Mechanics of a Self-Creating Universe

by Anton Biermans

Introduction

What is possible in physics is limited by the flaws in our ideas, concepts and theories as they scramble our observations or their interpretation, invite sloppy reasoning and lead to inconsistent or conflicting theories like relativity and quantummechanics, causing more damage and more difficult to detect as they seem more self-evident.
To track down these flaws, this study investigates how a universe might create itself out of nothing, what kind of mechanics this would require, guided by the findings and insights of present physics.
If in this universe the total of everything inside, including spacetime, is and remains zero, if it doesn't exist as 'seen' from the outside but has only reality to an inside observer who's part of it, then the universe as a whole cannot have any property, so if it doesn't make sense to ask from the outside how much energy it contains or how large it is, then how can we ask this question from the inside?
If we cannot speak about its energy content, it cannot affect whether it will keep expanding or not: if spacetime contains energy in the form of virtual particles so its energy increases as it expands, if we can express a quantity of energy in meters, then this suggests that the universe contains as much energy as it is large, whatever *that* may mean.
If there's no clock or ruler outside the universe to measure inside quantities with, then there must be something wrong with our ideas, why we came to think it would make sense to calculate such quantities. This reverse engineering, then, can be a useful shortcut to detect misconceptions which from the usual point of view look too self-evident to suspect.

To physicists, used to explain events in terms of cause and effect, quantummechanics came as a big surprise as it revealed nature to be essentially noncausal, at least at quantum level, a fact which even today hasn't been accepted by most scientists because our world seems so obviously causal.
However, if we understand something only if we can reduce it to a cause, and understand this cause as the effect of a preceding cause and so on, to end up at some primordeal cause which by definition cannot be understood as it cannot be proved, reduced to a preceding cause, then this invalidates any causal deduction, so causal reasoning in fact is irrational as it is founded on unprovable suppositions.
In a universe where events and things create each other, they explain each other in a circular way, so a sound argumentation would start with any assumption, any link in the chain of reasoning without proof, to be used to explain the next link and so on, to follow the circle back to the assumption we started with and which this time is explained, proved by the foregoing reasoning.
Science, then, should limit itself to discover and quantify relations between events and abstain from making irrelevant statements about what is cause of what: as the universe has no unique point from which can absolutely be determined what precedes what, we cannot speak about what is cause of what.

As mathematics cannot reveal whether a seemingly obvious idea is nonsense and our equations are designed to accommodate what we think is true, it won't solve the present inconsistencies: the fact that any fool can master the maths of physics and publish respectable looking nonsense full of impressive equations shows that mathematics is but a tool and never can replace the original thinking required to clean up the mess outdated ideas have made of physics.
One piece of mess which has obstructed the development of physics for far too long is the naive idea that a force can be exclusively either attractive or repulsive: the essay will show why gravity necessarily is both attractive and repulsive, how it powers or is powered by the expansion of the universe and inevitably leads to a uniform mass distribution.
As the uncertainty principle is at the heart of quantummechanics, a definition of mass is developed based on it and which, used in relativity theory, can solve the present conflict between these theories.

General conservation law

As in a self-creating universe the total of everything inside, including spacetime itself remains nil, its creation is like a zero splitting into positive and negative numbers the sum of which always remains zero, the laws of physics constituting its arithmetic.
This suggests that nature's creations are somehow ambivalent: if two identical photons annihilate without liberating any energy, if the energy of a photon in one phase is as positive as it is negative in the next, then its energy doesn't lie in the separate phases but in their alternation: the faster its sign oscillates, the higher its energy is.
As the source hasn't lost any energy by emitting the annihilating photons so their emission is nullified or was a potential, virtual event, if the emission of a photon only becomes real if it is absorbed so the emission doesn't precede the absorption, then it cannot be understood in terms of cause and effect as this requires that we can determine unambiguously what precedes what, which we cannot.
Of course, if energy is an ambivalent quantity, then mass and gravity must be ambivalent as well.

If an electron cannot express its charge if there is no other charge in the universe, then it couldn't be charged itself, so a property is something which is shared by particles: as its expression involves an energy exchange between the particles, they exist only to each other as far as they exchange energy, so by exchanging energy they preserve each other's properties and the force between them.
If it makes no sense to ask what precedes what, mass or gravity, then particles must be the source as well as the product of their interactions, which explains why the mass of a particle equals its inertia.
As the force one particle exerts on the other equals the force by which it is anchored at the position it acts from so it *can* act, and equals the opposition the other particle offers to it, to its inertia, and both particles are anchored by gravity to all masses in the universe so they owe their inertia to each other, then their mass indeed is the product as well as the source of their interactions, so gravity must be as well, that is, be attractive as well as repulsive.

Quantummechanics and the speed of light

If the emission of a photon is a virtual, potential event until it is absorbed somewhere, if it isn't emitted for real unless the receiver agrees to absorb it or even urges the source to produce it, if they determine together its energy and time of transmission so its emission doesn't precede its absorption, then the transmission must be instantaneous, though an observer will measure a finite time.
If a space distance is a time distance, then the speed of light isn't a velocity but rather a conversion factor which says how many meters correspond to how many seconds: as it is impossible to travel a space distance greater than the time distance it corresponds to, nothing can move faster than instantaneous, so all observers, whatever their own velocity, measure the same ratio between space and time as they are two aspects of a single quantity.
The transmission, then, doesn't consist of three separate, independent events, its emission, its voyage and its absorption, but is a single event which leads to changes at two different places, points that also have different time coordinates.
As at the speed of light the position of the photon is completely indefinite so it cannot interact en route, to the photon there's no spacetime distance between the points it is transmitted: as to an observer there *is* a spacedistance between these points, to him they are also separated in time, so he measures a time between its emission and its absorption proportional to their distance.

Our confusion comes from the idea that the creation of the universe and all its particles was completed in the past, all galaxies have about the same age, so if we imagine looking from outside the universe in to see galaxies of the same age billions of lightyears apart, then we implicitly assume that it's the same time everywhere throughout the universe, as if there's a clock outside of it: however, taking their space distance for real but ignoring their time distance invalidates these 'observations.'

If looking from within we see a galaxy in an earlier phase as it is more distant, we say this is because it took its light so long to reach us, then we try to correct one mistake with another: as its light affects our world in the state we see it in, then we see the galaxy in what to *us* is its present state, however different it looks from another distance.
In a universe which doesn't even exist as 'seen' from the outside, where galaxies create each other, we cannot speak about objects as if they have an absolute reality we can make objective statements about, as if they have an existence beyond its borders, beyond their interactions.

A B C

Though if galaxies take part in each other's creation and galaxies A and B at the rim of each other's universe see each other appear at the same time, in an equally early phase of their evolution, C exists to B long before A will appear at B's horizon, at a time when C and A don't exist to each other, so in general an observer will see other galaxies in an earlier phase than his own.
The state of a galaxy then is a superposition of states, the 'earlier' ones still active, involved in the energy exchange with distant galaxies: if photons depart at the source at the time they're absorbed elsewhere, then we don't see a galaxy as it was a long time ago, but in what to us is its present state. The idea that we see it as it was in a distant past refers to an impossible observation post outside the universe, as if there's a clock outside of it, a unique time of observation, an absolute 'now'.

As a particle at the speed of light cannot interact, express its properties as this requires influences to propagate even faster, its position is perfectly indefinite: though we can calculate its position anytime and find it at the predicted place and time if we intercept it there, as it has no position in a physical sense until it interacts, we cannot assign it a velocity.
Though one might object that a photon interacts with the virtual particles on its path, if they are the stuff spacetime is made out of, then their influence is already accounted for in *c*, any interactions taken care of by the particles between which it is transmitted.
As its energy is determined by both the source and the receiver, the source makes a photon of a higher energy for a receiver in a stronger gravitational field, so its energy doesn't increase in the field.
We should, then, abandon the classical idea of a photon as a bullet-like particle experiencing all kinds of adventures on its journey as it is a purely quantummechanic, noncausal phenomenon.

If gravity as an ambivalent force is far stronger than if it were attractive, then the graviton is no spin 2 particle and would carry enough energy to have been detected if it existed: if a photon changes the mass of the particles it is transmitted between so transports mass and in displacing them transmits gravity, then it does the job the graviton is supposed to do as well as its own, so, as we'll argue that charge is an aspect of mass anyway, let's just call the thing a photon.
If whatever kind of force on a particle brings its inertia to expression as gravity towards its source, if particles exchange (electromagnetic) energy to preserve and express their mass as gravity between them, then how can we invent a graviton, a non-electromagnetic kind of energy and still think we can unify gravity with electromagnetism ?

Quantum-mass

It seems reasonable to define the uncertainty or indefiniteness in the position of a particle as greater the smaller the effects of its presence are, the less it matters where it is: the smaller its mass, the smaller the force it feels and exerts, the less energy is involved with a displacement, the larger the area it can be found in, the less definite its position is.
As the energy to displace it increases with its inertia, it is obvious to try a definition of mass according to which the mass of a particle is greater as its position is less indefinite: the more equal the forces on it are from all directions, the stronger they are, the smaller the area where they are equally strong, where it can be found, the less indefinite its position is, the more energy it takes to displace it, the greater its inertia is, its opposition to a displacement.
Though the definiteness in the position of a particle, its mass, then depends on the observer and its environment, we always find the same value as a measurement is a procedure executed in some prescribed manner, in identical conditions.

If the force between two particles changes as the inverse square of their distance so its magnitude changes less per unit length at larger distances, the part of one particle in the energy involved in the displacement of the other decreasing, then the indefiniteness in each other's position, in their distance increases: the farther apart, the smaller the rate of change of the force between them, the less definite their distance is, the less definite, the smaller the force between the particles is.
However, as its rate of change also depends on the magnitude of the force, on their mass, the indefiniteness in their distance isn't unambiguously a measure of their distance.
If an observer sees a star shift to blue as the gravitational field he sits in increases so its distance is less indefinite as seen from a stronger field, then that doesn't mean a smaller distance: if seen from outside the field, a ruler shrinks inside of it, if the field is an area of contracted spacetime, then it contains more distance (as measured inside) the stronger it is.
If the (in)definiteness in the distance between the particles a photon is transmitted determines the (in)definiteness in the wavelength they can exchange energy at, then an increasing distance between the particles leads to a redshift in that exchange, even if they are at rest with respect to each other.

The smaller the mass of a particle, the weaker its interactions, the less it matters to nature whether it exists, where it exactly is, how large its mass exactly is, the less definite its mass is, so the mass of a particle also can be defined as being smaller the less definite it is.
The same holds for a photon: the smaller its energy, the smaller the effect of its transmission is, the less it matters how large its energy exactly is, the less definite its energy is, its wavelength and direction.
The smaller its energy, the longer, the less definite its wavelength is, the longer a cycle takes, the less definite the time at which a wavecrest or trough passes some point, whenwhere it starts and ends, the less definite the distance is of the particles between which it is transmitted, the less definite the time of the transmission is, the longer it takes, the longer its period is.
If seen from outside a gravitational field, a ruler in the field shrinks and a clocks runs slower, if the field is an area of contracted spacetime containing more distance as it is stronger, and a greater distance is a less definite distance, is associated with longer, less definite wavelengths, then we would see a distant galaxy redshifted even if it would (be able to) be at rest with respect to us.
The farther two galaxies are apart, the smaller their part in each other's creation is, the less energy they exchange, in less definite wavelengths, the less events at one galaxy are related to events at the other, the slower they see each other evolve.

Self-creation

As a finite light speed implies particles to be only the source of their interactions, they are supposed to randomly emit and absorb quanta of energy which carry the force between them so their energy would fluctuate about some mean value: though according to the uncertainty principle the fluctuation lasts shorter as it is larger, it is unclear why this should be if they only are the source of their emissions and not also the product of what they absorb.
The uncertainty principle dE . dt = 1 also implies that particles can appear out of nowhere: the higher their energy, the shorter they are allowed to exist, to violate conservation laws.
However, this is just Planck's law defining energy in terms of time and vice versa: as time and energy create, power each other, are two aspects of the same thing, there's no law violated at all as time doesn't even exist without energy.
As the accuracy in one is equal to that in the other, one cannot be less definite than the other, so if we define a quantity of energy to be greater as it is less indefinite, then the time interval it corresponds to, its period, is less indefinite as it is smaller.

If a virtual particle appears by borrowing its positive energy from its antiparticle which then appears with an equal, negative energy, then they can appear without violating any law, though if they only exchange energy between them, they would exist only to each other but have no further reality.
If they only exist to other particles by exchanging energy with them, then particles can force each other to appear again and again by alternately borrowing and lending each other the energy they need to exist, express their existence with, so by continuously exchanging energy, by appearing again and again, in concert, they can preserve each other's long term existence, their properties and the force between them, so real particles are virtual particles which force each other to appear again and again.
If as they alternate the sign of their energy or their time direction, then it is as if nature, in an effort to keep the total of everything in the universe zero, tries to de-create what it created a moment before.
The energy of a fundamental particle then doesn't fluctuate arbitrarily about some mean value: it exists by alternately borrowing and paying back *all* of its energy: as particles exchange energy with different neighbors in different wavelengths –the farther apart, the less definite, the larger the wavelength they exchange energy at– their energy is a superposition of energies, frequencies, so they indeed are the source *and* product of their interactions.

The more particles appear inside a smaller volume, the smaller, the less indefinite their distance, the higher the frequency they oscillate, exchange energy at, the higher the energy of the particles, the more strictly their oscillations must be coordinated in time, the less indefinite, the more precise their distance must fit the wavelengths they exchange energy at, the more powerful they force one another to keep reappearing, the greater the inertia of the particle cluster.
As in every cycle the energy of a particle is for a short time zero, its position is for that time completely indefinite, so it would act like a photon: the higher its energy, the shorter it is massless in each cycle, the shorter the distance it can travel in that time or the shorter its position is indefinite, the smaller the area this corresponds to, the less indefinite its position is.
Alternating the sign of their energy and quantum numbers, a particle and its antiparticle then oscillate in counterphase, depending on their distance and the wavelength they exchange energy at whether they see each other as identical particles, as each other's antiparticle, or as something in between.
As the universe as a whole can have no properties, it cannot contain more particles than antiparticles, so our present notion of (anti)particles, besides being simplistic, is wrong.
Unfortunately many concepts which at the time they were dreamed up in some specific context were provisional and often even doubtful, have over time solidified into the holy truths of today: whereas a really scientific attitude would have been to keep reconsidering them in the light of new discoveries, to adjust or eventually reject them, many of these partly or completely untenable ideas have been built into physics and are responsible for most of its inconsistencies.

Let's consider the identical particles

D A B C

The interactions C-A and D-A contribute to the force between B and A (as do D-B and C-B) so C and D are represented in the interactions between A and B.
As the position of A is less definite according to C than to B, the energy exchange between A and C proceeds in longer wavelengths than the D-B and B-A exchange.
If the wavelength of their energy exchange is a measure of the indefiniteness in the position one particle has according to the other, of the size of the area where they locate each other, then B locates A in a smaller area than C does, but, as the position of A and B also are affected by their interactions with C and D, there is a probability for B to find A in the larger area where C or D locate A.
As all exchanges contribute to the (in)definiteness in the energy and position of a particle, the probability to find it somewhere is determined by this superposition of indefinitenesses, its blackbody spectrum showing the distribution of frequencies it exchanges energy at.
Since A looks different to B, C etc, A can be thought of as a collection of particles of varying energies, as being the superposition of the more or less virtual particles of its field, all particles being the source of as well as the (interference-) products of their interactions, A looking more real to its different neighbors as the frequency they exchange energy at is higher.

The idea of a dimensionless point particle then is untenable as it considers the particle to only be the source of its interactions: being their product as well, its dimensions can be thought of as given by the superposition of indefinitenesses in its position.
As there are no point particles, forces and energies never become infinite, so renormalisation procedure doesn't so much correct for this outdated idea but rather describes particles as they are.
Likewise, instead of using the classical masses of particles in the equations of quantummechanics predicting the result of their interactions in an experiment by summing over every possible interaction times its probability to occur, we can consider such equations to *define* their mass, their masses being the result of the calculation, of these interactions, though it is of course much easier to just measure their mass as a measurement weighs all interactions anyhow.

Though quantummechanics describes particles as wave phenomena, physicist don't believe that there is something which does the waving as this would raise the problem that the sign of their electric charge then also would alternate, at the frequency corresponding to its energy.
However, if the charge sign of particles can be identified as the sign of their energy, refers to their phase with respect to each other, and two particles exchanging energy at one frequency flip their charge sign simultaneously, then they don't notice any sign change as long as they are at rest with respect to each other, any motion resulting in a change of the frequency they exchange energy at.

Gravity and spacetime

The uncertainty principle implies that virtual particles appear in empty spacetime to disappear after a time inversely to their energy, so as the universe expands there's energy created.
Energy is a source of gravity only if it has a position to act from: the less indefinite the position of the virtual particles is, the higher their energy is, the stronger it is expressed as gravity.
As positions are less indefinite near massive objects, the energy of virtual particles will be expressed stronger as gravity as the field they keep popping up in is stronger, so they are, in fact, part of the field of these objects and contribute to their mass.
A consequence of a mass definition based on the uncertainty principle is that gravity from of a cluster of particles (particles, stars, galaxies) depends on its mass distribution: the more contracted the cluster, the less indefinite the position of its masscenter is, the stronger the force it exerts.
If gravity from the galaxy's center can be much stronger than according to the classical calculation based on its visible mass and the field itself contains mass in the form of virtual particles, then this may perhaps explain the high velocities of hydrogen in large orbits about some galaxies.

If the force on a particle from the center of its own cluster can increase only as much as it increases from the other direction, from neighboring clusters, then clusters can only contract in concert.
The force between the particles then is the product and source of that between the clusters and vice versa, so they don't only exchange energy within their own cluster, but also with the particles from neighboring clusters, the clusters becoming more strongly anchored to one another.
As their energy increases on contraction, their exchange shifts to higher frequencies, the peak of the blackbody spectrum of the clusters becoming sharper and higher, shifting to a higher frequency.
The more particles are packed within a smaller volume, the more their frequencies converge to a higher value, the more energy they exchange within a smaller range of frequencies: the higher their frequency and smaller their range, the more coordinated their oscillations are, the stronger they collectively oppose a change of state, of their frequency, the greater the inertia of the cluster is.
If their energy increases as they contract and their position becomes less indefinite so the number of energetically different positions per unit volume increases, and an area of spacetime is larger as it contains more physically different positions, then what to an observer outside the field looks like a contraction, is to a particle inside the field looking out an expansion.

As the cluster contracts, so does its field: as its gradient becomes steeper and turns more abruptly flat nearer the cluster so positions become more equal, less definite in the flat area, then particles can be less at rest near the cluster and from there oppose its contraction.
As at higher energies there are more energy levels for identical fermions to occupy, their contraction creates more states to be in so more particles fit inside a smaller volume as there are more positions to be at, so the creation of energy, the contraction of the cluster, of spacetime itself is accompanied by the expansion, the creation of spacetime itself, of distance between the clusters.
So if an observer sees the distances between the clusters increase as they contract, then that isn't because their mass decreases, the force between them, but because there's as much spacetime created between them as energy as they contract.
The expansion of spacetime then isn't so much the adding of more of the same to an already existing volume but rather an increase in the number of energetically distinguishable positions and states.
As it depends on the energy, the definiteness in the particle's position what details it can discern, how many different positions its universe contains, spacetime is more defined, larger as its energy is higher, so spacetime expands as its energy increases.
If spacetime is smaller, has less different positions to a particle as its energy is smaller, then we might imagine the universe to begin with particles of a very small energy –if it can have a beginning at all.

As they create each other, particles define spacetime if only to be able to measure off their wavelength or frequency in it, so, to make positions differ from each other, (clusters of) particles must appear simultaneously and, as their energy only can increase as far as they can be at rest with respect to each other, more or less uniformly distributed.
Though we take spacetime for granted as we cannot imagine its absence, it isn't some property-less quantity which comes for free, but instead is built out of all kinds of virtual particles which by contracting to mass concentrations expand spacetime in between, the gravity constant relating the rate of this combined contraction and expansion.
Spacetime, then, like canvas on a frame, is stretched between mass concentrations: the heavier and more compact, the more taut spacetime is stretched in between, the emptier and flatter it is in that area.
If spacetime doesn't exist without energy, then it isn't a quantity which though curvable by mass, has an existence independent from mass, so relativity theory must be revised to allow for this.

If virtual particles can promote one another to real ones, it would'n take a Big Bang to be created: though particles are bricks baked in the building process, hardening as their cluster contracts, it is unclear whether they are baked in stars or if they have been partly pre-baked in a previous process ending in a Big Bang-like explosion.
If particles can be said to alternate their time direction about some zero time point, if we don't observe the energy exchange between objects as long as they emit as much energy as they absorb in every frequency, then we wouldn't see them, so if all objects in the universe would be blackbodies and their state wouldn't change so nothing would move, there wouldn't pass time.
If we only see objects as they reflect light or emit more energy than they absorb, like atoms emitting photons as they de-exite or stars and galaxies as they contract and heat up, then they don't so much evolve *in* time but rather *generate* time as we experience it as they evolve.
As we wrongly assume that time passes anyway (with respect to what?), even if nothing would change, we consider their evolution as happening *in* time, as being caused, predestinated, and so misinterprete the associated photon emissions as causal, as classical phenomena.

Unification

If every independent property is associated with its own dimension, symmetry and conservation law, then reversely the three spatial dimensions must refer to different, ‘perpendicular’ properties, with phenomena which however intrinsically related, are fundamentally different.
If an oscillating particle is an area of alternatingly expanding and contracting spacetime, if the energy exchange to keep reappearing is in radial directions observed as gravity, then this is associated with electromagnetic oscillations in a plane perpendicular to gravity, all field vectors flipping their direction simultaneously at the frequency corresponding to the particle’s energy, so ***G***, ***E*** and ***B*** would be the three mutually perpendicular manifestations of the same thing, so what to one observer looks like gravity, would to someone looking from a perpendicular direction be part of its electromagnetic field.

If like energy and time, mass and space create each other, if mass, a gravitational field is an area of contracted spacetime, if a ruler shrinks in the field, then the unit length used to express the strength of the electromagnetic field as a function of the distance ***x*** to the source isn’t just a mathematically useful idea: if spacetime, if distance is an aspect of mass, then ***x*** is a physical quantity, an aspect of gravity. Being a feature of mass, we shouldn’t take distance for granted, as if, except for mathematical purposes there’s nothing of interest in ***x***, as if spacetime is flat, as if it can exist without any energy or mass in it. So in expressing the magnitude of ***E*** and ***B*** as a function of the distance ***x*** to the source, we have, unwittingly, unified gravity and electromagnetism already, Maxwell’s equations describing gravity in the variable ***x***, the distance to the source coupled to ***G***.
However, as the field farther from a source is less its private domain but mixes with, passes into the field of neighboring objects, ***x*** doesn’t refer unambiguously to the mass of that particular source –also being the product of its interactions, so the question is whether we can relate ***x*** to ***G*** more explicitly.

As the limited length of the essay only allows for a sketchy overview and I was mainly interested in the general principles of the mechanics of a self-creating universe anyway, this is a but a qualitative study: however simplistic the view on many matters is, it is promising enough to try to translate into equations.