulties of their own lack of knowledge upon most things. They were not Gods, but Men, and could only know what they had found out or been told. There was always much more yet to be revealed and formulated, than what they already knew, and their theories reflected this. All their explanations were flawed, due to what they as yet did not know. So, every theory was, in part at least, a construct, which accrued any status at all by its contained measure of Objective Content – or aspects or fragments of the truth. Hence it was clearly unavoidable, that all theories would be flawed because they were always incomplete, and hence needed regular revision, or even a total recasting, as new and relevant knowledge was made available, usually via new discoveries.

And such unavoidable insufficiencies always undermined their status. The most superficial conclusion concerning this, by non-scientists, was that these people were not only ivory-tower investigators of unusual and indeed unusable areas of study, but also they invariably got their theories wrong as well!

Now, contrasting this with the mathematician/engineer alliances, which invariably led to useful outcomes for ordinary people, meant that the consensus attitude was that it was the products of those people that resulted in improvement in human well-being, and the scientists needed to get their act thoroughly transformed to feed directly into the production of things to benefit Mankind.

And, in addition, the philosophic differences increasingly came to the fore, and each new (and, of course, unavoidable) impasse that the scientists arrived at, was considered to be yet another proof of the inadequacies of their methods. “They needed to change”, was the widespread opinion.

So, in this critical historical environment, with the series of impasses at the end of the nineteenth century, and particularly in Sub Atomic Physics, and around the discovery of the Quantum, only added to the general hostility. Whereas, in the past, such impasses were lived with, and respectful laymen fully expected the scientists to solve the problems involved. But, in the new unsympathetic situation the differences between mathematician/physicists and the explanatory physicists turned into actual war! And, at the Solvay Conference in 1927 the maths-led faction gained a major victory over the “old school” (led by Albert Einstein).

A new philosophical standpoint was no longer merely held-but-never-admitted, but, instead, was now lauded as the “new realism”. A definitely overt Idealism was clearly articulated by the new (and now dominant) group led by Bohr and Heisenberg, and the effect upon Sub Atomic Physics was devastating.

Indeed, every new anomaly was immediately re-interpreted from the new standpoint as “the way things are at this level of Reality”, and the most way-out positions were insisted upon as being The Truth. They were, of course, no such things. They actually constituted the biggest wholesale retreat in the whole history of Science, and the whole direction and purpose of scientific research in this crucial area was completely changed.

And, very clearly, this imposes an unavoidable burden upon the new generation of physicists. They cannot just fall-in-step behind this March to Nowhere! The basic standpoint of current Sub Atomic Physics must be opposed, the anomalies of that crucial area solved and explained, to defeat that tendency completely. They must put Science back where it should be, as the primary investigative and explanatory discipline for future understanding and progress. They must stop the rot.

Copenhagen Myths: Between-the-Dots?

There is a very philosophical-sounding piece of current Sub Atomic Physics that is frequently aired to frighten away any dissenting voices to the prevailing consensus, which is about how we interpret data from experiments.

The defining case was to do with tracks in Cloud Chambers or photographic emulsions (used to capture elementary particle collision events in great detail), or indeed any other kind of detector, used for the same purposes. For, to be effective, these devices must not so interfere with any moving particle as to change the very features that are trying to be extracted. And this is only achievable if the detector is only affected in an ON/OFF basis throughout the trajectory of the particle under study. In other words, a “trail”, is indicated by a series of caused dots in the detecting medium. We see these “dotted-lines” and infer a trajectory by a causing particle.

This seems fine to most ordinary mortals, but to Copenhagenists, we are making a major error in assuming that.

“You cannot say anything about what happens between the dots”, they insist. And then go off onto their usual probability methods to leave you – the uninitiated, at a loss to follow their line of reasoning.

Fear not! It is not you, but they that are “up a gum tree”

They have taken the famous conundrum of the alternative assumptions of either Continuity or Descreteness as revealed by Zeno of Elea, to cover their own retreat.

Zeno showed that neither of these assumptions was sufficient in explaining all phenomena, and in his Paradoxes effectively proved his case. But we must be clear what Zeno was doing and why! And what our “modern” philosophical physicists are doing, and for what reasons.

Zeno wanted to show that such assumptions, though very useful in appropriate circumstances, are BOTH inadequate. He wanted to reveal the partial nature of all our basic extractions from Reality, as well as our assumptions and our explanations. He wasn’t, as some mathematicians insist, merely saying, “Give up now you’ll never do it!”, but, on the contrary, “Beware of turning valuable constructs into Absolute Truths!”, for they are *never* that!

Indeed, though Zeno (some 2,500 years ago) was in no position to deliver a solution to this contradiction, he did illustrate what today we would call Objective Content as the only possible result of our very best investigations and

explanations of Reality. All our “Truths” are conditional, and therefore partial: they cannot be any other.

We are, after all, only a part of physical Reality, and not a separate and above-it-all God! So, whatever such mere mortals find, will always be only aspects of the real content of Reality. But, nevertheless, they are NOT pure invention. They always have some Objective Content, and hence can be effectively used in the right circumstances.

Now, it should be made clear that our Copenhagen Physicists know nothing of any of this, but somewhere, somehow, they have heard of Zeno’s Arrow Paradox that scuppers the discrete explanation of movement, and which has it composed of discrete positions that are supposed to add-up-to the continuous movement. Zeno proved it impossible with the question, “What is in between your discrete positions?”

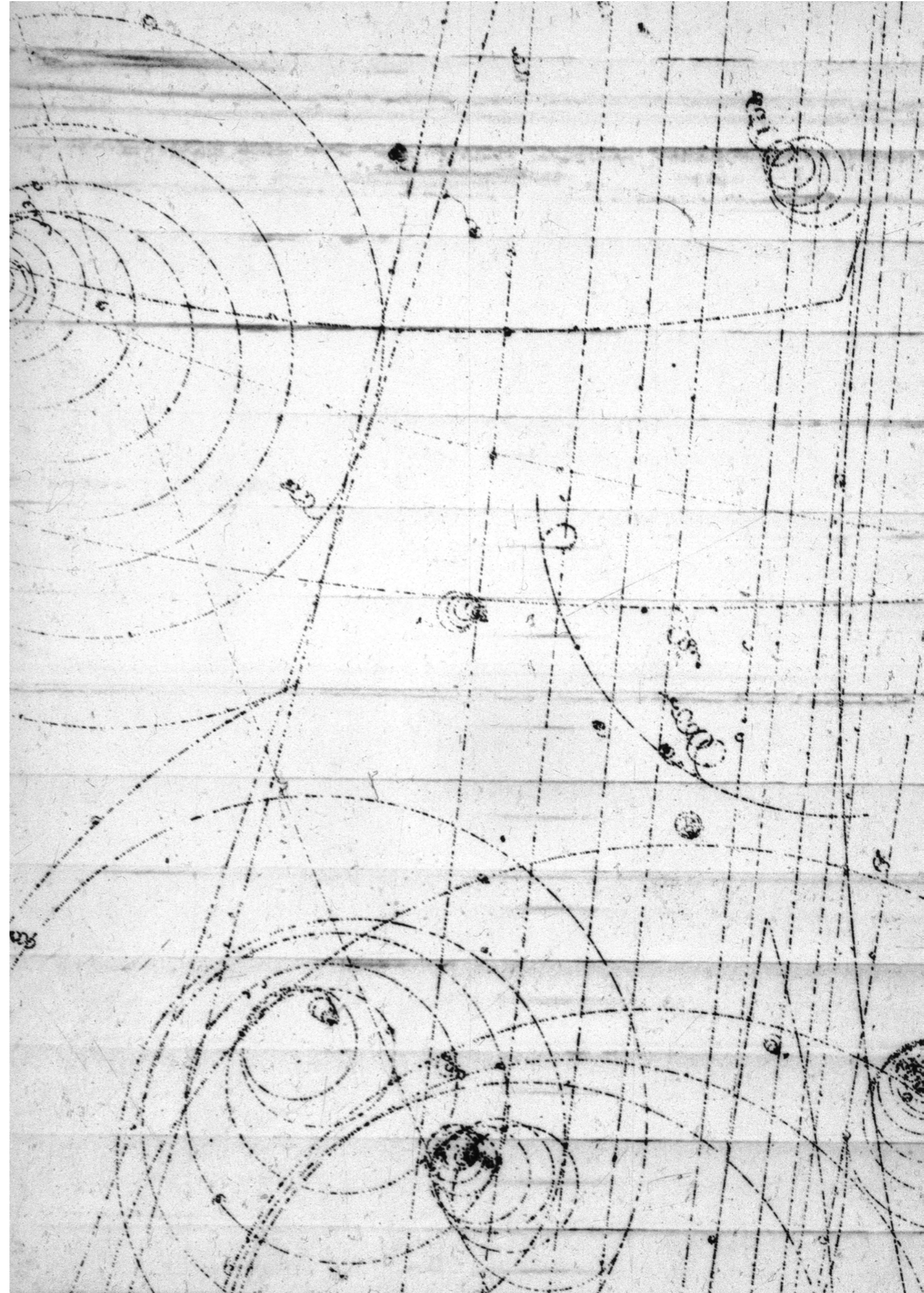
Now, clearly, the argument of the Copenhagenists is supposed to be soundly based upon this reasoning, but, of course, it isn’t!

Indeed, in the case of movement, such as this, the continuity assumption is much more accurate, and the supposition that a movement of the causing particle between any two identified adjacent positions identified by the dots in the detector is a good example of sound Objective Content. Whereas, “We can’t say anything about what happens between the dots”, is merely obscurantism and certainly not sound Philosophy.

It is basically the position taken by Kant, who also did not understand the nature of Objective Content, and assumed that as it wasn’t the Absolute Truth, it was possibly an “Unknowable Thing in Itself”. It is usually called Agnosticism, and, as a regular refuge for ill-equipped materialists, is usually called *Positivism*.

“How do they get away with it?”, you may well ask. And the answer is rather sad. Most scientists are terrible philosophers and have almost always been so. Reality is not as simple as they want to believe it is, and they will always believe in their formal perfections rather than the messy, unreliable nature that actually confronts them.

Indeed, they have always subscribed to the Principle of Plurality, which considers that Reality is composed of a complex mix of many, many individual contributions, and that these components are always entirely separable - that is they are independent of context. So that if most other contributions are either suppressed, eliminated or



cancelled out, then the individual component left will be revealed in its pristine and natural simplicity.

It is the way they DO Science, and every such simple component “revealed”, by these means of control and extraction, will be a totally legitimate and pure element that will act that way exactly in any complex Reality.

But, I’m afraid that such an assumption is untrue: it does not act in the same way at all.

The only correct part of such reasoning is the realisation that many contributory factors are involved in each and every naturally occurring situation. But those components are NOT separable elements merely summed to give the overall situation.

Indeed, though again a simplification, the alternative to such a pluralist assumption, namely Holism, turns out to be very much closer to the truth, and what really happens in unfettered Reality, even in a particular mix, is always determined by the *full context* – not as a strict sum, but as many mutually determining contributions: “Everything affects everything else!”

So, by reducing this context to a minimum, does NOT reveal a given component accurately, but has drastically modified it by its new (almost zero) context. In its real full context situation that component is always different.

So, this basic starting point for Science, which has been highly successful, not, it must be emphasized, in delivering full and perfect explanation, but only in allowing effective, predictable USE in highly constrained, controlled and maintained Domains of Applicability.

To address development and qualitative change, a new approach must be defined and explained, which, though it will still use the pluralist techniques of Science, will NOT rely upon pluralist assumptions. They will clearly be pragmatic solutions within what will be essentially and firmly holistic.

Bright Thoughts on Dark Matter(s)

The article *The Touch of Darkness* in New Scientist (2932) does not deliver what it seems to promise – revealing some final moves towards the discovery and description of what comprises the suggested Dark Matter, now considered essential to the present conception of the Universe.

Yet, in the multiplicity of approaches, and their necessary assumptions, being employed across the World in this area of research, there inevitably emerges the unavoidable contradictions that always mark all the many impasses in current Physical Theory, which seem always to be due to having exceeded the extreme viable limits of our current assumptions, principles and even laws.

The classic contradictory phenomena (which the Wave/Particle Duality conception was the response to) are clearly revealed here too.

Now, as a physicist who chased the last such impasse – the contradictions that resulted in the anomalies of the famed Double Slit Experiments, and the consequent drastic and incorrect abandonment of Materialism for a thoroughly Idealist alternative, it was clear to this theorist that this new seeming dead-end might also be related to the same underlying causes.

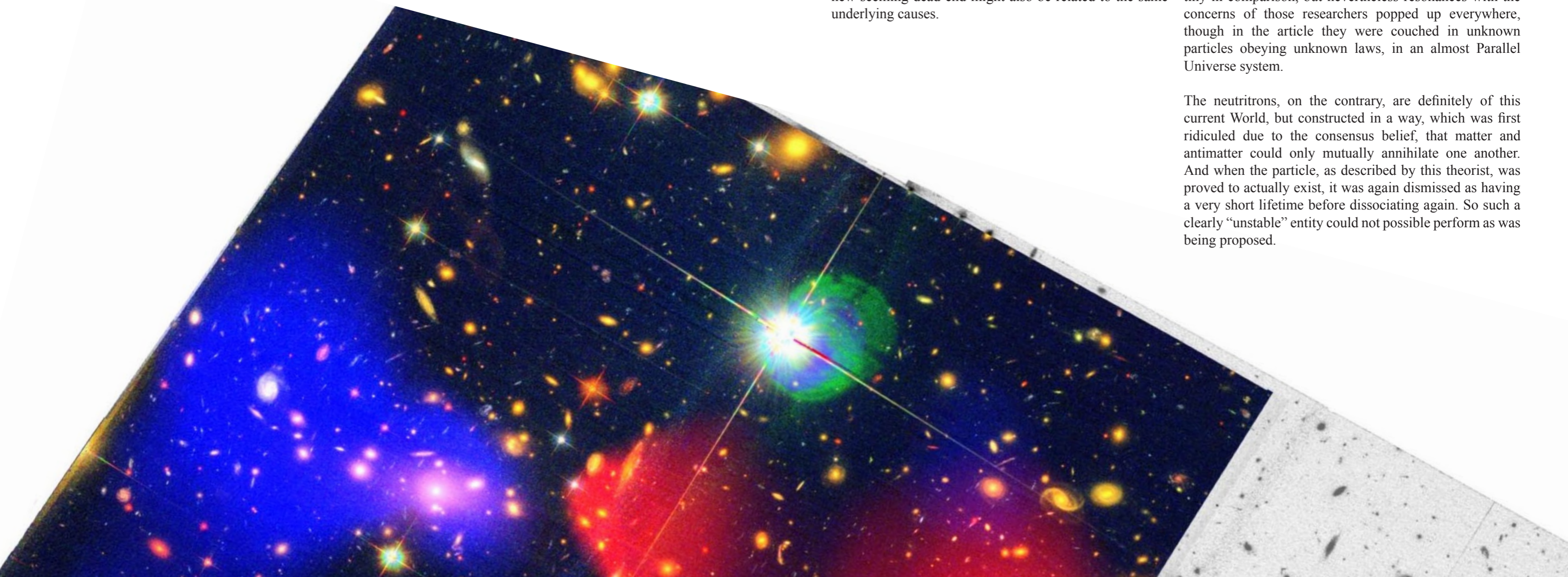
My suggested solution to the Double Slit questions, did it by assuming that Empty Space is not at all empty, but actually consists of a Big Bang created Paving of matter/antimatter pairs incapable of being detected by the usual means, but, nevertheless being able to deliver all of the anomalous phenomena in the Double Slit Experiments.

The interesting spin-off from these ideas was the parallel solution of the Propagation of Electromagnetic Radiation through Empty Space, and even the evident possibility of explaining such things as Fields in Empty Space too.

The key idea in these suggestions was that of a positronium “clone” (which I have theoretically derived and termed the neutritron), and which is deemed to be the single unit component of a universe-wide Paving. For, this union of a positron and an electron, mutually orbiting one another, unavoidably produced an undetectable entity, and which also has many resonances with the problems generated by the idea of Dark Matter.

Now, in this article in New Scientist, the range of suggested entities to deliver this Matter, makes my suggestions seem tiny in comparison, but nevertheless resonances with the concerns of those researchers popped up everywhere, though in the article they were couched in unknown particles obeying unknown laws, in an almost Parallel Universe system.

The neutritrons, on the contrary, are definitely of this current World, but constructed in a way, which was first ridiculed due to the consensus belief, that matter and antimatter could only mutually annihilate one another. And when the particle, as described by this theorist, was proved to actually exist, it was again dismissed as having a very short lifetime before dissociating again. So such a clearly “unstable” entity could not possible perform as was being proposed.



But in the theory put forward it had certainly to be extremely stable, but even so, in the very high-energy environment of an Accelerator, where it was first discovered, it would be caused to have its seemingly tiny lifespan. In Empty Space, devoid of anything else, it would, however, be entirely stable, and could explain many different phenomena, and in further work assuming the presence of this entity, this proved to be eminently possible.

But, returning to Dark Matter, such a paving of these particles would indeed include hidden matter in abundance, it even might be subject to another weak, but aggregating force to cause it to become a paving, rather than separate particles as in a gas, for in the presence of un-cancelled and much stronger forces, these weaker ones would be completely swamped and therefore unobservable. In addition, the very form of the constituent neutrinos is, without any doubt, very similar to that of the atom. For it is not only a stable pairing due to mutual orbiting, but also, theoretically, should both absorb and deliver energy in exactly the same internal way as occurs in the atom, by the promotion and demotion of internal orbits.

So, though being mathematicians, primarily, one particular research group, mentioned in the article, did also suggest similar possibilities, yet did as they always do, and managed to extrapolate everything into another “parallel world”, both un-admitted and unseeable. Yet, their suggestion is NOT the same as that put forward by the theorist of this paper, which, it turns out, also seems to be relevant to a number of other very important areas – Cosmology being perhaps the most important.

Another aspect of the New Scientist article is that at no point does it really relate the worldwide search for Dark Matter to the universal consensus in Sub Atomic Physics – known as the Copenhagen Interpretation of Quantum Theory, except that by saying nothing it must accept that standpoint. Hence all theoretical bases, for the conceptions of what Dark Matter “must” be, can only be ones, which are consonant with the state of Reality in that sphere, which comes directly from that standpoint.

Talk of Higgs’ Boson, and particle size, all of which were established out of a single experimental methodology – involving ever-higher speed Accelerators (more properly called Colliders), which always smash particles into one another, and study the produced results. It must be like trying to understand a mechanism from another world by smashing it to pieces, and then studying the detritus so formed.

Indeed, the energies now achieved in these devices are so high that there is a good chance that the method is very likely to be creating *new* particles rather than revealing the already-existing components of the Universe.

Now, it must be emphasized that that all the theories developed from such experiments are predicated upon the universally accepted Principle of Plurality, which insists that any relations (and particles) extracted by such means are separable – that is they are totally independent of their context – the same in all circumstances!

The interpretations of what are found are then, based upon this Principle, actual components of Reality – the experiments involved have merely revealed them, and they will be exactly the same, as extracted, as they were originally involved in naturally occurring circumstances.

Can you see why this theorist is so critical of the research ideas involved?

At base, it is not only Idealist, but also Pluralist, whereas he is both a Materialist and a Holist.

The conclusions about results will always differ, because though the Pluralists say what they isolate and extract is exactly what occurs within complex situations in Reality, the Holist says the exact opposite: they insist that the nature of conceived-of components is never independent of context, but depends crucially upon every aspect of that context, as to its nature in those circumstances. Every single factor is modified by its affecting context, and if it is somehow removed, you get something related but crucially different and even unique to those new circumstances!

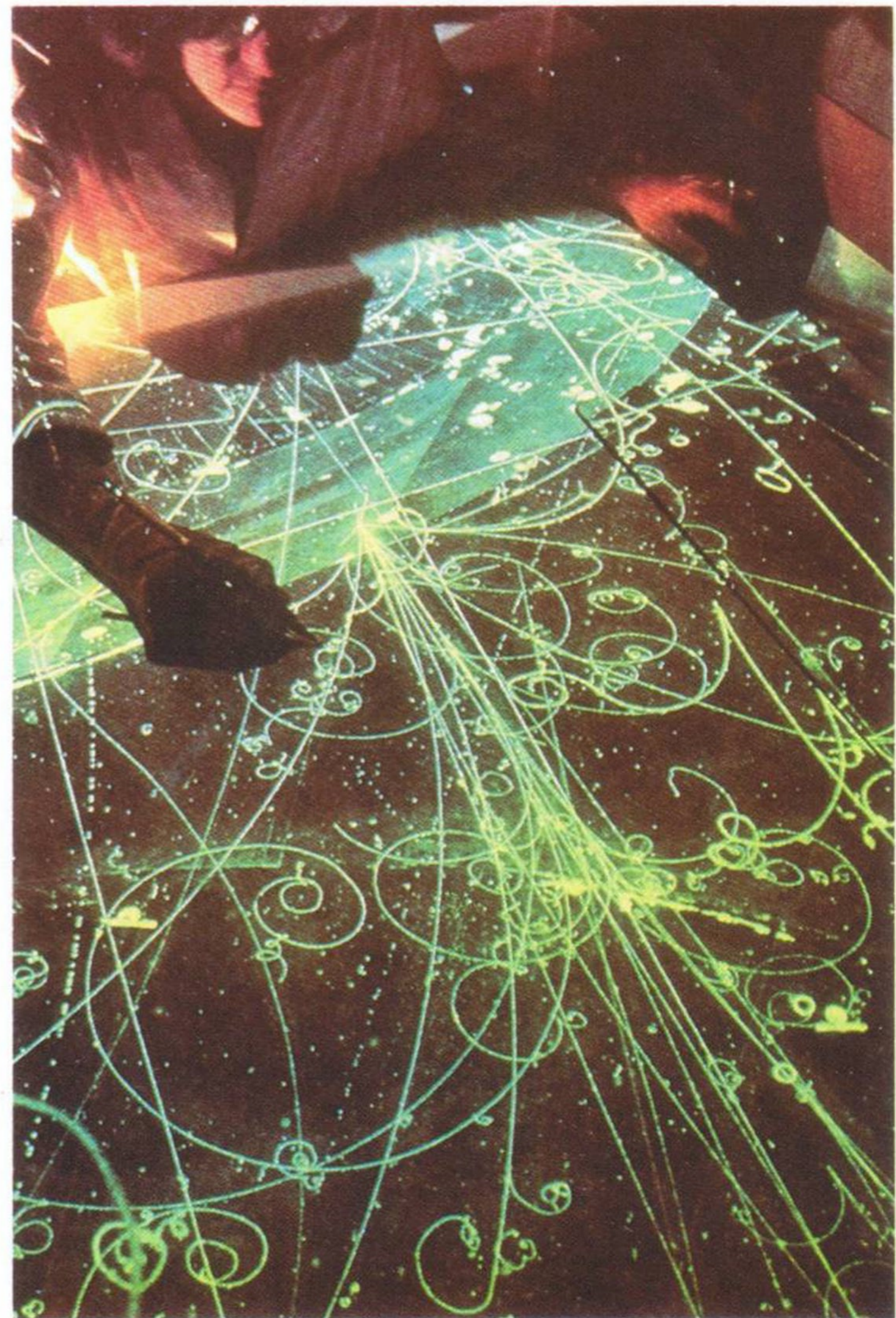
Perhaps the most important feature of this principle is the occurrence of Metamorphosis in living organisms. Let us see why.

Can we understand metamorphosis by dissecting an organism in its phase before this transformation takes place, and on the basis of what we find there and the entities and relations observed, can we explain the process and purpose of that clearly revolutionary transformation? The answer is, “No!” The pluralist method only works for *stable* systems within a seemingly permanent overall Stability. It can neither explain significant qualitative change, nor predict its process and results.

Thus, those methods are incapable of dealing with any of the creative interludes in development, which are properly called Emergences, or sometimes Revolutions.

Pluralism limits us to the stable interludes only, and therefore, can pragmatically assume the constancy of things. At its best it can deliver islands of predictability, but NOT the transfers between them.

Clearly therefore, all the mentioned researches in the New Scientist article are the work of both pluralist and form-led scientists. They seek the mother load in those investigations that they assume will finally explain Everything!



They do not care exactly how they had to arrange things to get their precious data, because coming from a pluralist basis, whatever they would finally unearth would be the unalterable building-bricks of what they seek to explain.

Now, readers of this criticism may well, and with justice, ask, “Well, how would you do it? And, why aren’t you doing it and publishing your results?”

Good questions, without a doubt! But, it is not easy to answer or fulfil an alternative, because it could never be achieved by the usual pluralist, quantitative methods. What is being demanded is a wholly different standpoint, and a consequent fully developed methodology, and that is NOT achievable by a single critic. The crucial questions are, “How do you undertake sound, *qualitative* experiments? And, how do you relate whatever you get with what things will be in other circumstances?”

The current scientists have centuries of pluralist experiments, and both their results and interpretations to use to guide them, but holistic experiments are unavoidably enormous and both time-spanning and time consuming.

Charles Darwin, following an entirely holistic agenda, actually managed to deliver, but to prove his Origin of Species took him decades of study, and in the teeth of opposition from his entirely pluralist opponents.

Stanley Miller proved that amino acids could be naturally produced in his holistic emulation of the Earth’s primaeval atmosphere and weather. But he couldn’t say how it had happened. In ensuring total isolation of his experiment from anything in the present day World, he also prevented his own detailed analysis of what was going on.

Yet even these difficulties are now possible to overcome. In his Nobel Prize-winning research on fertilised sea urchin eggs Hunt managed to take samples throughout the process without in any way affecting the crucial processes, and he was able to study his results as a time-based sequence and hence revealed the crucial factor *cyclin*.

Holistic Science, in spite of the giants mentioned above, is still in its infancy, and with zero support in the Universities, there is nowhere that the funding, or the facilities required, can be found to do it.

NOTE: Nevertheless, this theorist has defined a new holistic version of Miller’s Experiment, which could indeed, overcome Stanley Miller’s difficulties, and, like Darwin, gradually reveal what is required in such normally unanalysable experiments.

Is Space an Empty Void? Or is it both Active and Full? And how this question has determined Physics for centuries

Since Mankind first pondered the Heavens, and finally began to see it as a three-dimensional space, the question has been and repeatedly and regularly posed, “Is Space totally empty, or is it filled with some ethereal substances actually delivering the things that we knew were appearing in it or crossing it incessantly?”

And, such speculations were certainly not groundless. For, on the one hand, something must be capable of delivering the gravitational pull that keeps those heavenly bodies moving upon their ordered paths, while, on the other, anything substantial existing there would surely get in the way, and significantly hinder and indeed change such trajectories.

So, various hypotheses, meant to address the first of these, were constantly replaced by others that kept Space totally empty.

Many early myths were successively demolished by both new evidence and tighter reasoning, until a more long-lasting solution was one that seemed to deliver both seemingly contradictory requirements from a single conception.

It was, of course the *Ether*, which filled the whole of space, with a massless, charge-less, invisible, yet elastic medium, incapable of significantly reacting in any way with moving bodies, but disturbable due to its elasticity, and so capable of propagating light.

Though, as usual, and after a long reign, it was finally dismissed as an invention, and the alternative of a totally Empty Space was again vigorously proposed as being vastly more likely.

Now clearly, these alternatives could not but affect our ideas upon other things – the Nature of Light being the most important. And, though abundant evidence was available for Light to be wave-like, its propagation through a totally Empty Space caused scientists like Newton to suggest that it must be composed of particles, which were impelled with a speed, that according to his own Laws of Motion, would allow it to move across the Void forever.

Bur, such solutions could never accommodate all the contradictory facts that were, it seemed, incontrovertible.

And, “solving” one question would only prove totally inadequate in addressing another. Indeed, the more subtle and advanced were our investigations, and even the more we actually knew, the more certain it seemed to be that a single set of ideas could never accommodate all the phenomena that had been revealed.

To have any chance at all of transcending these evident dichotomies, we must be clear what we have insisted upon as incontrovertible facts, principles and assumptions. And perhaps, by such means, reveal what questionable assumptions may underlie our standpoint, which are, at present, clearly leading us astray, and hence must be replaced.

Light certainly crosses the Void for absolutely colossal distances, and seems to travel unaltered for almost unbelievable periods of time. Yet its speed is supposed to be constant - as if Space itself was somehow mediating all such propagation, in the same way everywhere. Yet also without, in any way, detracting from it at all. That is the crucial dichotomy!

But, after Newton, we surely also had the Universal Force of Gravity reaching far across that same void and affecting every known and measureable heavenly body significantly, without any *means of transmission*. Yet also they seemed to be again totally unaffected by any suggested separating content for that Space.

Clearly, both the Propagation of Light and Action-at-a-Distance were, and still are, unexplained by a Totally Empty conception of Space. Yet, in spite of the most carefully devised and carried out experiments, absolutely NO means of delivering these phenomena could be found.

After centuries just living with these unanswered questions, another complication was added to the mix. Cosmological observations failed to tally with the Laws of Motion as applied to the contents of Galaxies. And the only way that vast numbers of stars could be prevented from just shooting off from Galaxies, was by suggesting the massive presence of a undetected amount of Dark Matter, sufficient to enable Gravity to do its work and keep those Galaxies together and stable. And, guess what? Nobody has been able to detect the tiniest sliver of this precious substance anywhere, in spite of it supposedly being present in absolutely enormous amounts (estimated to be 85% of

all the matter in the Universe). The experiments currently underway to find it are almost laughable, as they clearly seek the odd, stray particle of this supposedly universal substance, as if it was the rarest of the rare!

And, the theorists are no better. In their usual way, as they continue to do in their attempt to reveal the original creation of Matter by seeking the Higgs' boson, they also seek the definition of yet another sub atomic particle to explain this proposed Dark Matter.

A critic may justifiably wonder why they do this, rather than re-addressing their inability to reveal the nature of Empty Space. But it is all they know how to do, since the overwhelming domination in experimental work of seeking new particles from ever more energetic accelerators. Nowadays, it seems, they know of almost nothing else!

And, following this added impasse, came yet another. Inexplicable anomalies in the speed of expansion of the Universe were found in the most distant regions of the Cosmos, which seemed to indicate a definite acceleration there, and hence begat the idea of Dark Energy, which for some reason was only evident in these far distant regions, and was there pushing those areas away at ever increasing rates.

Yet, perhaps the most amazing discovery, that surely involved the Nature of Empty Space, was of so-called Pair Productions, when an electron and a positron seem to emerge out of absolutely nothing material.

It was suggested that this phenomenon might have come from a particularly energetic Photon of pure energy. But, such Fusion could not be equated with Nuclear Fusion, so as to how this could occur, is merely a speculative guess, rather than any sort of explanation.

Now, all of these could not have happened at a worst time for theoretical Sub Atomic Physics. For the suggestion of a physical unit of energy devoid of any material content – the Quantum, as a direct and permanent replacement for the usually assumed infinite, waves of pure energy alone, that were supposed to be electromagnetic Radiation. Though its discovery did solve several crucial dilemmas in that area of Physics, it also created a whole new set of others, which were, it seemed, impossible to solve. The theoretical result was the largest, wholesale retreat in Physical Theory for centuries.

Indeed, there had always been a dichotomous pair of distinct approaches in Physics, which had uncomfortably co-existed for several centuries. The first involved quantitative experiments, with the aim of finding formulateable laws – Equations, which could be used (in the same circumstances) to predict subsequent behaviours on the basis of extractable past behaviours, embodied in a Formula.

While the second was an attempt at a causal and qualitative explanation of what had been revealed. And, surprisingly, these did both persist and were effectively used. If you needed to make productive use out of a discovery, you went directly to the predictive formula. But, if you had to explain what was going on and fit the phenomenon into a wider, integrated and comprehensive overall view (in other words get a handle upon why things happened the way that they did), you could only go to the qualitative theories that had been put forward.

But, these two were not such complementary and mutually supportive bedfellows as we had always assumed - for they didn't deal with exactly the same things at all.

Let us see why!

The real, direct offspring of experiment and extracted equations as such was NOT theoretical Science, but pragmatic Technology!

To use an equation, the exact conditions under, which it had been extracted had to be precisely replicated, and Engineers became the masters of doing this, and both conceiving of, and successfully building-up the most enormous and new technologies to enable their effective use.

But, what the theorists did was much more general.

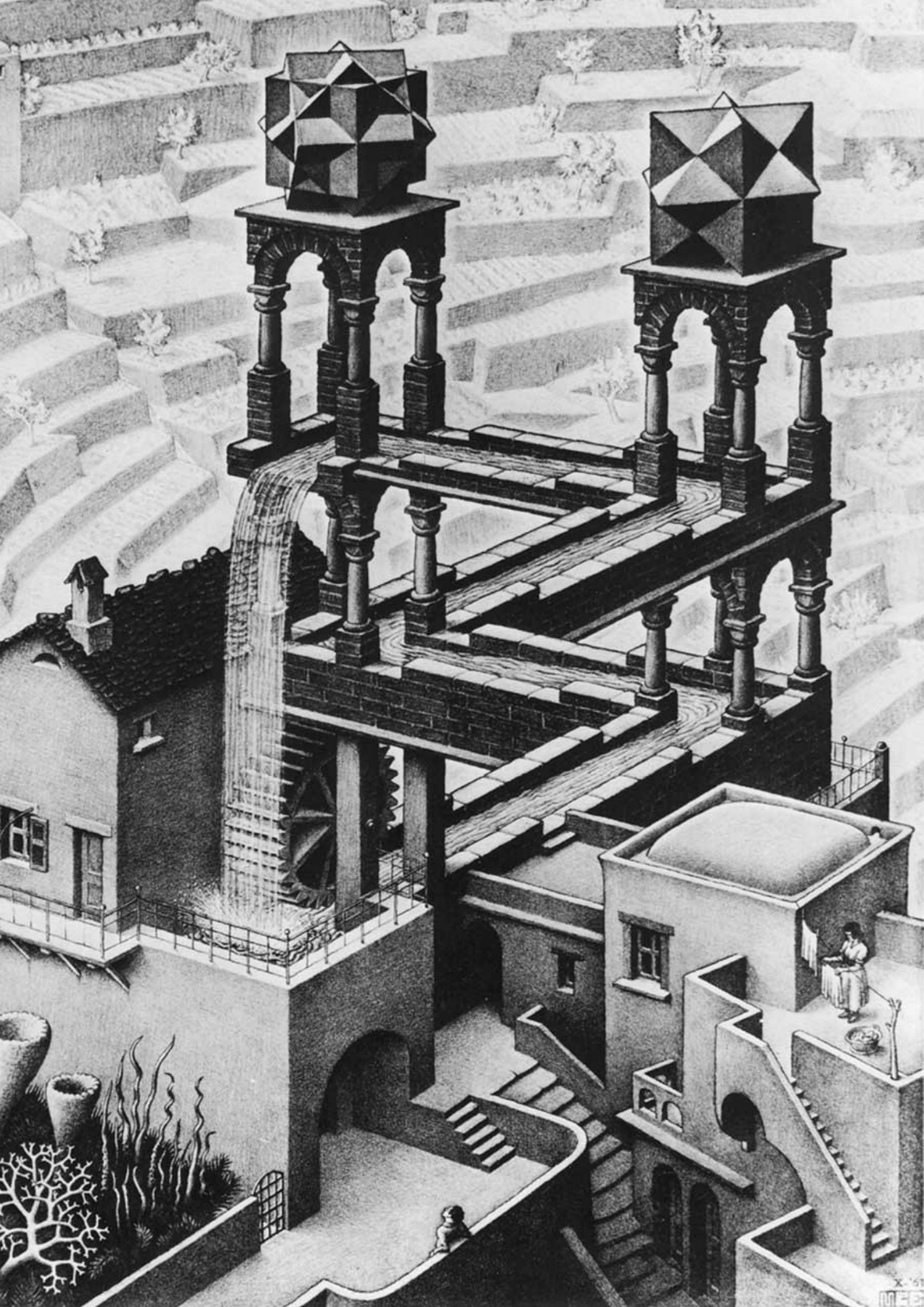
For, they attempted to explain phenomena in terms of the substances involved, their properties, and their consequent causal effects. They did not worry about rigid and necessary conditions, but gave the greatest attention to an alternative set of criteria, which to them were paramount. They of course, if they were also the experimentalists, had to arrange their experiments to reveal what they sought, but they were not involved in discoveries-for-use, but discoveries to extend understanding! Their "use", for what they revealed, was, primarily, as yet another brick in their objective edifice of a general understanding of the area under study.

Both types of scientists sought the Natural Laws acting within phenomena, but for different reasons. For the engineers immediately conceived of valuable uses of the new Laws to some productive and profitable purpose, while the theorists used what they had found to extend their understanding and define what next had to be addressed. The theorist built new understanding out of what they already knew, plus what extra they could find out. They employed very different imperatives!

Now, we have to consider these two approaches philosophically!

For the quantitative/equation approach may seem to be the closest to Reality, because it is that which has to be used productively. But, in fact, the opposite is the case!





For, in so carefully constructing and maintaining an ideal situation from which to extract a purely formal relation, the first kind of scientists were not dealing with Reality-as-is, but with an appropriately farmed version - carefully contrived to enable them to both see and extract an abstract quantitative relation. It was not, and never could be, the real relation pertaining in totally unfettered Reality, which would be a nexus of physical causes, but a ideal relation revealed by a perfectly engineered and maintained set of circumstances: indeed, an arrangement that removed as many affecting factors as possible until something unambiguous and simply formulatable was all that remained.

Now, such a technique was, of course, fine for revealing a possible single use, for all that was then necessary, was to replicate those same circumstances, so that you could use the extracted relation to some intended purpose, and it would then indeed deliver!

But, glaringly, what had been extracted was NOT a mutual interpenetration of many causes and effects – a Real Physical Relation, but instead a single and entirely formal (quantitative) separated-out one.

And, crucially, the very same relation could be, and indeed was, found in many quite different variously farmed areas of Reality, with very different, real and physical causes.
NOTE: Its very universality meant that it could never be an explanation for any particular manifestation of its many occurrences.

What was actually in their hands was only an Abstract Form, which would occur in all sorts of causally unrelated circumstances. To raise such a relation to a so-called explanation is inevitably a major and misleading mistake.

Now, to compound this felony, a wholly separate discipline had long ago arisen, millennia before anything resembling Science had been achieved, which concentrated exclusively upon these purely formal relations alone and in their own terms: Mathematics! And this “view” of the World settled exclusively upon the universally present laws, as being the disembodied essences and indeed the drivers of concrete Reality. The discoverers of this area, the Greeks, believed that the whole concrete World behaved as it did, because it was driven by these eternal, abstract laws. And, because of this, their studied World was NOT Reality, but a World composed exclusively of these perfect, formal, and indeed ideal, relations. They studied not Reality, but this idealised and purely formal fantasy world! And it was perfect and consisted only of purely abstract Forms, and absolutely nothing else!

NOTE: Even in that time of Ancient Greece, this kind of idealisation was considered to reveal the motive essences of Reality as being only these perfect Forms.

From the outset the Idealist versus Materialist alternatives were insisted upon by opposing camps. Within its constraints the original mathematicians discovered a much more tightly interrelated World of Pure Forms alone. Indeed, the most sophisticated logical systems ever developed by Man were already at a high level even in the time of the Ancient Greeks. Euclidian Geometry was, without doubt, a work of genius. But it wasn't about totally unfettered and intrinsically physical Reality or Reality-as-is. It was only formal relations consciously transferred to a perfect and purely formal World.

Now, after that surprising detour, we must deal similarly with the explanatory approach. For, it is certainly not the same!

The first thing to notice about it is that in all its “Theories” there appears no mention of conditions. It attempts to deal with Reality-as-is in terms of known unchanging substances and their constant properties. And, surprisingly, even though they could never nail down their explanations completely, they correctly identified so-called “fragments of truth”, which they could relate to one another into acceptable explanations.

And though these were never the total and absolute truths of the World of Pure Form, they nevertheless always contained sufficient objective content to represent a real step forward over prior and now superceded alternatives. So, Scientific Theory is never absolute: it is always improvable!

But, notice the comparison with Mathematics – for that ultra-selective discipline did indeed deal in Absolute and Universal Truths, but only when dealing with Form. Even in the best equations absolutely NO explanations could possibly be included. Anyone using only such formal factors to explain anything is clearly an idealist: they are crossing the gulf between formal relations and concrete Reality and supposedly explaining the concrete and materially-existing solely in terms of the formal.

It, of course, cannot be done, but they are sure that it is the Formal Law, which drives the Material phenomenon.

The attitude of such mathematicians to explanatory scientists was therefore hardly complementary. For, while they, the mathematicians, were dealing in absolute imperatives, the scientists, in contrast, were quite clearly “always wrong”, and forever having to improve and update their theories. But remember, they were always attempting to deal with Reality, and not just Ideality!

NOTE: Now it may be wondered why these alternative approaches were both, though in very different ways, unable to deliver everything that was needed to deal with the World. Why, for example, was Mathematics so absolute, while Science was always insufficient? But the inadequacies in both approaches resided in the same underlying Principle – that of Plurality! The shared emphasis in investigating Reality in both was to extract from it its determining features, and the paramount method was to increasingly and successively simplify situations until certain relations were clearly evident and could be isolated and then extracted. This, initially, seems fine, until we consider what we could do with out extractions. And it was at this point that both sides made the same mistake! They assumed that what they had extracted was the very same as pertained in totally unfettered and uncontrolled Reality: we considered them entirely separable - totally independent of context. That is the Principle of Plurality and it is untrue!

Now, after this necessary philosophical interlude, we still haven't finished yet with the difficulties.

We must return to the calamity of the quantum!

The famed Double Slit Experiments brought the long-standing, but loose, alliance of experimenters, mathematicians, engineers and theoretical scientists to an end!

Science itself split into mathematical/scientists and explanatory/scientists, and at the Solvay Conference in 1927, the former (maths-led group), led by Bohr and Heisenberg were victorious over the latter (explanation orientated group) led by Einstein. And, a wholly new standpoint was promoted by the victors, which severed all mutual cooperation with the "old school", who were condemned as dealing in incorrect self-kid, with no real fundamental, eternal or indeed essential content – for that could only be extracted and dealt with by the standpoint of their faction alone.

Effectively, Explanation was banned from Sub Atomic Physics as impossible to ever be achieved, and to also be inherently counter-productive! From that point on, only Form was considered primary! The World was considered to be driven solely by eternal Formal Laws.

Physics had been converted to Idealism!

Now, in case the reader has forgotten, our initial question at the beginning of this essay was about whether Space is empty or not.

The Wave/Particle Duality of the followers of Bohr and Heisenberg (usually termed the Copenhageners) could only be defeated it turned out, by assuming the filling of Empty Space with a paving of discrete entities.

So, this must now be the next phase in these considerations.

We must see what effect this had upon Sub Atomic Physics when it was confronted with the Double Slit Experiments. Let us concentrate upon one of these and relate what it delivered.

It had long been known what happened when Light was applied to a closely situated pair of slits. For the two emerging beams of Light interfered, and a corresponding pattern was delivered to a final detection screen situated beyond the slits. Then, some enterprising physicist decided to replicate the experiment but using electrons, rather than Light. Surprisingly, he got the very same pattern at the detection screen!

But particles aren't waves, so how could this occur?

Clearly, something odd was occurring in the region beyond the slits, so a detector was placed there, and as soon as this was done, the pattern at the detection screen vanished, and was replaced by exactly what you would expect from such a stream of particles.

No one could explain this anomaly!

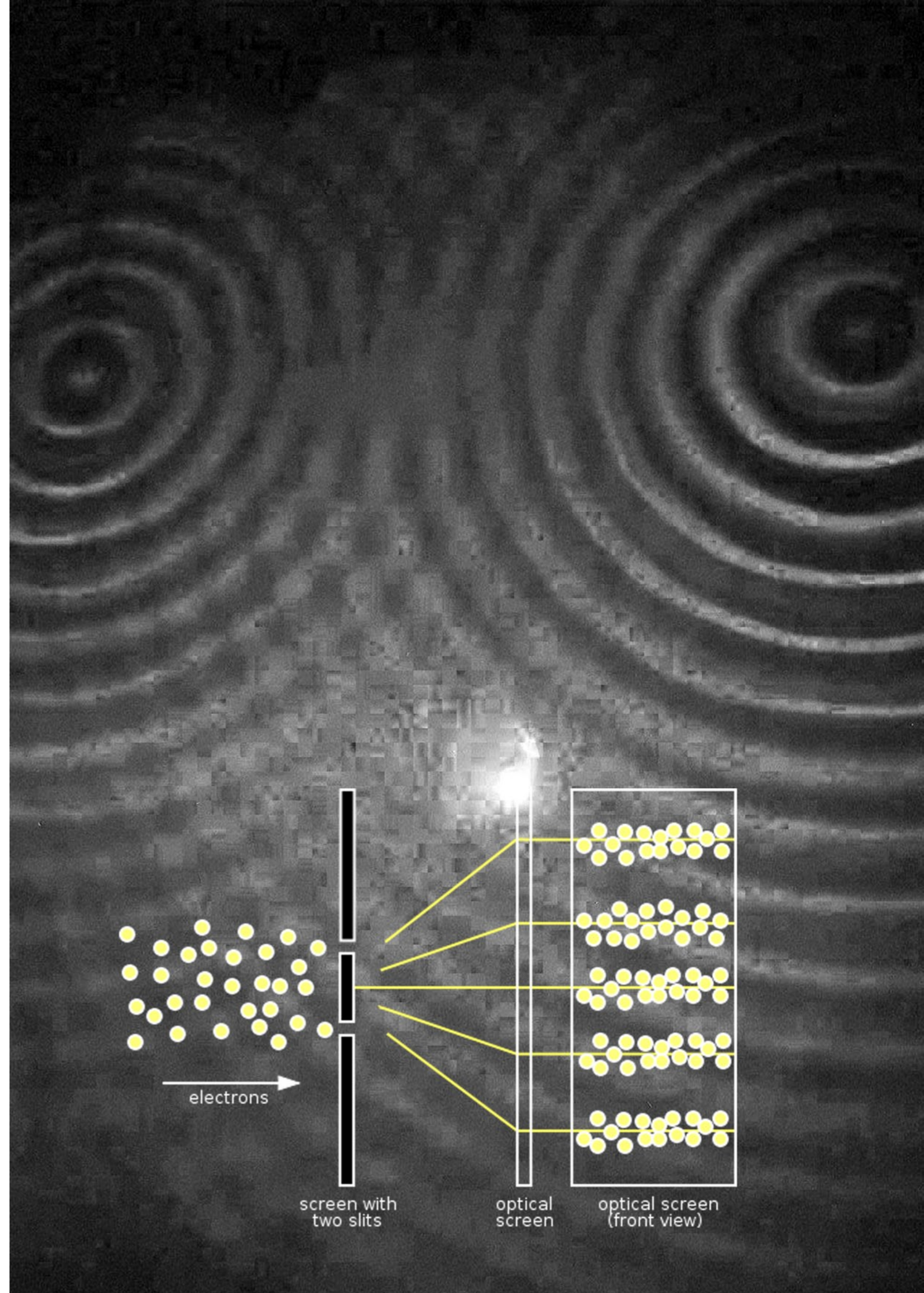
The stream of electrons could only act like a stream of particles OR like a system of waves. Thereafter, all sorts of modifications to the experiment were tried but nothing could remove the basic anomaly.

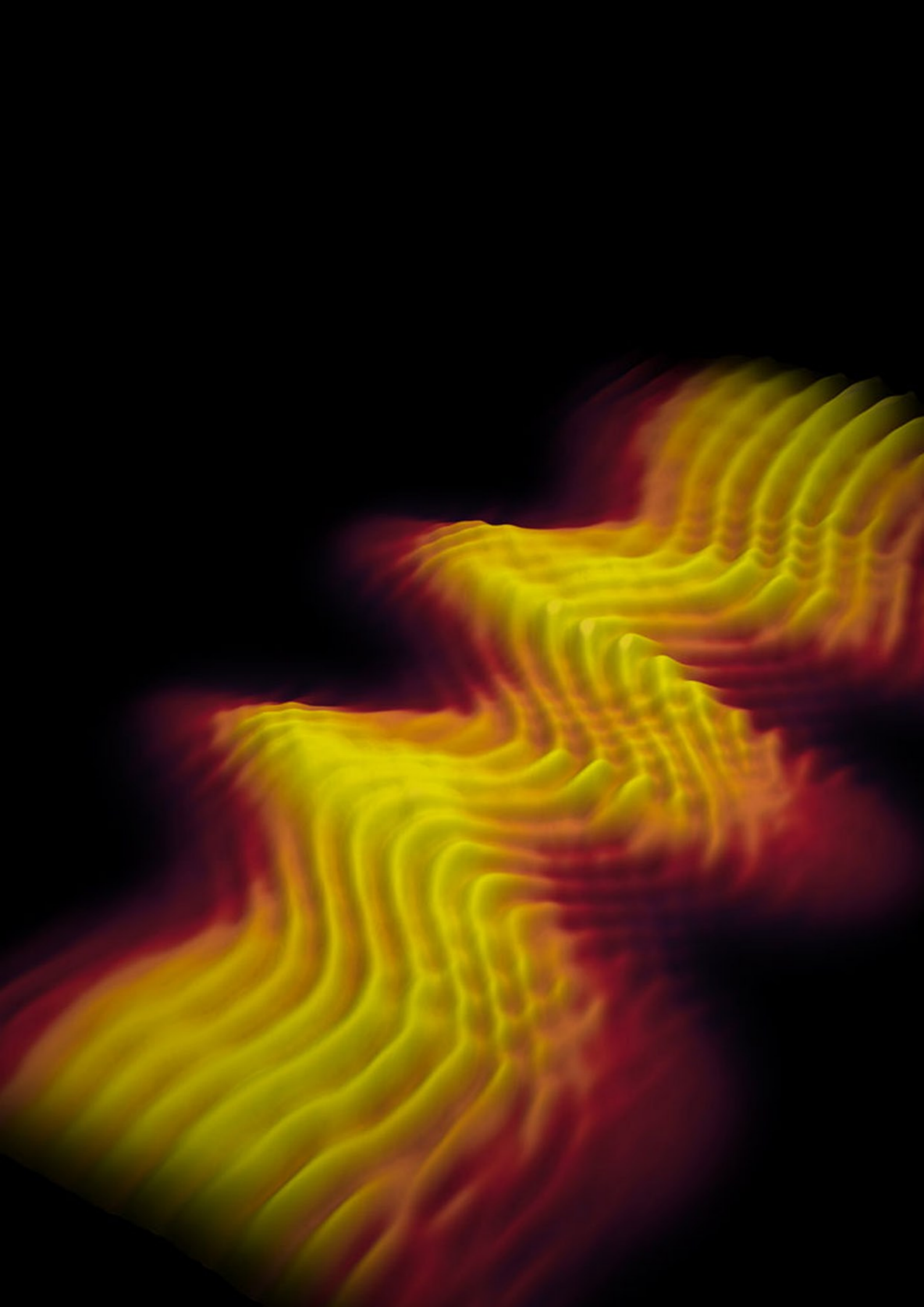
Now, the mathematical/scientists had a problem, so they attempted to solve it in terms of Forms they were already familiar with, and the one that fitted was based upon waves: it was Schrödinger's Wave Equation, and its set of solutions, its Wave Function. But it didn't do what was usually required for predicting the trajectory of a single particle, as was usually required. It delivered, instead, only probabilities for the electron to be in all positions on all possible trajectories for a given time, and remarkably they matched perfectly with the cumulative pattern on the final detection screen, when many electrons were used. It was, of course, a purely formal frig, but it delivered usable results, but of course, absolutely NO explanation!

The Copenhageners then took another giant step deep into Idealism, with the conception of the wave equation collapsing, because it was attempted to be observed, and torrents of similar idealist speculations then ensued.

Clearly, what was needed was an explanation in the way that scientists had always addressed such things, but such "self-kid" was now banned by the Copenhageners.

Yet, believe it or not, the anomalies could all be explained by the assumption of a **Paving** of the assumed Empty Space within the experiment by discrete particles, which though





undetectable due to equal quantities of both positive and negative charges, and of ordinary and anti matter, could deliver an explanation.

For this paving would be susceptible to being disturbed by the moving charged particle – and could then carry electromagnetic energy so inserted into the paving ahead of the electron and through BOTH of the Slits to “interfere” on the other side, and be maintained there by the moving particle, until the particle finally arrived passed through ONE of the slits. Such a situation meant that on encountering the “interference”, the electron was deflected, or not (depending upon its path through the pattern) to finally arrive at the detection screen consistent with the observed pattern.

NOTE: Clearly, such a brief description does not detail exactly how the elements of the paving were affected, but that was straight forward when the internal structure of the individual paving elements was taken in account.

The mutually orbiting electron and positron, which was the form of the paving units, could indeed, without even moving pass on disturbances by induction to deliver all the described effects.

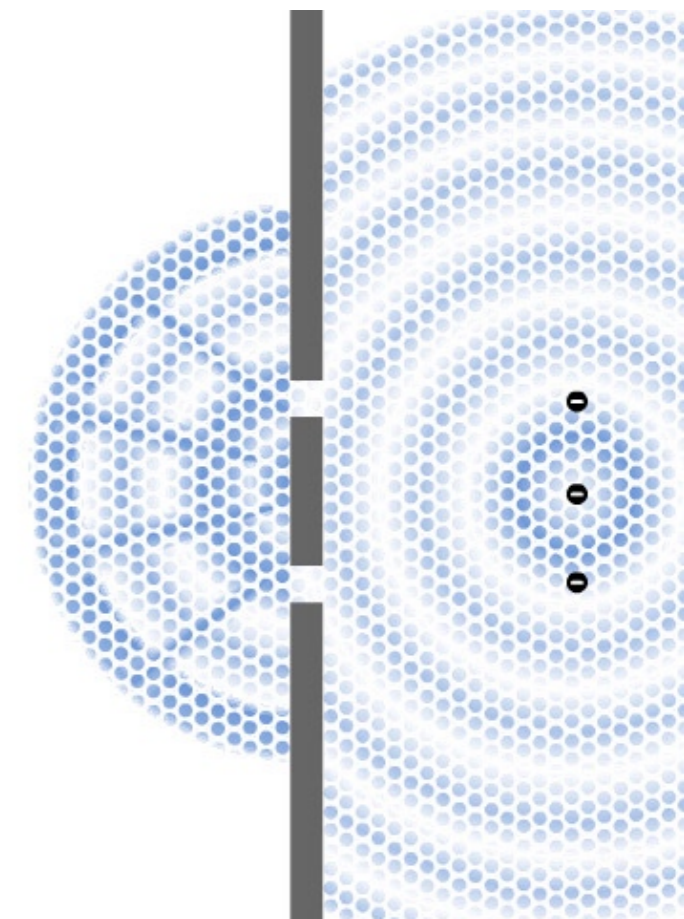
*For those dissatisfied with this cursory explanation, the writer must admit that what has been delivered here is certainly insufficient, but has been available, in full, for some considerable time on the Internet as a Special Issue of the SHAPE Journal with **The Theory of the Double Slit**, and an animation on the SHAPE Channel on YouTube, plus an extended series of posts on SHAPE Blog.*

Now, any insertion of a detector in that region beyond the slits would itself, and unavoidably, cause multiple and diverse disturbances in the paving and inevitably totally dissociate the interference pattern caused by the electron. Consequently, the electron when it arrived beyond the slits, would not encounter the simple, ordered, interference pattern, but instead a chaotic one, and there would be nothing to reinforcingly deflect its path, and the pattern at the screen would be as it was.

So, once again a new hypothesis for the Nature of Empty Space had “cracked” a seemingly inexplicable phenomenon, but such hypotheses could not but require extension into other important difficulties. Could the proposed unit of paving (or something similar) also deliver the propagation of Light through Empty Space, and even Action-at-a-Distance (in particular the seemingly infinite gravitational and electrostatic fields?)

Shape Journal comissioned an animation which attempts to illustrate this Holisitc explanation of the Double Slit Experiment.

Watch it here.



The Establishment of a Universe-Wide Paving of Space

Of course, any theory that suggests a filling of Empty Space must also explain how such an enormous substrate was both created and distributed across that almost infinite expanse, as well as its composition and its evident total undetectability. And, without any doubt, it must also be consonant with those widely accepted theories that “explain” the origins and distribution of everything else happening across that Universe.

Yet, in a sense, that should make it easier, for no one doubts (these days) that the Universe did emanate from some tiny starting point many billions of years ago, to not only spread to its present extent, but also to have created literally everything in it as it went!

We must start with the so-called Big Bang!

For, any purely formal theories, such as that commencing with a Physical Singularity, and proceeding via Inflation and a following Creation and Expansion of Space itself (from Nothing?) must be rejected as merely formal moonshine, and on a par with Parallel Universes and warped spacetime. For these are purely mathematical Forms that have infiltrated such theories and necessarily have abandoned physical explanation for Form alone, as if Shape alone determines everything else! And if we, as we must, turn our backs resolutely upon such formalisms, we must do what physicists have always done, and find concrete physical explanations for what has occurred, and not hide behind one or another of the Formal Truths of Mathematics.

NOTE: There is another, and perhaps an even more important reason, for this course of action. For though, over very short time periods, and in tightly controlled localities, we can effectively use the methods we have developed over centuries, they will most certainly fail, in addressing the sorts of questions posed here.

For such a colossal trajectory of Growth and Development is well outside the possibilities inherent in our present assumptions, principles and consequent methodologies. For, such things cannot be contained within any sort of Stability. Indeed, what will most certainly dominate will be the qualitative transitions that delineate the various phases of Development, and how they came about – one from another.

Rather than the pluralist assumptions of past Science, the new approach will be more akin to the best of Biology and Social Development, the prototype for which has to be Charles Darwin, with the breathtaking methodology

he employed in the final realisation his Origin of Species. Clearly, what we must address is also about origins – layers and layers of them forever creating the wholly new, and not only producing the Universe and Life itself, but also Man, Consciousness and Societies.

That is NOT what physicists ever attempt to do, and their current theories, when they are not just formal speculation, are always severely constrained within what is currently known or what can be currently revealed. They haven't the faintest idea of how to address *Creation* of any sort.

Thus, we can only start with some sort of Cosmological explosion (related to a supernova, but not of a single star, but of a whole collapsed Universe). And, if that was indeed the Start, then all assumptions about Pure Totally Disembodied Energy, Quantum Fluctuations and Eternal Equations must be rejected. And this probably unique Event attempted to be analysed in terms of both Energy and Matter as the detritus of such a mammoth collapse, and instead of randomness and regularity, we should assume instead a fundamental irregularity and asymmetry to the processes involved from the outset.

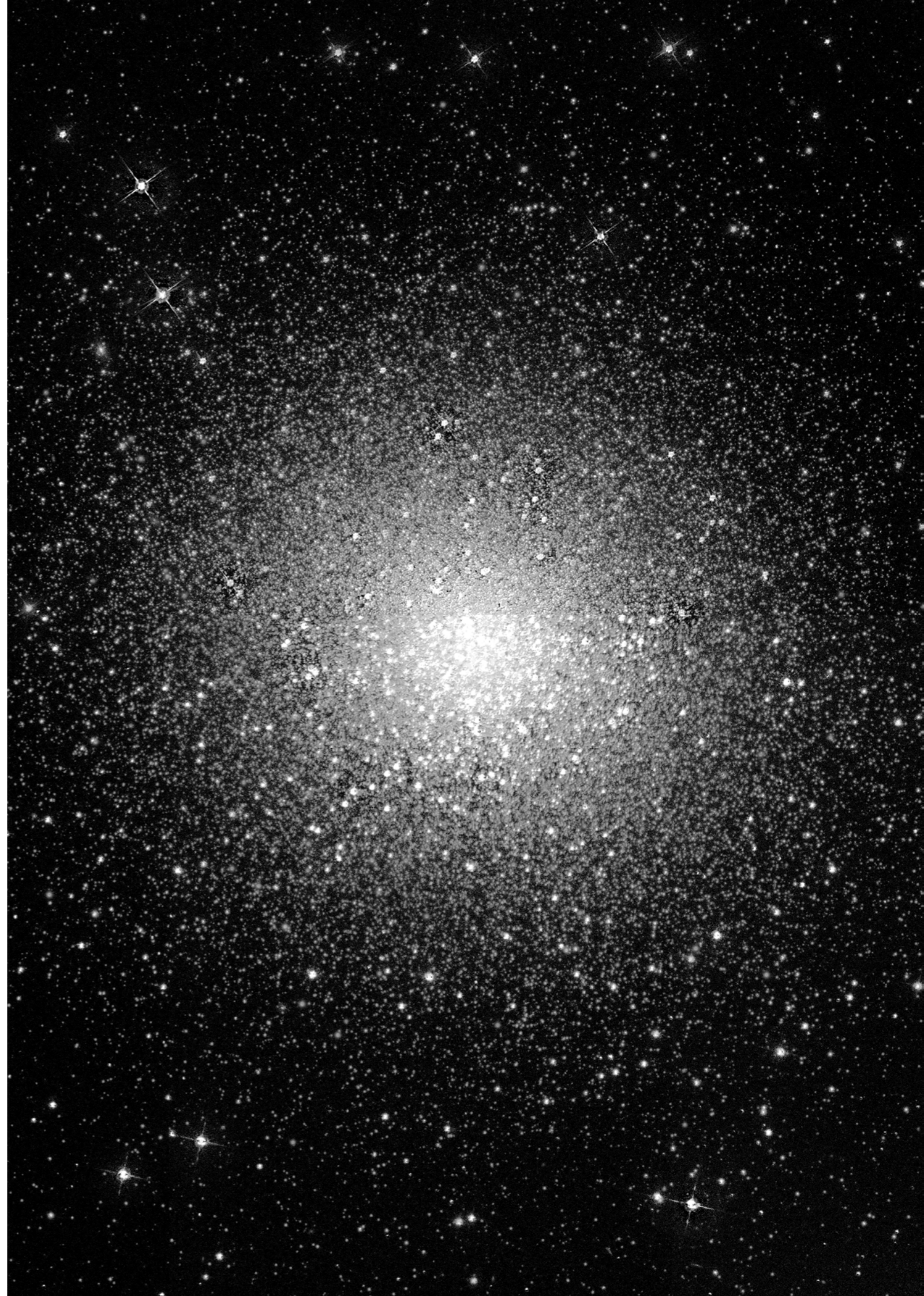
After all, the surmises of the maths-led cosmologists, dealing only in known Form, have backed themselves into the very same cul-de-sac as their mentors – the mathematical physicists of the sub atomic area of study, who embraced Idealism at Solvay in 1927, and have ever after sought meaning in Form alone!

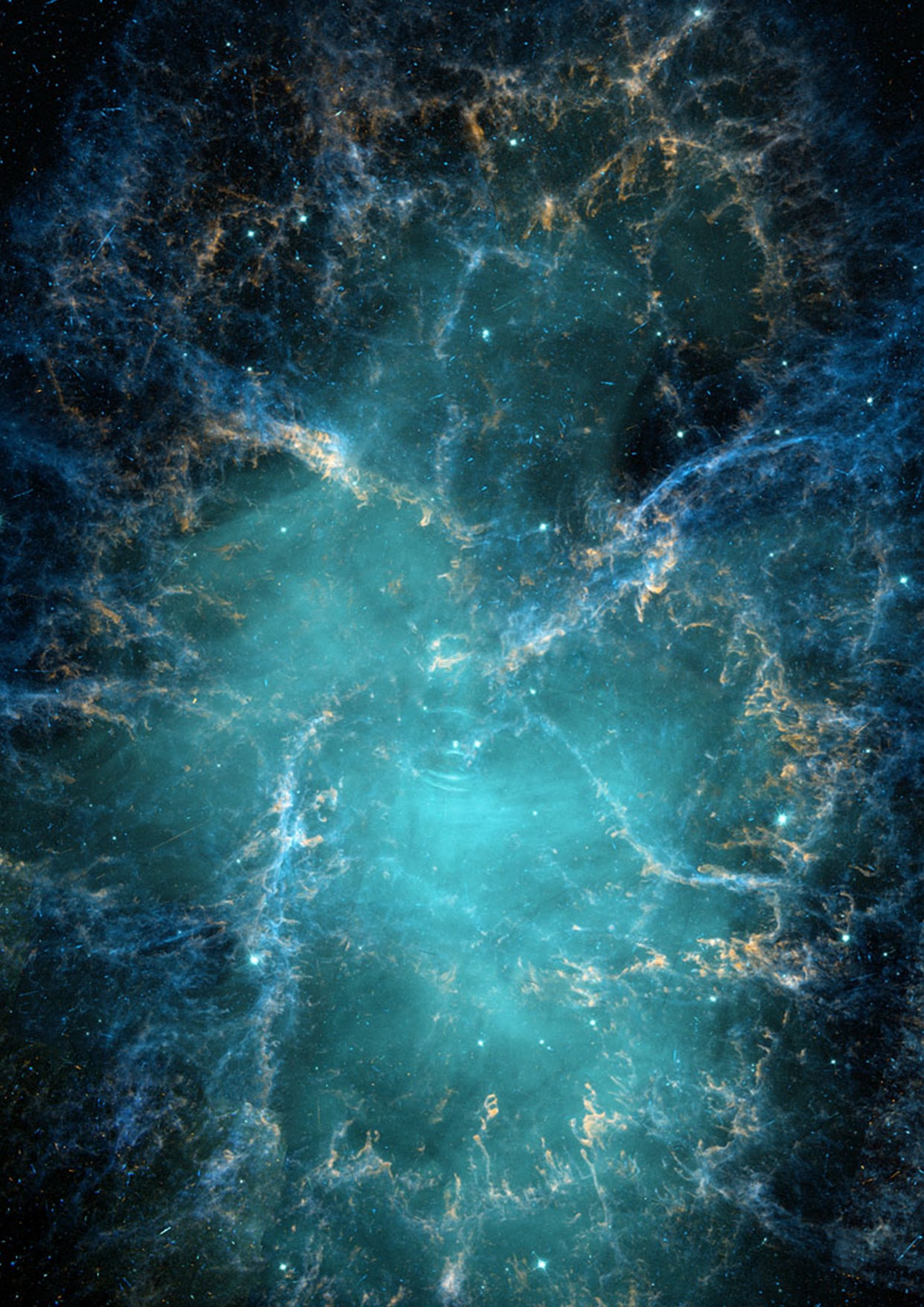
They were, and still are, mistaken, and the new future for those vitally important disciplines is not only a rejection of Copenhagen Idealism, but also of the false conception of Reality based squarely and solely upon the Principle of Plurality. And, indeed, start again with a standpoint that is both resolutely Holistic and Materialistic.

The brilliant gains of holistic scientists, such as those of Charles Darwin, must now be applied to Physics, and a new non-pluralist methodology developed, which can deal with the real, holistic World that actually exists.

Let us suppose that the Big Bang was indeed the result of a Universe-wide collapse of absolutely everything subject to Gravity, along with the principle that Energy cannot exist without Matter.

So, over a previous vast period of time, the whole of a previous universe had collapsed down to finally home in towards a single final position.





And, we can indeed, make very well founded predictions as to what will happen during both the overall collapse, AND in its final termination.

We can use our knowledge from such events in stars, where every single such collapse passes crucial thresholds and allows new processes to not only halt the seemingly endless process, but also reverse it into a newly powered explosion. And with a whole series of these from those of young Hydrogen powered stars, all the way to an Iron-caused termination of the series, and a final Supernova, we can consider further stages at present impossible, but, without doubt, quite likely in the distant future- a seemingly final and wholesale collapse of our Universe too.

If the experiences of present day accelerators teach us anything, it must be that the results of such a collapse will surpass anything we know about or even conceive. But, crucially, it will never be totally even or symmetrical. It will be entirely uneven and asymmetric, and this will allow all sorts of entities from all sorts of past situations to survive right up to the dramatic turn around.

So, instead of absolutely everything ending up as Pure Disembodied Energy, there will also be an abundance of different forms of Matter too. And, if our chosen new principles are correct, it will be these new fragments of Matter that will embody ALL the energy created by the collapse. A mode of existence of Energy and Matter unlike anything we currently observe will be this in absolutely colossal quantities, and it will be the driver of the explosion.

It will be these that are initially exploded outwards into what had been turned into Empty Space by the total collapse. The first outward pulse would have been of an almost continuous flow of these minimal particles of matter, packed with their maximum load of energy both internally (in promoted orbits as in atoms at the present time), and externally with very high speed and hence associated kinetic energy. And these will move out from that most concentrated source into nothingness, and with a certain and sequenced series of changes of phase, due primarily to their dramatically changing conditions as they went into greater and greater volumes of that Space, causing the concentration to decline along with decreasing speeds, due to the backwards gravitational pull of the vast bulk of matter still present and behind the outward moving front.

Now, as we know, even from our very limited experiences, and whether such conditions are intensifying or reducing, Reality goes through very different Phases or Modes, each with very different Laws. So, we must assume that the same sort of changes will have occurred during that expansion. And, as those happenings will not be symmetrical, or even various different localities will occur, wherein local conditions will also create their own local phases,

different in timings, if not in overall sequence, from others happening around it. For, though a location's contents may be careering outwards at truly colossal speeds, their individual internal and relative speeds will be very much less, and they will tend to aggregate together from the outset.

Exactly what the propelling energy was may not be clear, but once a particle of matter is moving it will certainly have kinetic energy, and presumably, apart from collisions, there should also be a chance of both individual spinning and mutual orbiting. For, as subsequent experience has shown, such phenomena are both frequent and indeed stable, and will continue literally forever, if not subjected to external interference. Any collisions will certainly widen the range of directions imparted to the material fragments, so conditions for stable orbiting in given local concentrations will surely occur.

So, let us assume multiple instances of such orbiting pairs being formed, even before the first Hydrogen atoms came into existence. What could these pairings be composed of? Could they, for example, involve an electron and a positron - the first of ordinary matter carrying a negative charge, and the second of antimatter with a positive charge, and thus form a joint mutually-orbiting pair? Now, they may well have existed at that time in the past, because we know that such pairings can indeed occur, for they have been observed in present-day, high-energy accelerators, and named as positroniums. Of course, in those observed cases these temporary unions almost immediately dissociated again into their component parts. So, we should assume the same must have occurred in the fast-moving, high-energy initial phase of the expansion of the Universe.

Yet those conditions, which guaranteed the dissolution of the positroniums, would certainly in time subside. The joint particles would exist for longer, until, at some stage, they could be considered stable, and would no longer dissociate due to the gradually changing conditions. Indeed, when lower interchanges of energy occurred, the pair might well continue to exist, but accommodate the inflow of energy by a promotion of their mutual orbits (as we know for sure happens in atoms in our present World). And, if there were sufficient of these forming literally the whole of the expansion front, they, as well as an overall decrease in speed away from the origin, would also be subject to local influences, especially in localities, where the local total interactions might well outweigh those back towards the source. The joint particles may move towards one another, and settle into a paving, in which "locally" they would be stationary.

Now, of course, this scenario has been ignoring what was happening behind this first flush of outwards moving fragments of matter, and these conditions would certainly be different from what might be occurring elsewhere in that vast expanse. Within the bulk of the expanding Universe

increasingly large aggregations that would lead to large particles, that could certainly not occur at the front, where on one side was nothingness, and on the other, only these very simple net charge-less and net matter-less particles were all that were present. A paving of these entities seems more than likely, for they would likely be the first material entities from the Big Bang to run out of kinetic energy

due to the backwards pull of the Universe behind them. If so, they would begin to slow down, and then begin to move backwards. The resultant Paving would no longer be careering outwards, but might well concentrate into a substrate upon which everything else that might be happening would then be predicated.

Explanation

What exactly is an explanation?

Well, before we go any further, I must insist that it most certainly is NOT a mere description! Nor is it a naming, or even a categorisation. For a description can't answer the question "What?", and even that of "How?", usually involves, in its most powerful form – the equation, only non-qualitative features, and it can deliver absolutely zero in answer to the most fundamental question of all - "*Why?*" Also, believe it or not, these very different processes are often confused. For example, an Equation is a rather concise yet broadly applicable description of the behaviour of parameters in a given situation, which can, therefore, encapsulate the produced pattern, and allow predictions as to what will happen in certain given circumstances. But it can say nothing as to why that is the case.

Yet, increasingly at the present time, if you ask that key question to a scientist, he or she will invariably just give you their derived equation. And, if you emphasize you want to know exactly why, you will get the answer, "Because Reality can do no other than obey this equation – the Natural Law, and that is why!" But, I'm afraid that though we can pragmatically get away with such a conception, it cannot possibly be true.

NOTE: For example, predicting that nine months after conception, that a human baby will be born, is NOT an explanation at all, but a description involving a reliable prediction. An explanation would involve showing why that "law of reproduction" exists in Mankind, and would detail the causal factors, their properties and interactions, and also why they don't always work, yet often do. Explanation, in that important area, will always be being added to, and in comparison, the "Nine-Month Law" is trivial.

A disembodied formal law – indeed an abstraction, cannot drive concrete Reality. That is pure Idealism. We may well be able to formulate it that way and even in appropriate circumstances, use it effectively. But, if we are to integrate what is happening with the way Reality is in all circumstances, we have to go beyond superficial Form. For, whereas the conformation of the use of an equation is restricted to its practical application in appropriate situations, the purpose of Science, is the gradually constructed edifice of Understanding- a self-consistent and comprehensive view of Reality as an integrated whole.

We therefore, in attempting to follow this superior path, cannot build it out of a multitude of individual forms. They may be ideal forms but they are NOT the causes of this World. And clearly, what we actually seek will not fall, ready-made, into our hands, because what we find will always be a consequence of our unavoidably incomplete understanding. It will be inevitably flawed because of this, and will require constant review and improvement. Short, formal cuts have their uses, but do not contribute to any sort of general understanding. "Obeys Laws like this one!", is not a profound conclusion about Reality: it is decidedly thin and inadequate, and cannot compete at all with the ever improving Objective Content of real scientific Explanation.

Interestingly, and perhaps surprisingly, though equations can quite correctly be said to be Absolute Truths, for that conclusion, in itself, excludes them from truly revealing the essence of concrete Reality, which cannot be driven by such purely formal abstractions. Now, acceptable explanations, though never perfect, do always reflect some aspect or another of Reality. This unavoidable "incompleteness" of explanation, is also determined by our own inadequacies, which can only be incrementally remedied by our dedication to explanation, and our consequent constant re-equipping with more and more things to bring into the problems. In contrast the formal perfection of equations makes them unworldly: for they only deal in the purest, possible Forms. So, in limiting study to only these Forms and nothing else, encloses them entirely within a very limited World of Pure Form alone – Ideality.

When it comes to understanding, the explanatory route, though always involving incompleteness, does also always involve a measure of Objective Content – aspects of truth, and so can be constantly used and improved.

On the SHAPE Blog, there is a now quite long in the tooth review of the book *A Certain Ambiguity* – a novel by two Indian mathematicians, which presented the possibility of Mathematics as the true path to understanding the World. It isn't, I'm afraid! It is a very damaging wrong turning, and will only build an ever-larger fabric of purely formal myths.

A New Particle Or Maybe a New World?

The article labelled alternatively as *Portraits of Darkness* in *New Scientist* (2932) has elicited a whole series of contrary responses from this author, and clearly this contribution cannot possibly solve the involved scientists' as yet, unsuccessful search for Dark Matter, it actually presents an entirely different view of what they are struggling with worldwide.

It is interesting how, in this article, something which is supposed to constitute the vast majority of matter in the Universe, the fabled Dark Matter, is so often said to be "only very rarely, and uncertainly, glimpsed". The evident hiding of such a major component clearly indicates that we are searching for something very rare indeed. But surely, that might mean that we are looking in the wrong direction for certain. And this is because the modern way in Physical Science is for Discovery as the main source, and not prior Theory!

NOTE: Indeed, even this isn't entirely accurate, because though Science is, in one sense, technology-led; it is; at the same time, only formally "explained". And, crucially, most "theorists" look only to extracted formulae as both their prior "theories" and, remarkably, also a major source for new concepts too. Indeed, a revealed Equation is usually deemed to be the closest thing to an Essence of Reality, and hence a Theory all by itself!

This redirection occurs everywhere in Physical Science today. All efforts are concentrated upon bigger and better displays, detectors, telescopes and accelerators – every one of them designed to reveal what we could not previously study. We no longer *think* our way to revelation; we simply look with ever more power to see!

But, if this absolutely enormous mass is so difficult to see, we surely must assume that it is masked rather than hard to find. It must be absolutely everywhere, but not detectable by our usual methods of observation. Its properties, for it is those that reveal anything, must be effectively cancelled-out, when it comes to our usual methods of detection. It's Charge and Mass must appear to be zero, and presumably in the usual classical way. Equal positive and negative charges can appear as NO charge at all. And, equal matter and antimatter may well give the same zero result if they actually co-exist without the usually expected mutual annihilation.

So, how must we change our methods of search? And where should we be looking?

Instead of deep mines, seeking the very rare, we should mount a strong, theoretical attempt to define stable, yet wholly masked, and very tiny particles that are absolutely everywhere!

Many, many years ago when I first arrived at University as a Physics undergraduate, I was told of the amazing neutrino, which was charge-less and massless, yet had to exist to balance certain sub atomic phenomena. I couldn't believe it, and was surprised at the way such things were banded about! Yet many years later they were able to give it a very tiny mass.

Now, if something also very tiny was also composed of mutually hiding component entities itself, it might not even be conceived of! The neutrino had been necessary to balance an observed situation, but if something like it was internally totally balanced in its properties, why would anyone find it necessary to even conceive of it?

With our Symmetry-dominated ideas, it simply would not figure in our formal, speculative thinking.

So, what might our unconsidered particle consist of? It would NOT be an "elementary particle", but a joint entity, composed of opposites, and to maintain the natures of their components, it must appear like a single entity, but maintaining the component identities without creating something entirely new. Now, this couldn't be a fusing or even a chemical combination: it would have to be a physical union – it could only be some kind of mutual orbiting!

Perhaps we are considering two particles, exactly equal in size, but of opposite properties that would cause them to be attracted to one another. After a great deal of thought, considering only already known entities, this theorist finally settled upon a unity of one electron and one positron!

The electron is of unit negative charge and composed of ordinary matter, while the positron is of positive charge and composed of antimatter! But, they are both very, very small, of the exact same size.

Now, such a unity would be immediately disregarded, because of the idea of their inevitable mutual annihilation, but when that is taken as the only possible outcome, it is absolutely meaningless.

Why couldn't they mutually orbit one another? After all, throughout the Universe the amazing stability of orbits is legion.

The atom was long considered to be totally permanent and indivisible: its very name means that you cannot divide it: it was the basic and smallest unit of a given element, still maintaining its properties. But, it is composed of a large nucleus, mutually orbiting with one or more electrons. It took some time to discover its structure, yet the asymmetry between its nucleus and its electrons did make it, in the end, fairly easy to detect, and it is also extremely stable!

Now, our proposed entity would be much more difficult to detect, for not only are its proposed components very small, but also of exactly equal size. So if an asymmetric monstrosity like an atom can be so stable, I imagine that our new entity to be even more so! And, of course, the two components are of different kinds of matter. It would be undetectable by the usual means!

Yet, when it was finally discovered, in the then most powerful accelerator ever constructed, it was merely a transitory, highly unstable thing. It existed only for the tiniest fraction of a second before dissociating into - guess what? - A positron and an electron.

Yet, all our investigatory eggs were in a single basket: the experimental method in Sub Atomic Physics is concentrated into ever more powerful particle smashers - not exactly conducive to Stability. They are in fact designed to dissociate - that is their purpose, and it is their colossal energies that affect that objective. So, the dismissive attitude to this **positronium** (as they called it) was, to say the least, incredibly warped. Remove this particle from that devil's cauldron, and put it deep into Empty Space, and it is likely to be entirely stable.

Why?

It is made of elemental particles that are naturally stable themselves. They don't dissociate into smaller bits, without coercive forces focussed to smash them to pieces. Two equal, and in every way, opposite and stable elementary particles could mutually orbit one another to produce a stable union. And the reason for such Stability is evident even in the atom.

For external energy pumped into an atom does NOT usually dissociate it, because it can be absorbed by the promotion of its orbits. It flexibly adjusts without dissociation, and can just as easily give up that energy by the orbit returning to its lower level again. Clearly, if the projected new particle is of the same ilk (and why shouldn't it be?), it too must have promotable orbits; it must behave similarly to the atom.

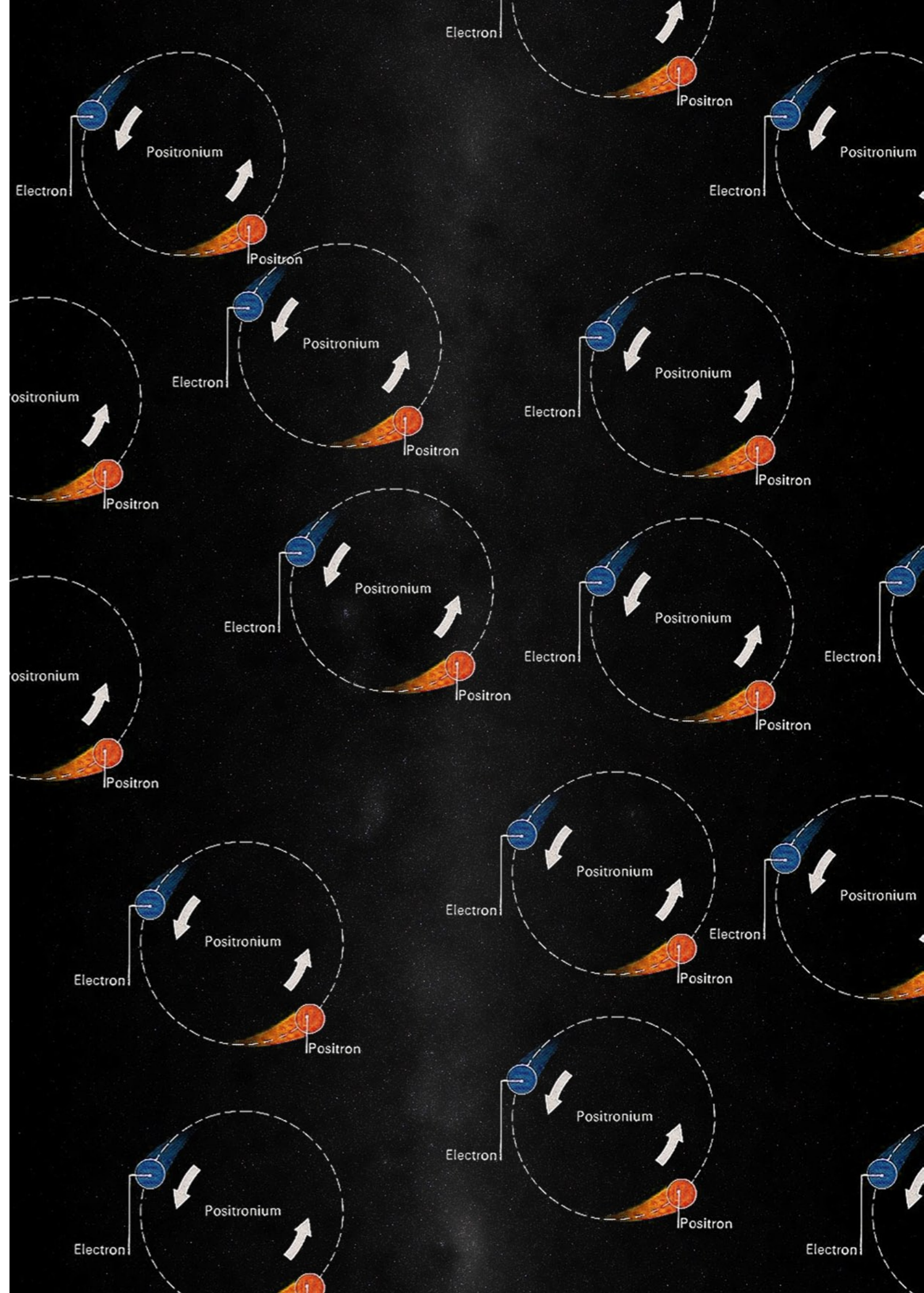
And, theoretically, it does! It actually can propagate Electromagnetic Energy through what is usually conceived of as Empty Space!

Have you ever wondered why E-M energy - like Light, composed of oscillating vectors, both electrical and magnetic, manages to cross totally Empty Space for billions of Years and covering multi-trillions of miles? Yet it is tailor-made for absorption-into, and emission-from atoms. Why not then to and from our new entities too?

And the very instability in high-energy situations (which happens with atoms too), and its dissociation into one electron and one positron - Pair Production is known to occur, but lamely put down to high energy Photons somehow creating them. Why not high-energy positroniums doing it instead? Then a Photon is not a disembodied goblet of pure energy, but is our new particle too! We have a receptacle for this quantum of E-M energy.

Now, all of this might be dismissed as yet more unfounded speculation. But, it differs from the usual Sub Atomic stuff in two important ways.

It is a *physical* theory and not a formal one. And, it has been shown to solve the anomalies of the crucial Double Slit Experiments, makes sense of the propagation of electromagnetic radiation through Empty Space, and looks very likely to lead to a physical model for Action-at-a-Distance in the near future also.





Radiation

The Conundrum of Disembodied Electromagnetic Energy

There is a central question, as yet completely unanswered, which arises when considering the nature of Electromagnetic Energy, and its association with the physical movement of a charged particle – both in connection with it as a lone projectile, and, more interestingly, involving an orbiting version of it.

We do have, of course, a purely formal description, which we use effectively in many different situations, but we sorely need a physical interpretation too. For current models are either entirely formal, or are only useful physical placeholders. We quite definitely need more than these. Let us see why!

James Clerk Maxwell brilliantly encapsulated disembodied electromagnetic energy as a pair or indissolubly linked sinusoidal oscillations – one electrical and the other magnetic. And these, though moving in the same direction through Space, and “locked together” were also orientated at right angles to one another. Now, this was a remarkable abstraction, for it involved absolutely NO matter whatsoever: it seemed to describe pure, disembodied energy existing in, and moving through, totally Empty Space.

Of course, that latter extension was beyond Maxwell’s formulation. But, nevertheless, the clearly begged question was naturally filled in by users of this valuable descriptive form into what it meant physically, and could not but speculate.

Now, this abstract model did, indeed, capture the formal essence of the energy involved, but it was, and still is, inexplicable *physically*, and particularly with respect to a single electron, moving through space: it though, could adequately deal with situations which involved multiple emanations, which it abstracted into a continuous (and infinite) wave.

The physical problem involved here is that energy can be propagated through totally Empty Space, without any apparent association with any matter at all!

We are thus presented with totally disembodied energy.

NOTE: Now, we should be absolutely clear what has been done here. In abstracting the general idea of Energy from many physical instances of it, we are then objectively treating that abstraction as a physical “thing in itself”, which is, of course, invalid!

It cannot exist entirely on its own! That would be meaningless. But, we notice various other features, which can also be abstracted, such as the fact that this form of energy involves oscillations, but not of anything material. Maxwell’s idea was to treat these properties entirely on their-own as Forms.

It is, of course, what mathematicians had been doing for a couple of millennia, and it certainly allowed a great deal to be done with those concise formal descriptions. Formally and pragmatically we used such formulations and their concise equations to represent Electromagnetic Energy wherever it “played a role”. And, for many years that certainly sufficed, in spite of the lack of any adequate physical explanations of why it was so!

We had to live with energetic oscillations of Empty Space being propagated across vast distances without any medium or receptacle.

Even Newton was aware, over 300 years ago, of the problems inherent in the propagation of Light, and proposed its corpuscular nature as a solution, so that it could be projected out across the nothingness of Space. But, as Hooke insisted, Light was, quite definitely a wave-like phenomenon, and our conception of particles could simply NOT deliver what was clearly evident.

Now, scientists long ago realised that they could not, at any particular juncture, explain everything. Mostly, they had to find out what they could, and, if possible, turn the acquired evidence into formulateable relations, and even mathematically generalised Equations. For these could be used to predict future behaviours in the same conditions.

And, to such a realisation, there could be only one possible partner for the new scientists in the consequent, more general enterprise – the mathematicians for they had for millennia extracted quantitative and spatial relations from Reality, and subsequently developed an abstract means of representing these via Formulae and Equations.

Such a relationship with Mathematics was unavoidable, and a fruitful partnership soon arose, wherein the scientists set up carefully conceived of experiments and extracted extended data sets by pushing those situations through a range of changed parameters, and the mathematicians could then be counted upon to deliver the most appropriate Form to fit that data.

The marriage enabled a swift acceleration to ensue, and without a doubt, both partners needed one another to produce the most fruitful results ever. And, the most valuable of these were certainly evident when using these formulations to intended purposes.

But, it must be said, that it wasn't any good at all in explaining what was actually going on, and why it was so! It was an after the event rationalisation using already known Forms. You couldn't go from any one, individual achievement to conquer ever new areas. So, scientists always insisted upon cause-based explanations to accompany their formal equations.

The trouble was, of course, that these explanations were always and unavoidably limited by Mankind's incomplete knowledge: they could never be the full story! They, at best, only included fragments or aspects of the truth, and were always, therefore, only temporary explanations: they could always be improved by new evidence. Nevertheless, they did always include more truth than the equations did. So, from the outset of this union, there always was an incipient, future divorce in the offing between these close collaborators.

The mathematicians dealt in formal absolutes – purely abstract and disembodied relations, which they considered to be the Absolute Essences of Reality at the most fundamental level.

But, the scientists found formal-only representations unhelpful in constantly widening and deepening a general understanding of Reality. They required their explanations to not only explain particular phenomena, but also help them to apply their methods to ever wider areas, and to constantly improve their currently always-insufficient theories. They were never on the same page at all!

Indeed, a philosopher would immediately recognise the mathematicians as Idealists, and the scientists as Materialists!

Now, having revealed the problems in this apparently blissful union, we must review the subsequent development of the relationship and its inevitable crises, and final termination.

A major problem arose when Max Planck solved the problem of Black Body Radiation only by assuming that energy came in discrete blobs – Quanta. And Einstein then used the same concept to explain the Photo Electric Effect. Electromagnetic radiation did seem to come in “particle-like” pieces. How could this be tallied with the continuous wave equations of James Clerk Maxwell?

So, like it or not, we have to address the dichotomy presented by the seemingly dual nature of the way we see certain aspects of Reality.

Though, for a great deal of the union between scientists and mathematicians, they could agree to differ, while fruitfully co-operating in useful scientific endeavours and engineering applications, increasingly significant crises were becoming unavoidable, and by 1927 at the Solvay Conference the battle was joined between two opposing groups – the mathematical physicists (like Bohr and Heisenberg) and the explanatory physicists (like Einstein). And the mathematicians won!

Now, we must be crystal clear what had occurred. The choice was between abstract Forms as the Essences of Reality, and Causal Explanations. And the majority had chosen Form.

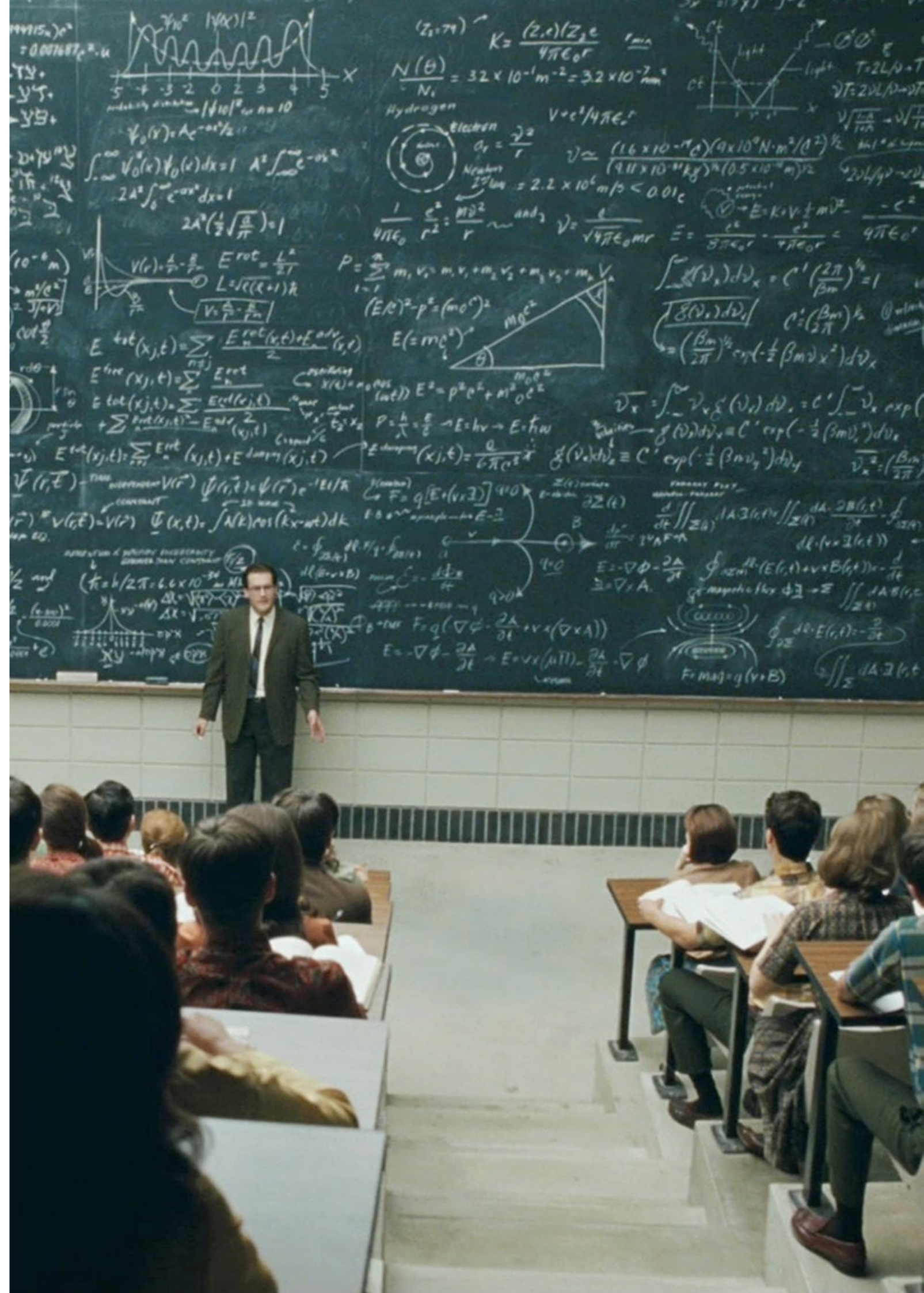
Now, when the new physicists compared an Explanatory Theory with their Absolute formal relations, they considered it obvious: the Truth was clearly perfectly contained in their equations, while the Explanations were always less than sufficient.

But, what would be the consequences of such a profound change in imperatives? The future arena for further investigations would be almost entirely mathematical. Theorists would now confront sets of equations and see what they could develop from them – very different from the driving forces in explanatory physics theory.

This meant that the idealism of the mathematicians became the predominant standpoint in Physics, and the materialism of the “explainers” was rejected along with their now condemned theories.

Of course, it was a major retreat, and could not but lead to a wholly new course for this crucial branch of Science. From here on Sub Atomic Physics became equation-led – that is it no longer had explanatory theories, but only absolute and eternal equations, which drove Reality without concrete causes. The “causes” were now the Laws that now existed as equations, and most research was consequently done on blackboards involving mathematical manipulations, and instead of experiments to investigate Reality, we had only experiments to smash up fundamental particles of Reality to guarantee an ever-increasing list of new particles to fit into the formal schemes that had now been promoted to be “Theories” The subject was well on the slippery slope, and could not be allowed to go on that way.

Physics had to be returned to being a materialist, explanatory Science, and the masked voids of unexplained yet crucial phenomena had to be returned to and dealt with in a physical and explanatory way. And, these would certainly start with the true physical nature of what we call Electromagnetic Energy or Radiation. What was needed was a physical model!



The Nature of Matter

This is a wide ranging question, which, if fully addressed, would have to include all the various Phases that matter can take, but as a starting point a good initial question might well be – “How do neutral atoms form an ordered crystalline solid?”

For, the very fact that atoms are neutral seems to eliminate the possibility of such a natural unifying form of arrangement. Yet, the oft-used hypothesis, in many situations, is that the atom can be conceived of as a positive nucleus surrounded by negatively charged electrons, for this does allow varying effects at different distances and times, so though we can conceive of neutrality with an isolated atom, when many of them get into much closer proximity, we have to take into account their detailed inner structure, and see what might happen in detail, and over time.

For, in a crystal the atoms are obviously attracted to one another, and they therefore come together, but unlike gravitational aggregation, this doesn't mean a continuing process until something like nuclear fusion occurs. On the contrary, when a certain separation between the individual atoms is arrived at, the concentration halts, and a crystal structure with fairly fixed inter-atomic distances results. Now, clearly, we must explain this!

Can we do it entirely in terms of attraction alone? The answer comes from the fact that we can no longer consider them as neutral entities, but as complexes of both positive and negative components - the former concentrated together in a relatively small volume, while the latter are further out and distributed over a much-extended volume.

Let us therefore address the problem by initially considering only two atoms, somehow attracted to one another and then ask. “Why should this moving together stop?”

Purely in terms of the two (considered in isolation), we would have to imagine a repulsive force as the cause, which only comes into dominance at much smaller distances apart, but only when such movement is allowed. And while still considering only two atoms in isolation, we could indeed still have that movement. [Maybe two Hydrogen atoms in a H₂ molecule may well be considered as mutually orbiting one another] And hence, there would be some kind of balance points between the two nuclei involved. But, such an arrangement would not be a rigid relationship. As long as the distance between the two was kept at an optimum, the individual atoms could still move about.

Now, we have a name for one kind of such a movement, when kept at the same distance: we call it an orbit (but of course for such a situation to occur there would have to be

an appropriate relative speed of mutual approach), but only when such movement is allowed in a gas. And, while still considering only two atoms in isolation, we could indeed still have that allowed movement [Maybe two Hydrogen atoms in an H₂ molecule, may well be considered as mutually orbiting one another].

Now, using the Solar System, with its Sun and planets (or even planets and their moons) as a model, we tend to have our orbits happening all in the same plane. But, that could be due to multiple, already existing influences in a multipart hierarchical system, or indeed, the common origins of everything concerned, so that a similar set of directions would, with interactions, determine a common plane.

Theoretically, with only two, equal components, we can conceive of one of them moving in literally any direction with respect to the other, as long as the optimum distance is maintained having their common plane so defined. But, what would cause changes in direction thereafter, if any at all? Without other, external influences, however, this would seem impossible.

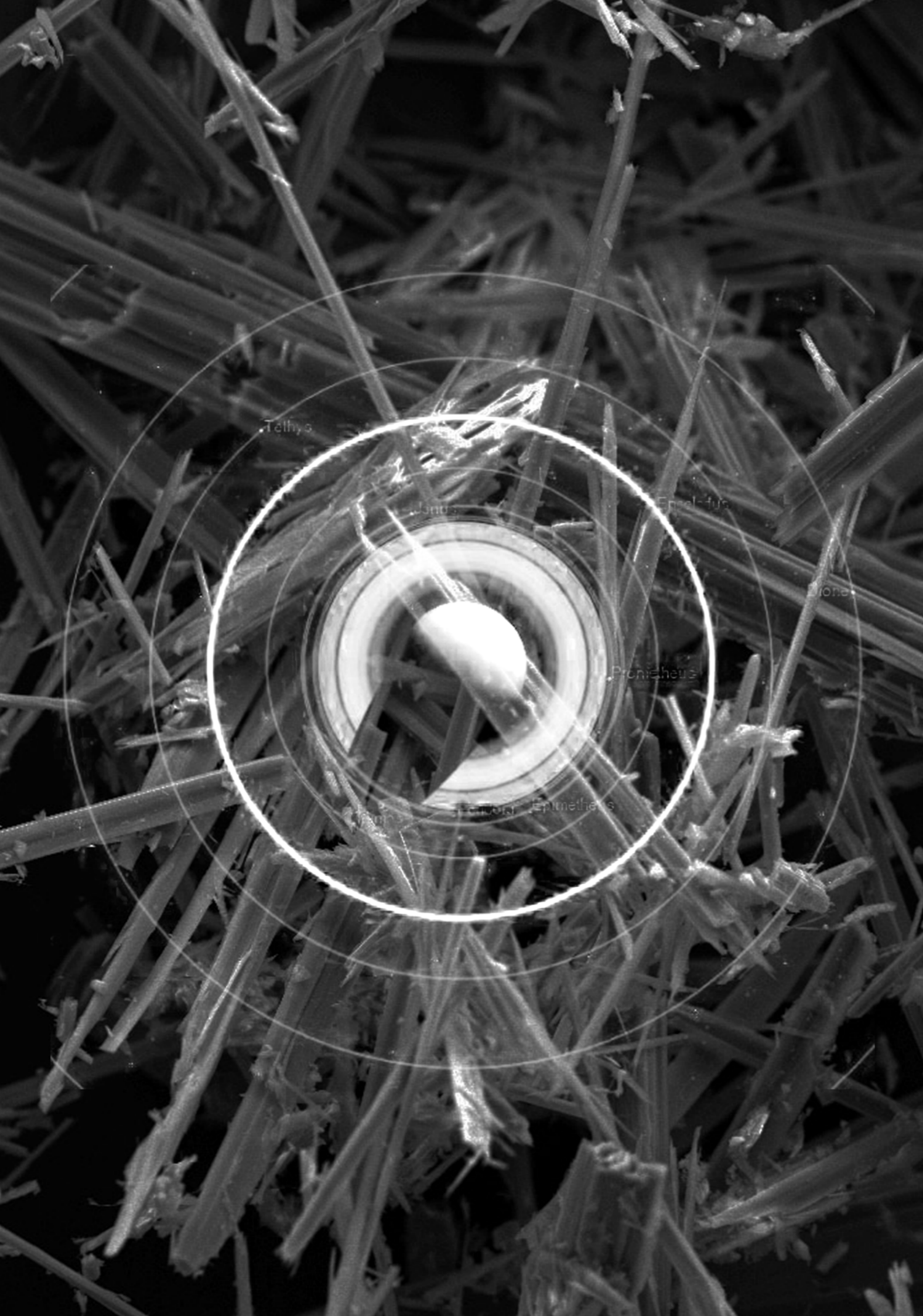
So, the individual pairs would have their multiple positions, orientations and directions determined by their initial directions and relative speeds, when they encountered one another, and formed their union. Clearly, the union limited to a single pair will be exceptional and simple.

If, on the other hand, we had many of these pairs, themselves subject to a mutual aggregating influence, then the between-pair influences across many pairs, may significantly change the situation arrived at for an isolated pair. And, the more general idea of “anywhere upon the surface of an optimum sphere” might well be more accurate?

NOTE: This, though, seems not to be borne out by the example of Iron (Fe), however, where the single outer orbiting electron definitely gives each individual atom a magnetic effect. Yet in a normal piece of that metal, it is usually not magnetic overall, and only by a special treatment can we align these atoms, and turn the piece into an actual magnet.

Clearly, this seems to infer a planar orbit for the outer electron, though they will be randomly orientated across the whole population of individual atoms.

Having considered such relationships with the assumption of some kind of attractive force between individual entities (and even between the aforementioned pairs) we must now address the real problem – “How can basically neutral atoms be attracted to one another to forms pairs



and even larger multiple atom aggregations?" It is a good question, and we know now it happens for the very first stars that were almost entirely formed from aggregations of Hydrogen, and literally little else.

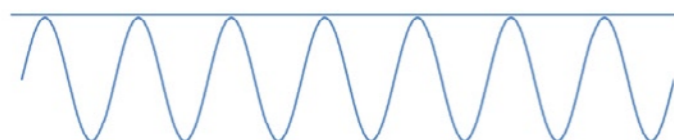
So, though we are dealing with very tiny entities, that would not prevent atoms in close proximity being drawn together by their gravitational interactions!

Now, we have to be careful here! For, we do have a more powerful force already involved – electrostatic attraction, which keeps the electron and the nucleus together to deliver a neutral atom, but which can in special circumstances still provide a kind of inter atom binding, which we call Covalent Bonding (involving a sharing of electrons between atoms), so we must be clear what happens when, and, of course, why!

Let us be clear about this electrostatic union first. With, say, a nucleus plus a single electron (like Hydrogen (H)), it has been explained that the electrons may well move about from one nucleus to another, due to temporary positions where the alternative nucleus is, for the moment, closer to it, leaving its prior partner positive, and its current union negative (with two electrons). Under such circumstances the extra electron would be drawn to the unaccompanied nucleus, and the electrons would have swapped over! Of course, with the relatively close proximity of many atoms, it is clear that such simple swapping wont be the only possibility and electron jumps in all directions are likely for the same reasons, delivering a relatively static set of nuclei with a fast moving cloud of electrons covering great distances, but, over time, keeping the whole set neutral.



So populations of such atoms could therefore be neutral overall, and also for every individual atom – overtime. But, momentarily each atom will be positive until it gets neutral again with the acquisition of another electron. The over-time variations in charge of an individual “atom” will therefore be mostly neutral but with frequent short intervals of positivity. It may therefore look something like the the image shownhere.



While the local “cloud” of electrons will look something like the next figure. It is easy to see “local” over-time neutrality, when these are considered together.

But what will be the effects of this upon inter-atomic forces? The nuclei will momentarily repel one another, while, in between, being neutral. But, we could, just as easily, see an ionised, positive nucleus being attracted to a negative atom with a temporary, extra electron.

Now, we could say something similar for the electrons. With then being momentarily repulsive, while the rest of the time in a neutral situation. In this oversimplified model we have both types of entities repelling like-forms part of the time, and at others attracting the opposite form. Clearly, with a substantial population, there will be an overall, optimum state - Neutrality with optimum distances between the two types, and in pairs predominantly, but with a constant hum of variation and movement of the electrons.

Now, of course, these are all idealised models. For the two entities are very different in size and amount of matter involved. Just like the planet with its moon, the former is very much bigger, so the majority of the relative movement is done by the lighter and smaller particle.

Now, the reader may wonder why all of this is of any value whatsoever, so I will explain!

We know that if energy was communicated to an orbiting electron, it would stay in orbit, but at a higher level, and if it fell back again at some time to its optimum, base orbit, it would release energy in a most surprising form – as Electromagnetic Radiation.

And this is nothing like kinetic energy – it constantly varies in its component vectors.

Indeed, taking its electrical component it behaves as follows:-



Also, at right angles to this oscillation, it also has a magnetic component, with a very similar trace.

Now, perhaps “the penny is dropping”?

When the electron orbits, it sets up a magnetic field as well as its surrounding electric field. So, orbits and electromagnetic energy seem significantly related.

Indeed, some very interesting considerations could be investigated, such as, if the orbit itself was precessing, for then, the magnetic field would be rotating, and, at any chosen stationary point, that field would certainly vary in a sinusoidal way.

Even purely formally, two sinusoidal oscillations at right angles do produce a movement in a circle - **an orbit!**

Now, of course, what has been almost entirely omitted from the above considerations, has been the energy involved in these arrangements.

Obviously, if we are considering only individual atoms (nucleus/electron pairs at its simplest case), the energy can be included in the orbit of the electron, with more energy causing a promotion to another orbit, but also, in translational (kinetic) energy of the pair as a whole.

In addition the actual mutual orbits (for that is what they really are, even if it seems to be the smaller orbiting the larger) could indeed also precess, in a kind of overall spin, and this would also involve a proportion of the total energy involved.

But, things will be different when many atoms have to be considered together.

Notice that, in general, (though obviously not for Hydrogen) these entities, initially, will be more or less independent as atoms, but will still form pairs of atoms – $H + H \rightarrow H_2$ a molecule of Hydrogen, and these relationships too must be explained.

And, at much lower energies the atoms or molecules would get so close together that they affect one another, and move into a different overall state – the Liquid mode. Finally, on reaching the lowest energies, they become so close that they form Solids, and particularly can arrange themselves into 3D matrices or Crystals. And, all these must now be considered.

Another area to be addressed is whether close approaches, in certain circumstances coming from without, can influence the locally achieved stability, and either temporarily disturb it, cause a continuing drift, or even a breakup, with the stability destroyed.

The example in gravity of Saturn’s Rings will be a crucial area to investigate, with questions like “Is every particle in its own individual orbit, or can they actually share a common orbit?” Finally, “Why are Saturn’s Rings confined to an extremely narrowly defined plane as a whole?”

Of Stability, Crises and Revolutions

The Critical Transforming Events in Development And How We See Them.

The basic assumptions of a scientist like Professor Brian Cox, are also actually endemic throughout not only the scientific community, but with Mankind in general too. It is because our normal environment is literally always within an extended period of Stability, wherein things do not change significantly, and what is expected to occur, usually does. These periods happen not only in our individual lives and in the society we in habit, but in everything else in Reality.

So much so, in fact that all the species of animals and plants were for centuries considered to be entirely constant, and had always been so. In addition, the rocks beneath our feet had always been there, and subject only to effectively minor disturbances: they too were considered to be eternal.

So, there are many assumptions which are a natural consequence of the holist-yet-unseen nature of Reality, in which, perhaps most important of all, the very laws underlying that nature would have been exactly the same throughout the whole History of our Universe.

Growing dominances and conducive, even cooperating productive relationships will always tend to determine a self-maintaining Stability, at least for a while (and sometimes for considerable epochs). Indeed, the periods of real qualitative change when they do come, actually frighten us to death, and whatever they seem to be heading towards, we still frequently long for prior and predictable Stabilities.

Even the small scale variabilities that always occur even within an over-arching and continuing general stability, seem too difficult to analyse, and do not easily allow us to extract regularities and laws direct from such a seemingly predictable World. And scientists have only slowly learned how to vastly increase the stability in small isolated areas, to make such extractions a great deal easier.

They set up what are called Experimental Situations, in which they suppress as many affecting factors as possible, control variables to keep them well within narrow constraints, and even remove the contending affects of many others by averaging our results over a whole series of runs.

Only then, when the Domain of study is close to ideal, can we clearly see, and then extract, particular relations between key quantifiable parameters. We not only take the general stability as essential, but also demand a vastly

enhanced version of it in our attempts to extract the important relations within. Only then, can we, and do we, extract our essential laws.

So, what can we say about this methodology?

First, it definitely takes Stability as its necessary ground. All Science is grounded in Stability. "Wait for equilibrium to become established before taking any measurements!", is the oft-repeated imperative. We then also assume that what we extract is not merely limited to our very highly constrained Domains, but is applicable *generally!*

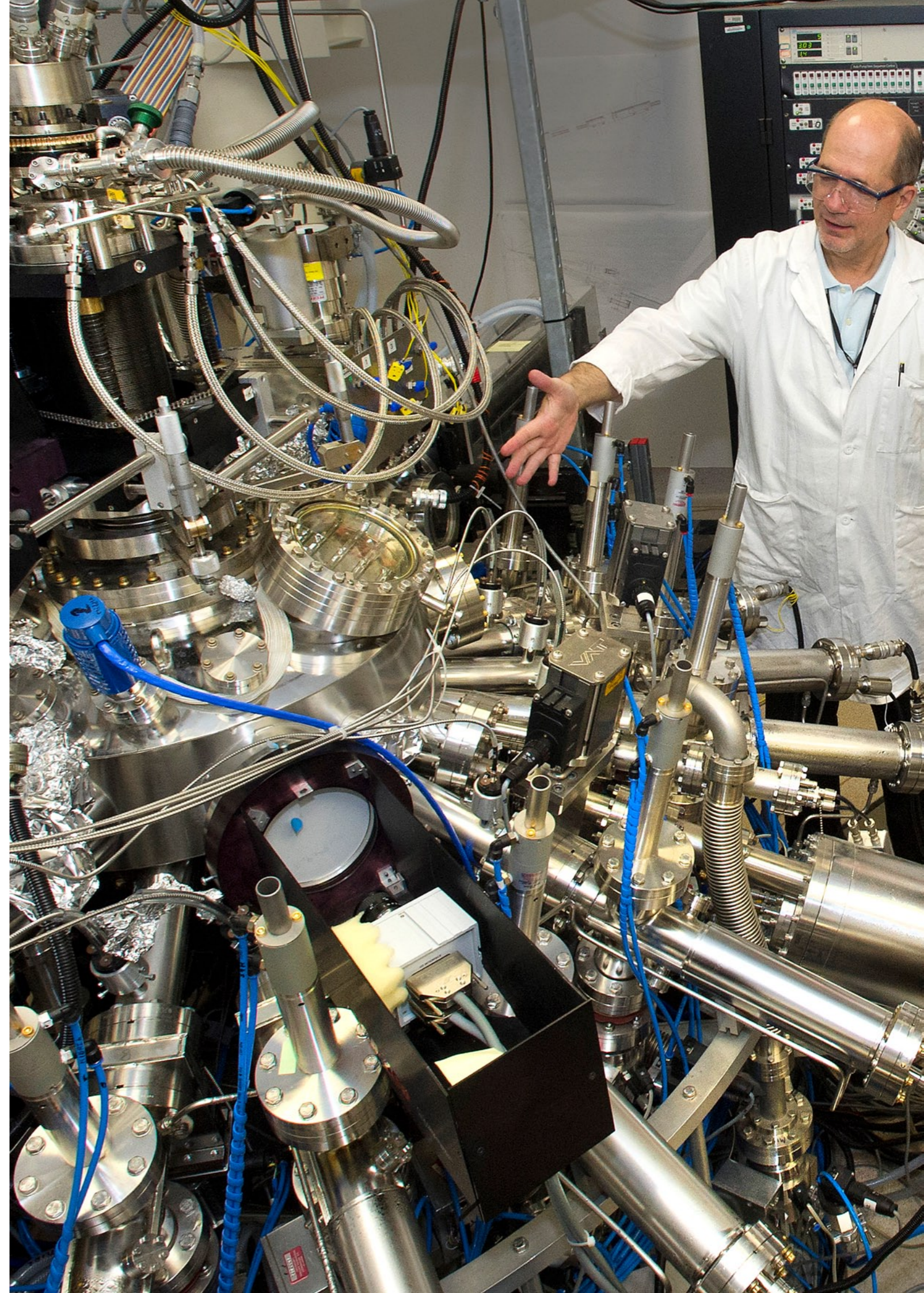
From extreme and tailored Stability we get laws, which we are sure are eternal. The quite evident differences in different contexts is assumed to be entirely due to a different mix of other laws, which effectively can give very different overall outcomes. But, our assumption of entirely separable laws, which, in themselves, do not change is steadfastly maintained.

Now, of course, we are aware of the difficulties, but we are so enamoured of our successful experimental methods, and their effective use in tailored Domains, that we assume we were merely clearing away the multiple factors to reveal the natural (though hidden) laws in their actual pristine state.

Now, embedded in that last statement is a particular and profoundly important assumption. That Principle of Plurality again! It claims that the laws that we extract are the Absolute Truth: they remain as the very same laws exactly that happen in all possible arrangement in Reality at large, though there they are blurred by the presence of many other relations, which tend to hide the individual contributing laws in an overall *Sum* of all those acting in the given situation.

But, in order to use our extracted laws, the only way that we can rely upon each one is to reconstruct the exact conditions from which it was extracted.

We rarely apply our laws in unfettered Reality-as-is, for if we did, the predictions would not work. In spite of our belief in their generality, we can only use them in carefully engineered and constrained Domains. We insist that our extracted laws are separable – totally independent of context in how each acts. Though, even then, in order to use them reliably, we must suppress all others acting simultaneously.





But are all the assumptions involved actually true? There can be no confirmation in the only way we know how to use them. For, that methodology is NOT dependant upon the assumed separability.

Many thinkers would vigorously deny that the assumptions made are true (though there seem to be fewer and fewer nowadays, with the clearly evident achievements of those who subscribe to Plurality).

That alternative, holist position insists that no laws are separable. Indeed, laws don't produce Reality, but it is Reality that produces the laws! Context is in fact everything! The confusion we often experience is not merely the effect of many separable laws acting simultaneously, but on the contrary – all things actually change the relations involved. Different contexts will always produce different versions of particular laws, and in some environments they will NOT be present in any form whatsoever. In fact the special versions extracted by the Domain constructing and maintaining methods NEVER occur as such anywhere in Reality.

“But”, I hear you say, “The very fact that the methods used do reveal a dependable law, must validate the truth of that particular relation.” And, of course, in one sense you are quite right, but only in the arranged context defined by the experimental set up. In all other contexts, the law may exist there and be similar (perhaps), but certainly different in some way, AND what it is then is due to the same reasons as its form in the experiments was determined – the physical factors present.

Finally, we must also admit to dominance.

All the factors contributing to a given relation are never of equal weight. So, if we, as we always do, go for a glimpsed, but clearly dominant relation in our experiments, we will extract a law, which though not the same as is acting in unfettered Reality will certainly be similar. If, on the other hand, we chose a non-dominant relation to isolate and extract, that last statement will be far from the truth.

Domains are so carefully prepared and constrained as to give ONLY a purely abstract formal relation. And that, outside of such carefully farmed areas, can only exist in one very special place – that World of Pure Forms alone that we call Ideality – the parallel, formal World in which Pure Mathematics exists, and absolutely nothing else!

Now, this is not a merely academic argument, of no interest to real people in a real World, doing and making real things. For, it becomes absolutely vital when we are dealing with *qualitative* change – when periods of Stability end and collapse – when new processes arise and new potential stabilities compete for overall system-dominance. The holist alternative ideas are then the only ones that can cope with such major transitions.

For example – The Origin of Life on Earth was just such a revolution, and stability-based and pluralistic laws will never be able to explain such a creative transformation.

The successes of pluralist science require Domains of Applicability, which ensure that laws extracted in such contexts can be applied reliably in exactly the same contexts. The achievements of our Technology are predicated upon such essential production conditions. Clearly, we can build laboratories and factories with multiple Domains to produce according-to-laws, but we cannot deal at all with Reality in transformation. And, not only that, we cannot understand how Stability itself was first established, how it is thereafter maintained, and finally how it is also guaranteed to eventually fail.

Thus, if we want to get at the very heart of Developing Reality – to how and why it evolves and establishes stabilities, and then in periods of cataclysmic failure and transformation, creates something wholly new, such as LIFE, and even MAN, then we must study those Events where these changes actually occur - these so-called Emergent Events or Revolutions.

When the Bastille Finally Falls!

How can we identify the current cul de sac into which Modern Physics has purposely and noisily marched, and not merely criticise as Prophets of Doom, but also be able to present a ready alternative and much better show already waiting in the wings? Now, if such an alternative were both fully assembled and available, as a coherent, consistent and comprehensive standpoint, along with a clearly useable methodology, then there would be no real problem. But, that ideal situation is far from being the case at the present time.

There are, of course, many very good examples that could be brought into any ongoing argument, but altogether too few, and at this time, too little developed, to stand against a united chorus of “Yes, but” type responses from the sizeable majority representing the currently “universally-agreed” consensus.

For, in spite of the grave weaknesses of that currently accepted position, it has now been “in charge” for a very long time, and in any ping-pong battle, hurling examples from each side, there can be absolutely no doubt who will have the deciding weight of projectiles.

It is certain, however, that if the *philosophical* case were allowed to be put, the new alternative would win hands down.

But, who has such arguments about Philosophy these days? You know the answer, it is, “Nobody!”

And, the vast expansion in media of all kinds only reinforces that situation.

Twitter one-liners dominate these days, so wit will trump argument, and humour will always trounce commitment. So, there is certainly a major problem is getting anything at all complicated out there, and then discussed properly.

Now, such episodes, when reaction rules, have happened before. There were times after the failures of revolutions across Europe in 1848, when reaction ruled, and even a new Bonaparte was installed as Emperor in Paris. And, similarly, after the demise of the 1905 revolution in Russia, the leadership of the Bolshevik Party was down, as Lenin said, to “You, me and him!”. Yet in 1870 during the Franco-Prussian War the sans culottes of Paris rose again and instituted the Paris Commune, while in Russia in 1917 the very same Bolsheviks actually took power, and established the World’s First Socialist State.

So, though the task at present seems impossible to carry out, it will NOT remain so!

The swoop downwards from all-powerful repression to powerless impotence does indeed occur, and it will occur in this task too - and for similar political reasons. As the Crisis of Capitalism again dominates across the World, and the Ruling Class as usual insists upon the Working Class footing the bill, the latter will finally SNAP! And all hell will break loose!

In such turmoil all prior short-odds predictive bets will be OFF, and *everything* will be up for debate!



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