

THE EXPANSION OF SPACE ITSELF

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Shape Journal
The Expansion of Space Itself
Special Issue 16

1. Introduction
The Expansion of Space Itself?

2. Big Bang Consequences

3. Do You Really Believe In The Big Bang?

Introduction

The Expansion of Space Itself?

Welcome to the 16th Special Issue of the SHAPE Journal.

Now, it must be admitted from the outset that to oppose, as I certainly do, this assumption of the Expansion of Space Itself as an alternative to the simpler conception of the Big Bang, then it is clearly a major undertaking. And, if I along with everyone else working in this area, limit myself to investigating the formal questions alone, then I couldn't possibly succeed.

For, in such an approach, the truth or falsity of any position can only boil down to the obeying of the Rules of Form, and hence ultimately to those of their undoubted basis – Formal Logic.

It is then about mathematical conceptions and formulations as the supposed essences of Reality.

My opponents (who I readily admit, can find appropriate Forms for literally anything) would certainly demand that I should do likewise: it is the only truth that they recognise!

But, I cannot and, indeed, will not, join them in their exploration of the World of Pure Form alone – of Ideality! For I am a scientist and philosopher, and therefore require explanations of everything I study. To give me an equation is to give me a succinct and accurate description only, and then only for a particular contrived and maintained Domain: it contains NO explanations whatsoever (unless you deem, “Obeys this equation!”, as an explanation).

Now, those who take the opposite view would most certainly demur, and insist that Reality is caused by the obeying of these types of formal relationships: obeying a disembodied formal relation delivers such results!
NO it does NOT!

In actual fact, concrete Reality delivers formal patterns and relations, but only in the most carefully constructed and maintained conditions.

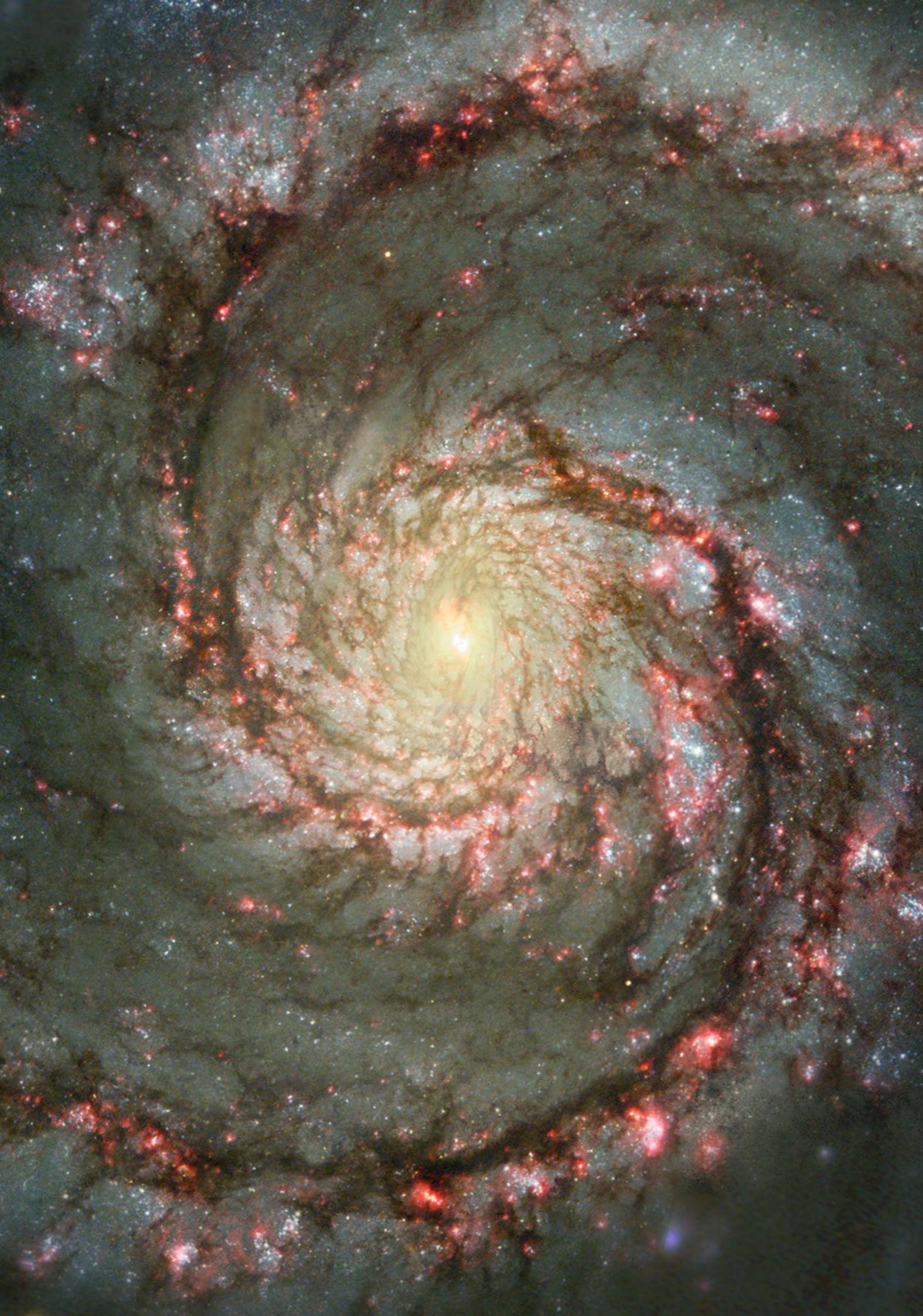
So, I will tackle the problem, as the best physicists always have, by attempting to explain why things happen as they do, and NOT merely by how they seem to happen.

Hence this couple of papers can only be a start to this necessary task. Though most scientists can and do, with any evident problems, solve everything piecemeal – and each with its defining equation, that is never what I do.

The first paper addresses the mathematicians' idea of the Expansion of Space Itself, while the second paper questions the actual contents of what we choose to call Empty Space.

Jim Schofield January 2013





Big Bang Consequences

Contents

This Synopsis gives brief descriptions of all the main sections of this paper.

1. What Actually Expands?

This idea demands an answer to “What is the Nature of Space?”, and the author finds his answer in the Paving of Empty Space within our Universe by entities with all the necessary properties to do what Space does!

2. Space Expansion Problems

The problem of the Ultra Deep Field image of a small section of the Heavens was interpreted as coming from a galaxy 13.2 billion light years away. And for the light to be reaching us only now means that the expansion of Space would have to have been at 0.9 of the Speed of Light. An alternative interpretation via a Paving of Space within our Universe seems to make more sense. The inevitability of an extended Virtual Universe is then considered, as being what we think is the real Universe.

3. The Phoenix from the Flames

Here the true basic star formation and development, due to Fred Hoyle, is explained as being due to a series of self-generated catastrophes, which were Emergences and deliver the wholly New. Once this had been established, a whole new approach had been proffered, which ultimately would explain the whole trajectory of the Development of Reality.

4. Vestigial Empty Space

This postulates that the big Bang was the explosion following a supernovae-type collapse of Universe-sized proportions, but would leave behind any net-zero matter and net-zero charge entities as un affected by Gravity. Once again the hypotheses of the Empty Photon (neutrino) Paving seemed to fit, and would be left behind as the contents of all of Empty Space within the collapse, and into which the following Big Bang would indeed expand.

5. Emptiness?

The conception of Empty Space into which the Big Bang expands based upon a Paving of Empty Photons is investigated further.

6. Conclusions

A brief conclusion of the ideas within the context of the continuing Crisis in Physics is laid out here.

Big Bang Consequences

And the Expansion of Space Itself

1. What Actually Expands?

As cosmologists react to criticisms of their formal conceptions of the Universe, and particularly its origins, they retreat ever more deeply into their safe and predictable Mathematical World - and consequently towards one particularly breathtaking solution to problems of the Big Bang Model.

For that standpoint immediately generates the unavoidable question of whether it was it an explosion, and if so, what caused it? Or, if that was not the case, what was actually happening and why? And that is the idea of it being Space itself that was actually expanding.

So, let us be clear what they are suggesting with this conveniently formal alternative.

First, they always commence their “explanations” as to the actual precursor state to that Event, with either Nothing, or some infinitesimal speck of “something”, which for some unknown (and, it seems, unknowable) reason, began to expand.

And by switching to such an expansion of the “neutral” ground, on which other things happened (for quite other reasons, of course), it was considered that the queries about an actual Big Bang could be silenced once and for all. We could keep the evident advantages of such an idea, without any of the usual difficulties. You cannot beat a purely formal solution, because it is independent of any real world causes!

The content of this initial “speck” is also unknown, but is often regarded as entirely Pure Energy, and nothing else. Now, with its initial form, the Big Bang (as its name implies) was regarded as “something like” an explosion (but not an explosion!).

This was arrived at by the evidence of a still-expanding Universe – measured now and extrapolated backwards all the way to a “conceivable” Origin-Time and at a “conceivable” Origin-Place (even if such could not be identified specifically).

But, of course, though they could not think of any alternative to this chosen, purely- descriptive model, it

was still full of unanswered questions as to both Cause and Process. Now, the significant factor in “dealing” with these questions was undoubtedly the new approach, following the victory of the Copenhagenists at Solvay in 1927, which effectively terminated the usual scientific process, with regard to a study of Reality, as soon as effective equations had been extracted, and could be relied upon for predictive purposes. So the conceptual trajectory (the explanation) has ever since been definitely steeply downhill. It was, and is, a placeholder theory – the best that they could conceive of on the available evidence AND, of course, with the obligatory Copenhagen approach).

Now, there are many and various examples of these speculative inventions that should here be addressed, but let us just take this Expansion of Space Itself to begin with.

Let us commence with the question, “What is it that is actually expanding?”

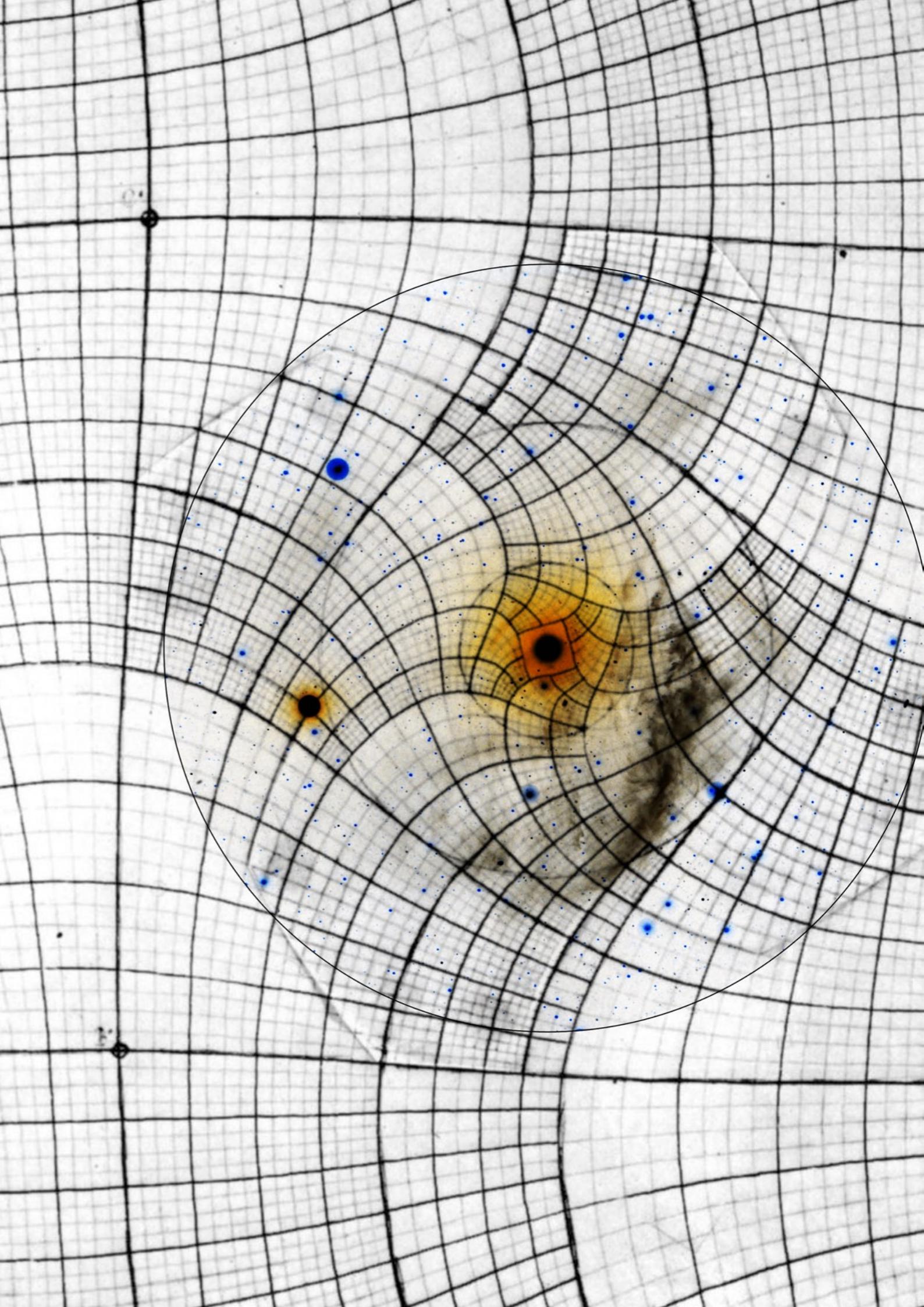
Surely, if we start with “Nothing” and expand that, we will still have Nothing (only bigger?).

Indeed, the term expansion surely implies there must be “something” that can, in fact, expand?

For whenever else we use this term, we can surely ask, “What causes the expansion, and why does it affect the “something” in this particular way?” But, not here it seems!

For the usual conceptual model is the expansion of a material thing due to heat (not appropriate here). In this odd conception, we have only “Space”, and when we ever ask what that consists of, we generally get the debilitating answer, “Nothing!”

Of course, we must remember that these speculators are essentially mathematicians, and hence have absolutely no trouble redefining “Nothing” as the “mutual cancellation of opposite somethings” - like the effect of adding +1 and -1, or positive and negative charges, or even Matter and Antimatter. “These all deliver zero surely!”, they aver!



They are mathematicians and therefore only deal in formalisms - abstractions, perhaps taken from Reality, but then exclusively considered in their own terms alone.

So, of course, all the above "cancellations" were not only considered legitimate, but could be inferred to be behind their Nothing, as used in Cosmology, too.

But, clearly, the actual Origin of all Reality cannot be included in such speculations, unless, that is, you consider that such "rules" were in existence eternally, and were therefore in action from even before the event commenced.

On the contrary, if this event occurred at all, it would have to have had a cause: it could only be both concrete and non-singular!

So, how are we to address their conception?

It tidily, and purely formally, does away with the consequences of any concrete explosion, for none of the features inseparable from such events (and for which we certainly have zero evidence), need to be addressed. Indeed, such an expansion of Space itself needs no cause and no beginning or end! It merely separates everything detectable within Space, as separate from Space itself, and therefore appearing as if they are moving away from each other, when what is "really happening" is merely the entirely separate growth of the spaces in between!

NOTE: but of course, you will drastically alter the moved-apart entities: for their mutual attractions due to gravity will be diminished!

Forgive me, but how can anyone seriously suggest such a happening?

Well, the answer to that question is much easier to deal with.

Once the concrete is dispensed with, and only the formal is considered, then all things can be addressed in purely formal, descriptive terms alone. For causes have been ignored and only formulateable descriptions have been substituted!

The New World, in which all this happens is NOT concrete Reality any more, but the relations possible within a conceived-of World of Pure Form alone, where all forms can always be considered, whether they actually happen or not in truly concrete Reality.

This New Physics fillets Reality looking for, and then extracting, only Forms, and purifying them into pure formal essences, which never, as such, occur in concrete Reality as they have been abstracted.

Now, before every reading scientist falls off his chair in hostile rejection, maybe I should be allowed to explain further.

For when the forms were originally glimpsed in concrete reality, they could not be extracted, so the most able experimenters very carefully and extensively farmed the "holding locality" to reveal what they thought they had seen, and now sought.

In, as far as possible, perfecting the Domain of study, they then could extract the form that had been made clearly evident, and certainly NOT the form in its original, real context: they have transformed the location by tailoring its conditions to deliberately reveal only one thing. And what they then see and extract is almost true in that new, farmed context. The process, which they believed was to extract a formal essence, was in fact a process to isolate, as far as possible, a pure form in its own terms alone. It had been abstracted into a Pure Form, and could then be investigated and manipulated in its ideal formal World, using formal considerations and nothing else!

Indeed, the very best of these mathematicians regularly extend their collection of Forms (even those extracted as above) with a whole set of purely formal (and hence "legitimate" in the new World) extensions and similarities, whether they can exist in concrete Reality or NOT!

Indeed, the history of the conception of Number tells it all!

From Fractions to decimals, and negative numbers to so-called imaginary numbers, the extensions have long left behind the very real counting numbers to even include Operators within that category.

For example, we have the famous basis of all "imaginary numbers", i, (the supposed "square root" of -1) which is no such thing. Indeed, even the -1 isn't a number. Neither is the implicit multiplication in i^2 (which is supposed to be $i \times i$). Indeed, all these are in fact operators, with -
i being "Turn anticlockwise through 90°"
 i^2 being "Turn anticlockwise through 180°"
-1 being "Turn anticlockwise through 180°"
x being "followed by"

All of these are very useful and can conform (mostly) to the rules of manipulation of Number, but that doesn't make them "Number", does it?

Clearly the World of Pure Form has its uses, but it is an idealised World: in fact I insist that it is labelled as, Ideality, and understood as such whenever formal manipulations and Proofs are considered. For example, Absolute Truth is entirely possible within Ideality (if only formally), but such is always totally impossible in Reality.
You can see the dangers!

Now, all mathematicians retort that many of these extensions have turned out to be invaluable in many areas of concrete Reality. And that statement is certainly as true as it is of all Mathematics – by which I mean that it involves an abstraction which has resonances in Reality, but still exists exactly as such only in Ideality!

Now, even when such reverse applications are successfully used, if the forms were considered to be the whole Truth and nothing but the Truth, then major errors are guaranteed to occur. They are NOT the Truth of Reality, but a purely formal and abstracted relative of that Truth.

Indeed, the uses of such formalisms are mostly entirely pragmatic, in that in appropriately tailored circumstances they can be used to predict.

But that is NOT Science.

Just recently, I have revealed in research that the mathematicians' idea of Chaos, is most certainly not the same as what they append it to in Reality – namely Turbulence. It is a formal frig with similar features, but it is NOT the same! And this turns out to be true for all these extensions. They are all pragmatic frigs, for difficult areas of Reality. And they are ultimately guaranteed to lead us astray, if we are more than mere technologists!

Yet, this turns out to be neither only a recent nor a trivial conclusion. I am, and always will be, a mathematician myself, and have spent decades chasing such formal solutions to real world problems. But, I did not choose Mathematics for my University Degree Course, but Physics, because I wanted Understanding of the world, rather than merely formal representations.

Yet sadly, I soon found that literally all my fellow students and certainly all of my lecturers had already swopped over (in the opposite direction to myself). They were all now mathematicians first and foremost.

The victory of Bohr and Heisenberg at the Solvay Conference in 1927, had initiated a wide-ranging and accelerating retreat, and ever since Then the Project of Science has changed to terminating with the extraction of useable Equations, whereas before that retrenchment it was only after that point that real Science had begun.

Yesterday, as I watched one of the incessant repeats of one of Brian Cox's TV Science Spectaculars, he blithely "explained" to the watching world how Space had expanded, entirely of itself, to distribute what was once together in the tiniest of specks into the entire Universe. And in passing, he mentioned the Cosmic Microwave Background, which he said had been composed of visible light at the start of the Universe, but had since been "stretched" to make its wavelength longer, purely by this expansion of Space and nothing else. And this had changed

its initial wavelength so that it was now of Radio Wave proportions.

NOTE: It would be interesting to hear how this could have happened to individual quanta, and how the energy of a single quantum was thus transformed.

So, now we have Space expanding and actually "pulling" the original waves that it was "carrying" apart to larger sizes: a real expansion of Nothing. It sounds to me that if this is a valid explanation, then the Space involved is indeed composed of something physical rather than Nothing. So it can, not only propagate oscillations (Light), but also can stretch them along with its own general and necessarily continuous expansion.

Now, if you are going to use such arguments, I'm afraid you cannot leave the question of the nature of this Space open. And this is because you are assuming very concrete properties to give you the things you are "explaining" – not only the CMB radiation, but also the propagation of all radiation in general across this "emptiness"

So, I have to ask, "What exactly is this Space, which you quite definitely define by the properties with which you endow it?"

The very properties that you give it to explain various phenomena, mean that you, whether you like it or not, are indeed defining it!"

But, as scientists, you must go further. You have to explain why it can do these things. For, if you don't, you most certainly cannot use your "explanations" based upon its assumed properties.

Clearly, certain questions can no longer be left unanswered.

If we are to smuggle in properties of Space in various explanations (such as that of the CMB) then the nature of Empty Space NOW must be overtly addressed immediately.

Yet at this present time, there are already experiments being conducted and evidence gained (and being published) that throw light upon this question.

From suggestions that Pair Productions and Annihilations can occur (of various types from positron/electron situations to matter/anti matter oscillations, and a series of other similar investigations of Empty Space (The Casimir Effect being a particularly intriguing one)

And the writer of this paper has even proposed a "paving" of the whole of Empty Space within the Universe, with what he terms Empty Photons (or Neutrinos) (a mutually orbiting pair consisting of one positron and one electron).

But, whatever is the final theory; the establishment of the nature of Space is now imperative.

In addition, we must also address the actual evolution of this crucial component of Reality, from what it was at the beginning of the whole process (as we now conceive of it) right through the development of the Universe to its state at the present time.

For, along with everything else, it will not have been a constant, unchanging thing. It will have evolved! For, as its environment in terms of its current entities and processes, changes, it too will have had to change as all the contained developing things had their effects upon it.

The seemingly priority question of the nature of primaeval Empty Space, will be unanswerable without some justifiable trajectory of development overall.

Nothing remains exactly the same, so “Nothing” will certainly have developed too.

There are other reasons why the expansion of Space itself is universally preferred. It neatly dispenses with a whole host of contradictions that are unavoidable if the entities within Space are actually moving apart. Indeed, taking the idea of the “Big” “Bang” literally throws up so many contradictions that to dispense with it completely was a great relief to cosmologists.

Yet, when I instead followed up the alternative consequences, many banker conceptions were brought into question. For example, with an “explosive” type of expansion, all entities would, of necessity, get further and further apart, moving only along basically radial paths from their common point of origin.

The required (and hardly dispersing) clouds of matter, which are supposed to aggregate to ultimately form stars and planets seem more than a little unlikely. Indeed, the most likely outcome would seem to be the thinnest possible distribution of all outwardly moving and dispersing matter, with less and less likely local concentrations.

Indeed, the other necessary assumption to cope with actual and evident aggregations had to be that of Quantum Fluctuations, which Cox once again brings in to explain the necessary unevenness of the Universe, to allow such local aggregations. Believe it or not, these are said to be entirely due to a wholly natural (yet unexplained) quantum fluctuations, when the Universe was merely a speck!

So, even at the very moment of creation, there were laws acting which randomised things sufficiently to explain the whole ultimate pattern of the Universe.

2. Space Expansion Problems

Brian Cox informs us that with the tremendous maximal depth of field photograph taken by the Hubble Space Telescope of a small patch of sky, with an exposure time of some 11 days, it is possible to see a galaxy as it was some 13 billion years ago.

Now such an assertion supposes, with the usual “Expansion of Space itself” version of the Big Bang, that the galaxy in question was then, where it appears to be now, so that light from that “Time and Place” has taken all this time (13 billion years) to reach where we are now.

What?

Surely, according to the other version of his belief, the Universe has been expanding ever since its origin in a Physical Singularity (along with absolutely everything else). And, if that were the case, wouldn’t our “stuff” (the matter from which our bit of the Universe is made) then have been very much closer to that Galaxy then? So much closer that the light we are talking about would have reached our-area-then a very long time ago? So how can we be seeing it NOW in our current position? It must have passed us long ago and thereafter be unseeable again!

The only conceivable alternative is interesting, to say the least!

If it is truly only reaching us now, we (our bit of the Universe) must have been moving away, or the source been moving away, or both, at a relative speed close to that of Light itself for the whole 13 billion years. Our bit must have throughout been ahead of the following light from that moment in the past. Indeed the distance between that source point and our part of the Universe had been separating at 13/13.7 of the speed of light (i.e. 0.95 of C or 176,500 miles per second) throughout. The light from that moment and that galaxy must have been slowly catching up with our bit of the Universe, until it finally reached us only NOW, 13 billion years after it started.

Now you can see why Cox and his fellow scientists have abandoned the explosion interpretation of the Big Bang. For that would infer all the matter in the total Universe would have had to have been doing exactly the same! It doesn’t convince does it?

Instead, they have plumped for Space itself expanding (with NO Matter intrinsically involved, and hence NO Energy required for the expansion to occur). Handy, isn’t it?

Indeed, the individual material entities are not moving at all, it is merely the Space in between that is “spreading out”.

So, the “explanation” is clear, Space has been expanding everywhere at that colossal speed, and that accounts for what we see.

NO it doesn’t!

It explains nothing! It is an assumed description only. For whichever way you take this “theory”, you have to explain what is causing it. Otherwise, you are certainly only describing it, from the way that it appears. You may demur and say that Empty Space doesn’t need any inputs, because there is NO matter there, except that the same sources in Sub Atomic Physics and Cosmology also say that Space isn’t actually Empty: it is packed with something! Indeed, most of the Matter calculated as required for the universe to behave as it currently does is “missing” and allocated to the nowhere to be seen Dark Matter. No one has been able to find any part of it anywhere.

And to compound the felony, more and more researchers are finding that the only way that they can explain their results is by Space itself being packed full of “something”, which is in constant activity – producing and annihilating photons and particles literally constantly, while the overall totals of all their summed properties always amounting to the usual result – Zero!

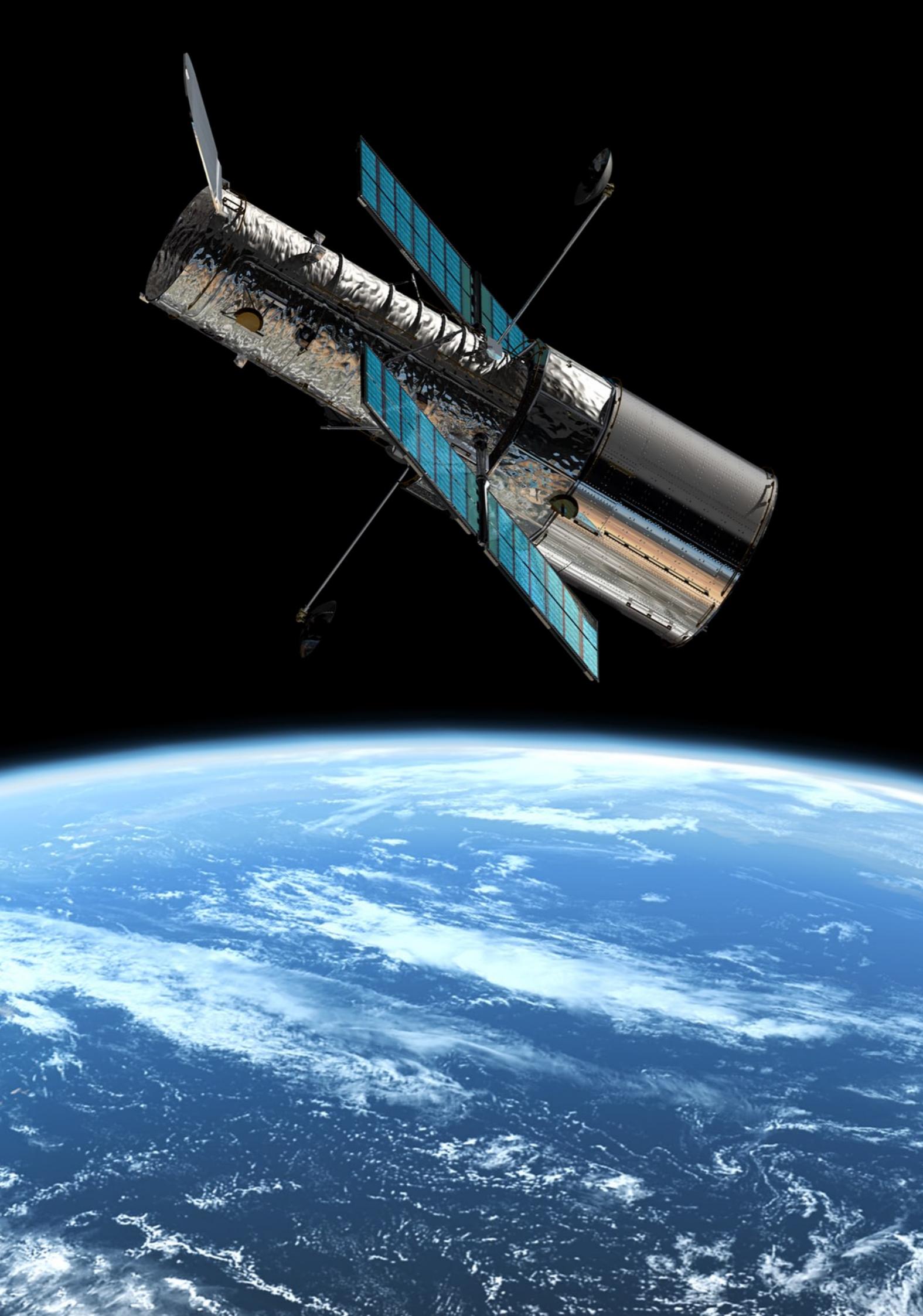
So, if they are correct, the “no energy” argument also falls to the ground.

There might, though, be a surprising answer! The Universe from its inception could have been “paved” with impossible to detect particles composed equally of matter and anti matter, and involving equal amounts of positive and negative charges. And this “content” would have to be such as to provide the medium to allow all E-M, energy-only radiation propagation to occur to all points in the Universe.

Also with such an “enabling” paving, the edges of this particular Universe would be transformed. They would certainly provide a final limit to any continuing propagation of all radiation, which on encountering this boundary couldn’t just vanish: it could only be reflected back into the paved Universe, like a form of Totally Internal Reflection.

And the consequences of this would most certainly transform what we see, and determine how we must interpret our observations.

For our view, wherever we look, will not only be composed of directly-seen sources. For many of the sources we see will have been delivered by totally internally reflections at the boundaries, and be mere virtual images of entities entirely situated elsewhere within those boundaries.



Yet we will see them and indeed interpret them as being directly seen, and occurring beyond those boundaries. Indeed, if the Universe really did “expand”, it would once have been much smaller, and totally internal reflections would have been bouncing back and forth multiple times, though as time passed and the universe got much bigger, the number of these multiple reflections would certainly decrease.

NOTE: Clearly there could be a way of confirming or denying this supposition, because the apparent density of stars and galaxies would be greater in those earliest seen areas than could be accounted for by expansion alone.

Clearly, any single observer could possibly see the same source multiple times, appearing in very different directions and from different production times in its history.

NOTE: Another unusual case would be when light from a source reached the boundary at a large angle to the normal, for it would be reflected back in at the same angle on the other side. Such light could thus remain close to the edge permanently, and when the Universe was young could commence one or more complete cycles around the edges. Extremely old light, apparently from colossal distance could actually be from much closer but travelling around that edge for billions of years.

It is clearly worthwhile to consider exactly what we would see, and how we would interpret it, if these suggestions were true.

As always working through the consequences ought to produce a view, that could not be explained by any other arrangement.

And with this in mind, how might it transform how we might interpret 13 billion Year old light? Can you honestly affirm that it is in its current direction having travelled directly from its source all those billions of years ago? Maybe not?

Now, the reader may dismiss these musings as ill-informed. “Surely, these great scientists are not kidding themselves? It is you, in your evident ignorance that is failing to understand the profundities of Modern Science!”

I think not! I am a mathematician and physicist and ended up after a lifetimes work in education in a professorial post in London University. I am now retired, and a full time writer and philosopher of Science.

All these modern day speculations of Cox and the consensus in Modern Physics and Cosmology stem from the epoch-making retreat of those who insisted upon the Copenhagen Interpretation of Quantum Theory, initially by Bohr and Heisenberg, but latterly by the vast majority of physicists and cosmologists. For, when coupled with

the Formalism of Einstein, this standpoint could only lead professed physicists away from reliance on Reality, into the “wonder-world” of Ideality – where only Pure Form is considered.

You only have to ask a question of any one of these “new men” to have them reaching for the chalk and delivering their “essential truths of Reality” - Equations, but which are indeed only the consequences of speculation based solely upon Pure Form and nothing else.

The science of the era before Darwin, Maxwell, Planck, Einstein and Marx could not deal with the new evidence upon numerous fronts, and in zig-zagging to and fro from einsteinian formalism and Copenhagen probability could only retrench into the worship of Equations as the essences driving Reality. Equation-based speculation in place of Reality-based explanations was funnelled inexorably into this modern-day cul de sac that is embraced and indeed lauded by Professor Brian Cox, and most of scientific academia of today.

3. The Phoenix from the Flames

Now, though the main thrust of Brian Cox's view of the Universe is clearly gravely flawed, even he has had to subscribe to a very differently grounded approach in certain areas – the most crucial of which is his account of the development histories of Stars. Quite unavoidably, he has had to abandon the idea that all laws are eternal, and merely add together in ever more complex ways to deliver all that we now see before us.

Any attempt to start from a beginning, and work through to now MUST involve the development of Reality, not merely in complexity, but also in novelty: there just have to be emergences of the entirely new, and hence the creation of new Levels, with new laws!

Indeed, following Darwin, we would talk of first the Origin, and then the actual Evolution, of Reality.

NOTE: This is not merely a disagreement on Naming what has occurred. For the crucial ingredient in complexity alone is that from known laws you can predict outcomes, whereas in emergences of the entirely new prediction is always impossible. And their study involves quite different approaches to Reality.

Now, in addressing this crucial development, Cox and all his colleagues, have to address the actual emergence of a whole series of very different Phases.

The Jewel in the Crown of modern Cosmology is undoubtedly Fred Hoyle's explanation of the creation of the chemical Elements in a series of different kinds of phases in stars.

No matter how the majority of physicists looked at the supposed birth and development of Reality, they had also to cope with ever higher energy requirements as time passed to create each new Element.

Now, this delivered a perplexing contradiction, for the general availability of energy from the Big Bang onwards was definitely downhill, with it clearly decreasing rather than the opposite. Yet in terms of what was known, though Hydrogen fusion into Helium was to an extent both understood and quantified, the energy requirement for all the rest of the known Elements seemed impossible to be naturally achieved anywhere in a Universe that was continuously “running down”.

Two major problems presented themselves.

First, how could sufficient energy be concentrated, in that universally agreed scenario, to the greater extent required for every newly created Element?

And secondly, where did the vast majority of those Elements come from beyond Iron, for that Element seemed to exhaust the possibilities for normal fusion?

Now these questions were initially cracked by Hoyle, but only by completely transforming the methods of explanation. Laplacian concepts could never arrive at such results by merely a complexity of known laws. Indeed, as emphasized already, prediction from known laws could never deliver an answer. Hoyle had to address Emergence – the creations of the entirely New via unique transforming Events, which not only delivered the required Element, but also transformed the situation to ultimately allow the next possible Emergence. These individual Events also changed the ground for future possibilities, and actually did these things via dramatic cataclysms of change in short duration turnovers.

No incremental or imperceptible changes here, only catastrophes with wholly new outcomes.

In his proposal he suggested that in spite of overall expansion of the Universe, there would also be local Aggregations, so that more and more matter (Hydrogen) (under Gravity) would accumulate about single centres, until the amount of mass and donated energy of prior movement would together deliver sufficient energy to bring about a fusion event (say of Hydrogen into Helium), which would also convert some of the mass involved into energy and thus precipitate a chain reaction and the birth of a star. But he also considered how this would achieve a kind of stability via a balance between the outwards force of radiative and corpuscular energy and the inwards force of Gravity, defining a stable surface to the star.

Now, of course, this only explains a primary star, and Hoyle realised that though it could be maintained as such for billions of years, it would be continually using up its available Hydrogen resources, and would ultimately run out of enough of this to maintain its stable form.

In such circumstances Gravity would win and the star would collapse down to a much more concentrated density.

Such a calamity, however, did not mean the demise of the star. For the collapse and great increase in density would vastly increase the temperature, until it passed a threshold at which even Helium could be fused to produce the next possible Element. The same production of mass into energy would precipitate another chain reaction and a new kind of star would result.

Once again, a stable size would be achieved by a balance of radiation and Gravity, and the star would continue

as before, until, that is, its resources of Helium became insufficient to maintain it.

This type of crisis, calamity and rebirth was not the usual type of science. It was not simple reaction, but Emergence, and was about Stability and its Demise, and consequently about Phases of a Development. Science heretofore had been the study of processes within Stability, while this new form addressed the interludes of cataclysmic qualitative change that led to the entirely New.

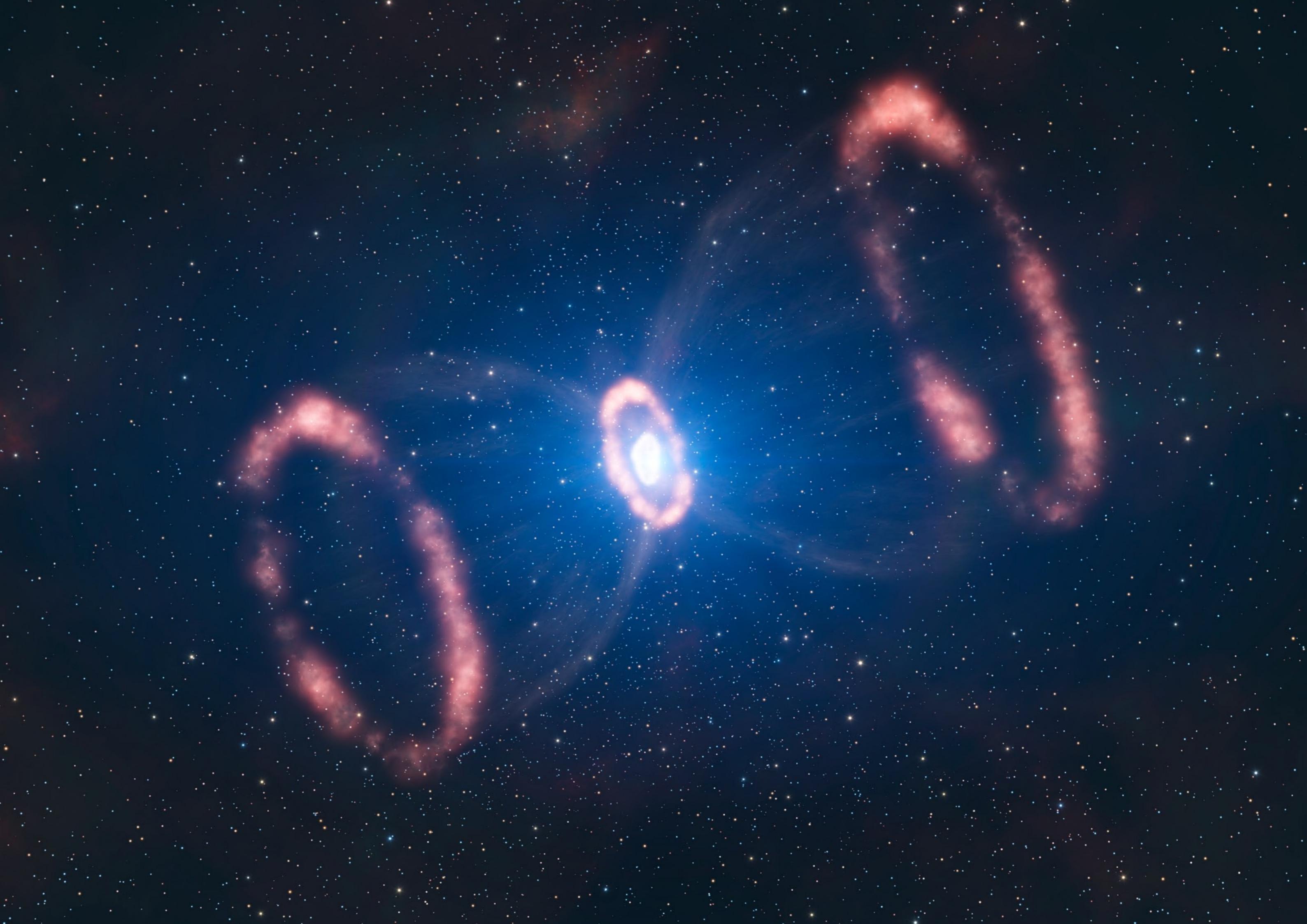
It could be repeated several times all the way to the fusion of Iron, which terminated this type of process: no further oscillations as previously were thereafter possible. Yet the vast majority of known Elements were still unaccounted for.

But, Iron only terminated that particular type of phase. On final collapse that would not result in another stable star, but would keep on going into a final Event, which in one fowl swoop precipitated all the rest of the elements via a Supernova!

Clearly, this is no mechanist Science.

It is packed full of Significant Qualitative Change – indeed the Evolution of Matter and the consequences of such a history has had the most remarkable consequences as evidenced by the Solar System, planet Earth and Life itself.

A new Science is sneaking in by the back door. It is a shame our usual practitioners are not up to employing it to finish the job, but instead seek to complete their Mathematical Standard Model by the old and inadequate methods.



4. Vestigial Empty Space

Whatever caused the Big Bang; it must have been within a prior state. Some cataclysmic collapse of something absolutely gigantic (a prior Universe?) must have precipitated our presumed Event, for apart from well-known, within-stability incremental changes and the system-changing and stability-terminating Emergences, what else could actually cause such a prodigious and fruitful happening?

You can see the advantages of a purely formal approach in addressing this question, for Equations “helpfully” deliver only the predictable changes of the former type, and merely indicate (rather emptily) the latter major turnovers only via their “full-stop” and merely “place-holder” Singularities.

But would anything have been left behind totally unaffected by such a mammoth causing collapse? Clearly, that would have to depend upon the actual cause of such a catastrophe, and from what evidence we have from similar collapses within, and contained by, our Universe, the most obvious candidate cause has to be Gravity! And if this were the case, then ALL mass would certainly be involved. And such a collapse would leave nothing behind affected by Gravity, and what might remain could only be those entities with a “net zero mass”. For without mass they would not be drawn together by Gravity.

Now, if such entities did exist, they would presumably be left behind, defining the remaining “Empty Space”, into which the following Big Bang would “expand”.

Now, various candidates have been put forward, including the intriguing idea of totally disembodied Pure Energy, but the only one that this writer feels qualified to expand upon is his postulated idea of “Empty Photons” (or Neutritions). Now these were “defined” for him by their evidently necessary properties in order for them to play a series of different roles, and the only form that seemed to cover all such requirements were these particular particles.

They were conceived of as being the stable product of a pair of thought-to-be incompatible sub particles – the electron and the positron. Their survival within a joint particle was seen as being possible via their mutual orbiting of one another.

Clearly, if their relative approach velocities and directions were appropriate, they could indeed form a joint particle (on the model of the Atom), but with not only opposite charges, but also opposite types of matter too. The result would be a particle with NO net matter and NO net charge.

NOTE: It is also crucial that without the other particles and

higher order aggregations sucked into the collapse, what would be left would be only such inactive particles and with no local transaction with Matter (none would remain), these would inevitably be at their base orbiting state, and likely to be entirely stable.

Also, as well as being undetectable as a material entity, when existing in such a form, it would also be similarly invisible as such when a mutual annihilation occurred as only Energy would remain, indistinguishable from other energy present. The only known proof that such an entity had existed would require the “release” of its component parts in what is termed a Pair Production Event (and presumably this is what indicated the momentary existence of an almost identical entity in a High Energy Accelerator, then termed a Positronium).

NOTE: Though those similar entities (Positroniums) were in existence and detected as such in Accelerators, they were found in those circumstances to have incredibly short lifetimes, which seemed to prohibit any possibility of also performing their roles as I have defined them.

But, those were only found in those circumstances, because they always dissociated, in such conditions, so I would suggest, and it could be considered possible that in low energy cases they could well be entirely stable, because they would always be well away from an insupportable, contained energy content, which could cause an unavoidable dissociation. (And, by the way, I can indeed explain their behaviours in both sets of circumstances consistently)

Now how, in such an “empty” Universe, could such leftover detritus from a Universe-wide collapse behave?

It is from here impossible to prove definitively, so let us indulge admittedly in some “informed” speculation! Let us imagine that these would themselves, under some other, very slight, attractive force, slowly aggregate and begin to form a finite paving of that otherwise totally Empty Space, with a final limiting boundary. Clearly, the “explosion” of the Big Bang would then occur within that environment. Indeed, the outward expansion would most certainly encounter that paving, which having itself aggregated after the calamitous collapse of ALL “effective mass”, would not be totally even in distribution. So, it could then interact with the expanding-matter-front of the Big Bang in an uneven way, and consequently it could then impose a varying effect upon the nature of the expansion, and allow aggregations to begin in various more dense localities.

It would also provide a medium for E-M radiation to be propagated, and a boundary at its limits for Totally Internal Reflection of all such arriving radiation.

5. Emptiness?

So, let us now consider such a finite, “empty” Universe as the area into which the famed Big Bang “expanded”. Though a seeming contradiction in terms, we could construct such a Universe entirely out of “Empty Photons” (as defined above).

[But NOTE, that by the same reasoning as above, any matter-neutral and charge-neutral entities will be present in the detritus from the pre Big Bang collapse]

And these are conceived of as a binary pair of mutually orbiting particles – one electron and one positron – that is of a negative, matter particle and a positive antimatter particle.

Clearly, if such were the only remaining entities left over from an emptied past-Universe, then it would be they, and they alone, which would initially define (or at least constrain) the new developing Universe. There would be NO abstract, dimensional basis as is the usual conception, but, instead, a concrete content, neutral in every way except one – and that last non-zero property would have to be Energy. For without sufficient orbital speed to maintain their separation and continued mutual orbiting, the two particles would, we are told, mutually annihilate one another. And that involved energy should be calculable, for we know the individual (identical) sizes of our two components and their unitary, but opposite, charges.

Indeed, we had some idea of the number of these vestigial bits defining a space might also be able to define a minimum and necessary separating distance between such connected entities, and hence the size of that Universe.

Also, because such internal orbits can be elevated, with the inclusion of extra E-M energy, and passed on from entity-to-entity by induction, we can imagine that any such extra energy above that required to maintain the integrity of the joint particle, would be momentarily containable by such entities, and passed on continually around the Universe. Also, with these particles being necessary for any energy propagation, we can see that the boundary of such a paving of these entities would also determine a limit to propagation, so that all such radiation arriving at those boundaries could only be reflected back via a sort of Totally Internal Reflection.

Thus, given time, such vestigial extra energy would be propagated throughout the entire Universe, so that the extra above-base energy per Empty Photon would be close to zero. Yet, the cumulative total of this energy (of the two kinds) could be considerable, and made up of:-

- a. All the base orbital energies within the holding entities, and
- b. Any above-base propagatable energy.

And these would definitely be different kinds of energy. The built-in base orbital energies would be unavailable, locked into their joint particle, while the extra would be communicateable to any appropriate receiving alternative. The idea of the immeasurable Energy does not seem so way out in this scenario.

6. Conclusions

The contributions in this combined paper will probably be condemned out of hand as pure unfounded speculation and immediately “binned”.

But, what would be the reaction, if I quantified all the values involved, and even constructed one or more equations to support the ideas?

I have a suspicion that they might be received quite differently.

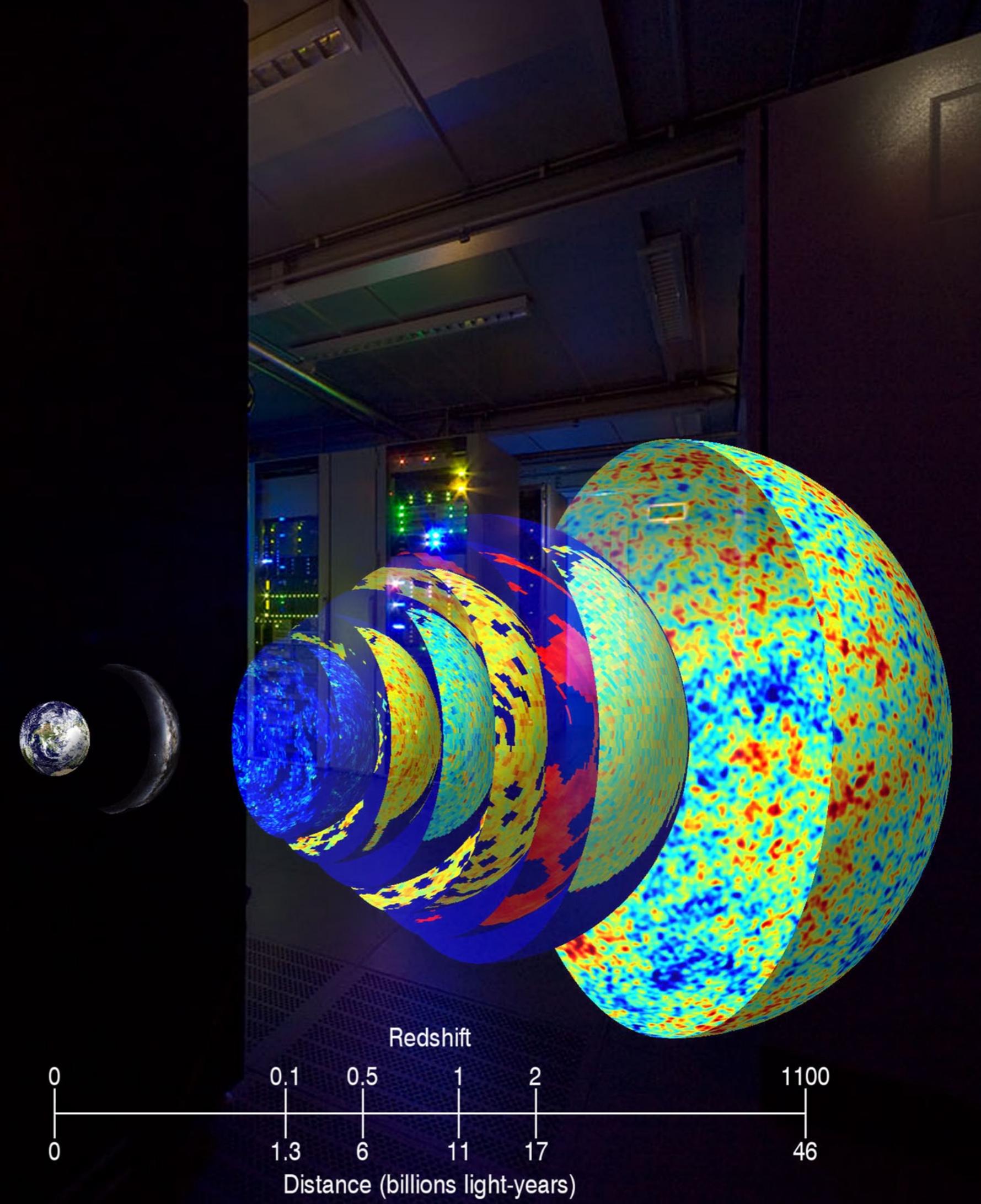
Now, why might that happen?

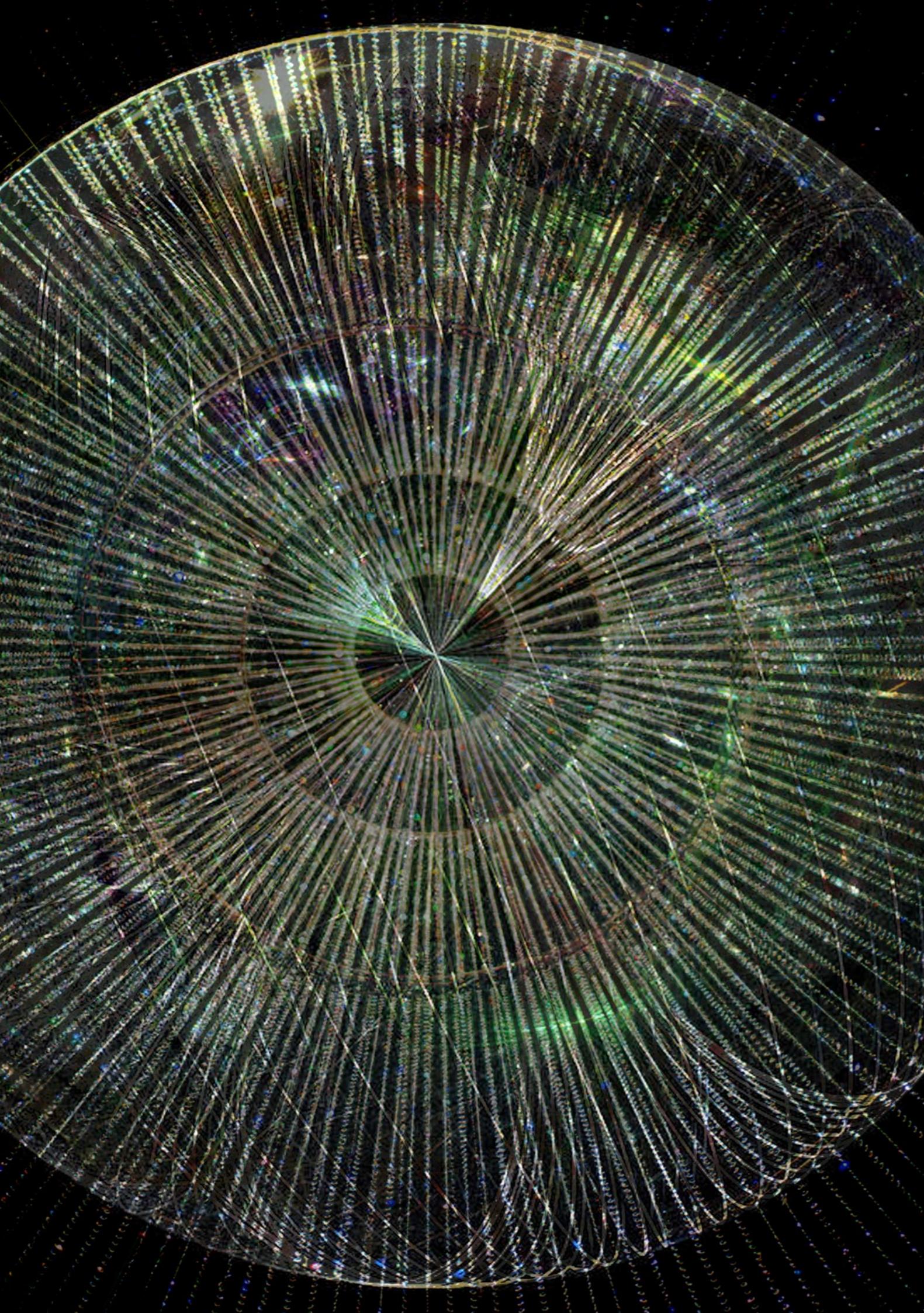
The speculation would certainly in no way be reduced by the equations and quantifications.

The ideas would be just as speculative. Yet, the current dominance of quantities and equations in Sub Atomic Physics is usually considered sufficient if these “primary” and “basic” factors are addressed.

Since the victory of the Copenhagen Interpretation in these areas, when explanation was dumped, the scientific process was terminated as soon as verifiable equations had been produced, but were consistent with a given data set, and no evidently impossible limits of quantity had been transgressed.

Theory has been debased to become mere relation. In other words, the question, “Why?”, is no longer asked, only “How?” and “How much?” are considered.





Do You Really Believe in the Big Bang? The Origin of Everything

Let us start from a totally materialist standpoint in our attempt to understand the Nature of our Universe, as determined by its origins and subsequent and indeed necessary history of development. And, in addition, attempt to devise what the very fabric of its Empty Space must consist of.

This, inevitably, means that the joint creation of both Space and Time out of “some dimensionless dot” of Pure Energy has to be unsubstantiated rubbish, and could never be our starting point! So, all the equations so carefully structured to deliver such an invention must also be rejected as invalid - as speculative extrapolations of current formal relations only.

Physically and scientifically such an Origin can only be a speculative myth of a very special kind.

We, on the other hand, will just have to fall back upon some known kind of real Event consisting of at least both Energy and Matter, and occurring in a real physical and extended space.

We can be absolutely certain from all our scientifically investigated experiences, that it will never be a dimensionless dot. No calamities, no matter how catastrophic and seemingly permanent, ever terminate in such a situation. Some threshold is always reached long before that, which changes the game significantly, and also usually profoundly too.

So, in demanding a cause for this “beginning”, we must somehow explain a necessary enormously powerful concentration (of whatever existed prior to this cataclysm) into a tiny but extended area, which, of itself, would trip over into some kind of expansion (explosion?).

But, in all the many already-existing, though in comparison very minor models of such Events – like Novae and Supernovae, for example, these always had such a cause – the final collapse of an enormous Star under unrestrained gravity, and a Space into which a consequent explosion, caused and fuelled by Nuclear Fusion, could vastly extend.

Using these models as a valid starting point, we also might speculate (though scientifically, of course, and certainly NOT mathematically) that some sort of a most almighty collapse (of Universe-sized proportions) resulted in an equally almighty Big Bang.

The mathematicians, at such a point, definitely part

company with such ideas, and give innumerable objections. They even denounce the idea of any sort of explosion, and instead, once again, use a mathematically portrayed version of the creation and expansion of Space in itself, which therefore gave the impression of an explosion without there actually being one.

Form before Content yet again!

But, their main grouse is that they cannot develop the necessary equations, for such a happening, which would also give exactly what it is that we see in the observable Universe now. And clearly, the crucial question has to be, “Why can they not do this?”

The answer to the layman is surprising, “They believe that the Laws of Nature are eternal, and knowing them extensively, they cannot make any of them fit either of these two requirements.”

So they insist that that-sort-of Event could not have happened. Anything outside of the known Primary Laws of Nature is unfounded speculation of the worst possible type, and must not only be rejected but also prohibited in scientific circles.

For what they insist must be done is to extrapolate backwards from our currently established essential relations, and by doing so we can fit the Big Bang into them. They claim that their version is wholly consistent with the eternal Laws of Nature. And in that, at least, they are correct. For, all such equations can vanish to Zero, or zoom off to Infinity, and they are just being followed to such endpoints.

Such things, when they occur in equations are termed Singularities, and to display their dedication to such relations, they call the Point of Origin of our Universe a “Physical Singularity”. [And just for completeness, they define a Black Hole as another Physical Singularity, but this time of both zero size and yet of infinite capacity. Do you believe them?].

They do admit they may need a few more dimensions, and a unified fabric of Space-Time (as with Einstein), but they insist that they are basing everything on much sounder FORMAL ground than are those who disagree with them. Thus spake Modern Physics!

But, there are crucial philosophical reasons why they are mistaken.

To base everything upon abstract Pure Forms (which is exactly what their equations are) is a totally idealist standpoint. The Form is assumed to come before the Content. The Word comes before the Deed And the Shape precedes the Cause!

"Once you have described something accurately you have "explained" it!"

What utter piffle! How do they get away with it?

Indeed, if these “theorists” are pressed, they will insist that these laws were there before the Origin of Everything. Abstract Form – Pattern is supposed to determine everything. But, where do these laws come from? What determines them?

If they are there before the material World, then surely they must emanate from an all-powerful, immaterial entity? Are they the Word of GOD? What else could they be? Either they have a history, or they infer a God!

The alternative, materialist, holist and developmental position sees NO beginning, nor any End. It sees all Laws as consequences of particular material and energetic context. They could not possibly precede them, but can only be consequent upon them. And such relations are not totally separable as the mathematicians affirm. For their most profound principle is that of Plurality, which says exactly that relations are independent of their context.

But, in fact Laws do vary with context and what's more they are never eternal.

Local dominances and the Farming of Domains can make them approach the principle of the mathematicians, but they fail abysmally, where their equations zoom into Singularities. Why should it be any different in Cosmology?

Now, in a similar way, we can have NO actual initial Origin from absolutely Nothing!

For such is meaningless! We can indeed have Demises and Rebirths (à la The Buddha), but they must always be in a concrete context. And, most crucial of all, if The Theory of Emergences is anywhere near the Truth, then all such Rebirths are actually Emergent Events, and each one always creates the Wholly New as part of its establishment of a New Stability: things that have never occurred before happen within such Events for the very first time, and hence form new inter-relationships (i.e. “Laws”).

Do you want an indisputable example? It is surely Life!

To do what the modern-day, mathematical cosmologists do, and insist upon current Laws as eternal, and hence the only Source of an explanation for the initial Origin, that is as silly as using the Laws of Living Things in a purely non living context.

So, the current theoreticians, as you might have guessed, extrapolate both ways. As well as using Sub Atomic Physical Laws to explain the Origin of our Universe, They also confidently expect that these same Laws will deliver Life and all its subsequent Laws too. The expert extrapolating his expertise into a World View is once again raising its egocentric head.

So, what would be our basis for both ends of their seemingly straightforward extrapolations? We would be much more general in attempting to tackle Development.

By studying all areas in which Emergences have occurred, from Cosmology to Life, and onto Society and Thinking. We would, taking a modern, holistic standpoint look for the inner trajectories of Qualitative Change that appear only within such Events. We would use metaphors from all these areas to tackle the most important and difficult areas of Reality – the way that it innovates via revolutionary disturbances and resolutions.

We must study both Stability and its incipient dissociative forces (usually collected together as the Second Law of Thermodynamics), and the wild gyrations and oscillations within the melee in a happening Emergence, both in initial collapse, and in the final, constructive rejuvenation. The Phoenix must be tracked as it arises out of the Flames of Destruction.

No external Essences will be expected or relied upon. We will, on the contrary, expect to find everything necessary within concrete Reality in these Transforming Events. But, that Reality is not a fixed and unchanging thing. It unquestioningly develops, but much more importantly this can only happen via its hierarchies of Systems.

Now, there is a problem!

Almost no one is currently doing this. The basic Principle of Plurality rules OK throughout Science, and is preoccupied with Technology and certainly NOT Philosophy. Indeed, in spite of various books by prestigious scientists purporting to address Physics and Philosophy (Werner Heisenberg and Sir James Jeans come to mind) all have been of an abysmal philosophic quality. Truly, as philosophers, physicists are the pits!

And, this presents the major difficulty, for what is required constitutes a truly enormous task. It needs more than the odd genius to plumb the depths of the problems and resurrect Science to how it will have to be to tackle this gigantic impasse.

But, we must start somewhere, and the clearest basic question has to be, “What is the Nature of Empty Space?” Of course, we must be absolutely clear which “Empty Space” we are talking about.

Is it the Empty Space prior to the Big Bang, or that produced by the Big Bang itself as it created our current Universe? Or finally, is it the Empty Space between material objects now?

Now, we have no choice in where we must start. It has to be our current Empty Space, and we must attempt somehow, to define it by what it actually does, and, rather than a static investigation of an eternal, we must then attempt to reveal its history – what process brought it to what we have now, from what did it originate and by what processes did it occur?

We can start primarily by studying the Heavens, for only there are there moments from vast tracts of the distant past.

The Hubble Space Telescope, with its recent Ultra Deep Field image, is claimed to be seeing all the way back to 13.2 billion years ago, so there must be, when all directions get a similar treatment (and consequently all times from then to now), we should be able to sequence things as we did in a much smaller timescale with the rocks of the Earth, and its History.

The primary question about Our Space must be, “Is it really empty?” After all, it effortlessly propagates electromagnetic radiation over truly colossal distances, and for incredible periods of time.

And, if you are not a mathematician with the appropriate equations and a Copenhagen conception of wave/particle duality, you will not stomach an electromagnetic oscillation of nothing (as the current String theorists insist upon); you will want something there!

In addition, the established phenomenon of Pair Production is perhaps a key event, which needs an explanation. Physicists have certainly detected this event as the seeming creation of one positron and one electron appearing from no evident source, and careering off in different directions. I think that most interested people would like to know exactly what was happening here as it sounds like creation!

But, the same scientists have also observed the same two particles coming together and vanishing on contact. So, there is evidence both ways: there seem to be both the creation and annihilation of matter from and to NOTHING! Now, not only the man in the street finds this unbelievable, but also even our theorists require some kind of explanation. Now, needless to say, stupendous efforts were undertaken to try to find other things that were associated with both Pair Creation and Pair Annihilation, but they found nothing material.

There was though evidence of E-M radiation present, so they finally decided that the transfers were to and from

high energy Photons of Radiation.

The theory, which was proposed, had single photons of disembodied energy dissociating into the given pair of particles. And, in a directly contrary way, when such a pair of particles came together they mutually annihilated into a photon of E-M energy.

But, the only existing prior evidence of such Matter-Energy transformations were in Nuclear Fission and Nuclear Fusion, and these were so gigantic as to trigger chain reactions into the world’s most enormous bombs. Yet in these dual particle phenomena there seemed to be NO gigantic energy requirements at all. But, our theorists could find-and-fit a formulateable answer.

They could make positrons and electrons of different sorts of Matter

The positron was conceived of as anti-matter, while the electron would be of ordinary matter, and these are conceived of as natural opposites, like Charge, and just as when positive and negative charges come together they cancel out, these opposite types of Matter were considered to be similar. They are also irreconcilable and would mutually annihilate on contact into Pure Energy.

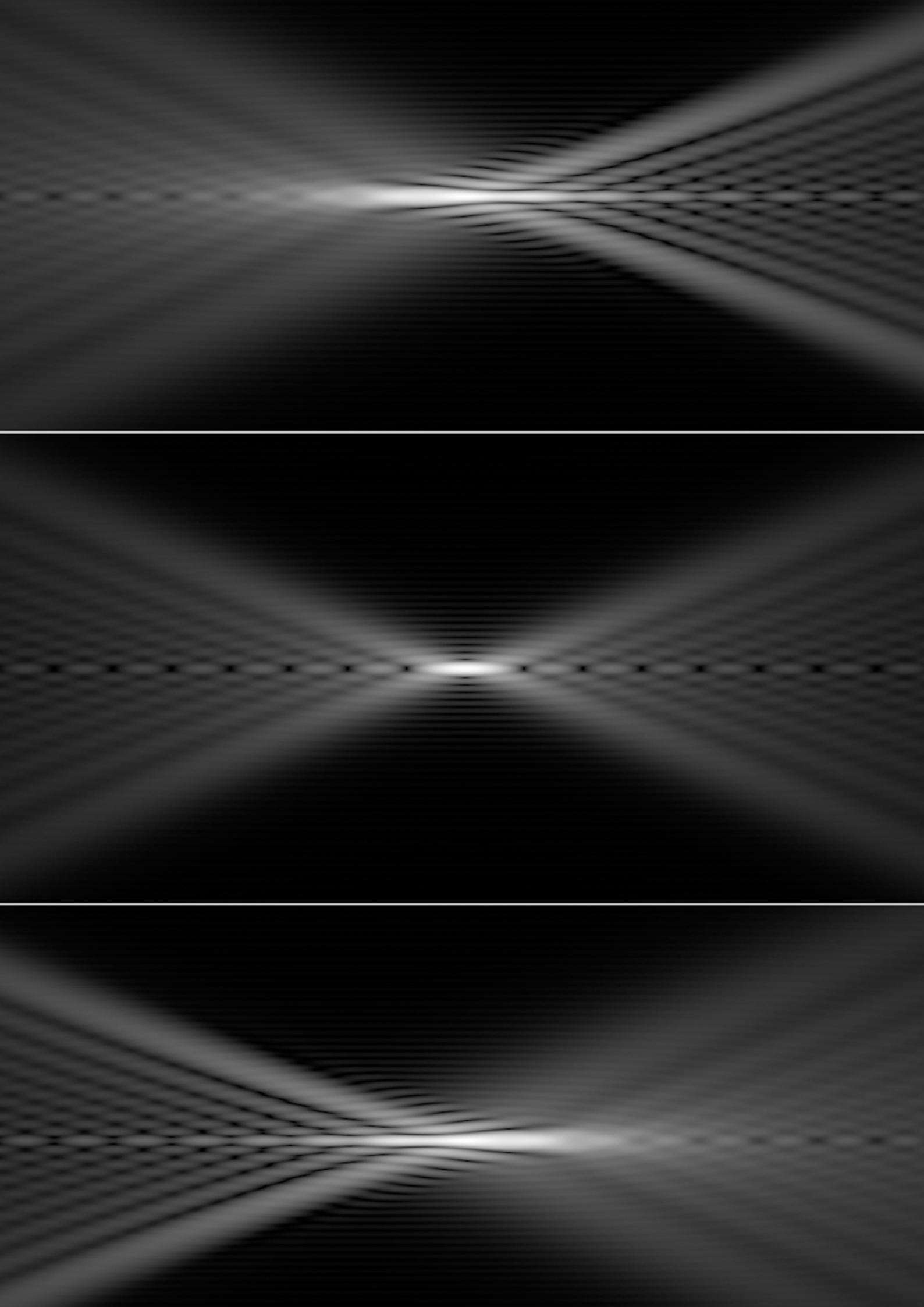
Now, you may notice, that with these theorists, the once crucial requirement for a meaningful explanation, has been downgraded, and by far the most important criteria has become, “Can we cover it with a formula, that will give the right answers every time?” If it works, it is right has become the primary criterion!

Also there is the Casimir Effect, also in Empty Space, for this somehow elicits a force from nowhere, and these examples are not alone. Empty Space does not sound entirely Empty, does it?

But these theoreticians are not in any way undermined by these cases. They are always satisfied as long as each phenomenon can be fitted to a formula – a useable description. It is, of course, because they insist that the only universal in Reality is Form, and in this they are indeed correct.

Form or Shape or formulateable pattern is indeed the same everywhere. The question is, “Why are they so easily satisfied?” For it is only a description: it is NOT an explanation!

The fact that the same equation can appear in a hundred, absolutely-unrelated situations, doesn’t mean that they are caused by the “necessity” of a universal pattern. It merely means that Shape or Form is vastly more limited than Reality itself. Patterns do recur all over the place. You can get the same equation working in a drop of liquid, and in an atomic nucleus, BUT it doesn’t mean that they have the same causes, does it?



The idealist allocation of cause to Form allows our “modern” scientists to halt the scientific process as soon as they have extracted a useable equation. But we do NOT call that Science: it is surely only Technology?
Science must explain!

For it is only in attempted explanation, and the inclusion of an improved measure of Objective Content that any Understanding can accrue. The halting as soon as an equation has been found leads to NO progress in the essential scientific explanation. You stop it dead when you have your equation. How can that lead to an ongoing, ever-improving and extendable, yet correctable, set of conceptions?

So, taking the evidence or our current Empty Space must begin our first attempts at a more general explanation. It absolutely must be full of something that will deliver all these phenomena. The question is, “What?”

Early scientists conceived of a weightless, charge-less and elastic medium, which they called the Ether. And the formulae based upon this invention are still used today. It is useable but does not reveal the nature of Empty Space at all. You can find Form without Understanding. We do it all the time! But this conceived of medium was merely a placeholder, and nobody was able to detect it.

So, can we define a New Medium from its necessary properties as evident in Empty Space to deliver this? For, we have quite a demanding group of these properties – from the propagation of complex electromagnetic oscillations (radiation), to positron/electron Pair Creations and Annihilations, with many others thrown in too?

The most demanding of these has to be the propagation of electromagnetic radiation. The difficulty is, as it has been since its discovery in the late nineteenth century the amazing Quantum. For this seems to localise radiation into separate gobbets, and also, therefore, the conception of a massless particle carrying a single quantum of energy. The trouble was it wasn’t usually evident as a single particle. And, nevertheless, many properties usually associated with mass could be attributed to these alternative forms.

Yet, the same could be said for the propagation of disturbances in water. Even there the components of that medium were individual molecules, but it was the bodily oscillations of these that were the crucial thing. What could possibly play the same role in Empty Space?

It would have to be massless and charge-less, and have something oscillate-able. It could, of course, be of the same structure as an atom, and carry the oscillation internally as an orbiting part of the entity. But that would invariably involve mass!

Could we conceive of a massless, charge-less particle, somehow capable of carrying an oscillation internally, and passing it on effortlessly to another of the same?

The search started for a known candidate with these properties. There didn’t seem to be one! So, theoretically, the attempt was made to devise how one could be made out of known particles.

The components would have to be small, preferably of opposite charges and even of different types of matter (if such were possible) But the latter requirement seemed to scupper such an idea, as particles of opposite kinds of matter, as were then known, could not come together without mutually annihilation – like a positron and an electron were known to do.

BUT, wait a minute, isn’t it true that a positron and an electron seem to appear and disappear in JUST such Empty Space?

Maybe they could mutually orbit one another and so prevent annihilation? Also, if that were possible, the orbits could also be promoted to higher energies to hold incoming E-M radiation, and those gobbets of energy could be passed on just as the atom can do.

We would have a seemingly massless, charge-less particle, which could carry quanta of energy and propagate them. The question then becomes, “Has any such particle been observed?” And the remarkable answer was, “YES!”

It appears in High Energy Accelerators and is called the positronium, but lasts only for the tiniest of lifetimes before it dissociates into.... Guess what?... into a positron and an electron.

So, initial excitement was deflated by this instability, it seemed to be yet another dead-end. But, then we considered the place that it had been found. In such very high-energy conditions, it would be likely to be at the very upper limits of its possible existence, where the tiniest of additions would obviously dissociate it. What if the environment was very different, like Empty Space, for example, where available energy would be very much lower. Surely, when existing towards the lower end of its viable range, it could very well be STABLE!

So, how about a “paving” of the whole of the Empty Space within our Universe, with stationary, very low-energy positroniums (which to make clear their differences, we will call neutritions). For this would have all the necessary properties (and maybe a few more), but would be undetectable by the usual means, except, of course, in its universal propagation of electromagnetic radiation. There are even intimations as to how this might have arisen historically. For as most matter would tend to aggregate and be capable of absorbing vast amounts of energy, these

neutrinos, would be likely to be normally reduced to their minimal energy state, and in this condition be extremely stable.

Why could such a mode for this known particle not exist?

Now a great deal of work was necessary to take this beyond speculation.

NOTE: But notice how different this kind of theory is to the usual equation-led stuff. No equations were necessary to consider such particles: the speculation was entirely physical and informed.

The first area in which these ideas were applied was in a successful attempt to explain the famed Double Slit Experiment with electrons. And it worked!

Putting up an animation on YouTube has so far elicited 27,000 hits and well over 100 comments, and has demanded a series of 7 papers from this author in further explanation. But this was clearly insufficient.

The next area had to be to explain why it should be there in Empty Space. What could possibly have paved the Universe with these “Empty Photons”?

S H A P E

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