The Phoenix Theory of the Universe

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Abstract

Introduction
Much knowledge has been discovered about the Universe and is readily available. The Phoenix Theory attempts to re-interpret it in a simple and intuitive manner that better fits what we see. The Phoenix theory builds upon Einstein's theories of Relativity and General Relativity. His simple equation $E = mc^2$ explains a lot more about the universe than it has been credited with. This theory fills in many of the missing details and attempts to complete the picture.

Everything in the universe is made of energy. This theory attempts to explain the relationship between mass, energy and time in a cyclic universe, matter, antimatter ad infinitum.

Affirmation and integration
The Phoenix Theory maintains that the original universe was born, of a quantum creation event much the same as the Big Bang predicts. All of the following:- baryon asymmetry, time asymmetry, time and the arrow of time, inflation, gravity, the repulsive "force" of expansion, the speed of light, the net amount of energy, size, the net amount of time and the rate of entropy are all facets of the rate of flow of time and are therefore related. The theory explains all of the above connections and goes on to incorporate red shift, quasars, black holes, white holes, galaxy formation and on the very large scale filaments and large voids. It explains the origin of the universe, the fact that it is closed and why it is cyclic, with matter universe, following antimatter universe ad infinitum. It explains how the universe can be cyclic (perpetual motion) without violating the Second Law of Thermodynamics.

What features of the Phoenix Theory are observable or generally believed to be true?
Antimatter particles travel backwards in time
Baryon asymmetry
The universe is expanding
The expansion is accelerating
The universe is homogenous and isotropic
The universe appears to have no center
On a large scale the universe is made of foamy filaments surrounding large voids
Spiral Galaxies originate with quasars at their centers. (Galaxies are born center out and progress to out to center)
"Quasars" in the early universe produce huge amounts of energy
"Quasars" often reside in the centers of galaxies
"Quasars" are often seen outside of but seemingly connected to galaxies
"Quasars' seemingly connected to galaxies have a much greater red shift than the galaxy
Stars convert matter into energy
Gravity slows down the rate of flow of time

The Phoenix Theory explains the "how and why" of all of the above features.

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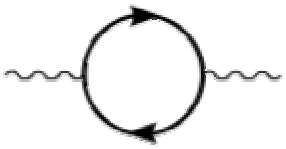
The Phoenix Theory of the Universe



This diagram shows how energy can convert to matter and matter to energy.

A high energy photon enters from the left and creates an electron positron pair that travel in a loop, annihilating and emitting a high energy photon on the right of the diagram. The process obeys all of the conservation laws and is time reversible.

Matter travels forward in time, antimatter (relative to our matter universe) travels backward in time. The laws of physics do not preclude the existence of an antimatter universe. Matter and antimatter are just relative terms. In an antimatter universe intelligent beings would perceive their universe to be made of matter and time to be flowing forward. The universe contains an unwritten law that in the phase that can support life the "arrow of time" can only point forward. In fact the arrow can point forward, backward or be double ended.

An outcome of this is that, whilst mater is gravitationally attracted to matter, antimatter gravitationally attracted to antimatter, mater and antimatter will gravitationally repel each other.

Energy creates matter in the proportion of E = MC 2.
The proportion of energy to matter which is a variable dictates the rate of flow of time.
Rt = E/M where Rt is the rate of flow of time. E is energy and M mass
This can be re-written as Rt = E/M-Ma where Ma is antimatter
In other words the rate of flow of time in the universe is directly proportional to energy and inversely proportional to matter minus antimatter.
Rt = E/M-Ma can tell us a lot about the universe.

What is Time, how does it arise, what gives time an arrow, why does it never flow backwards and what determines the rate of flow?
Time is a measure by which things happen, the yardstick of causality. We live in a universe that essentially only allows time to flow forward, were it to be otherwise we wouldn't be here to contemplate it.

There are three aspects to time; one is the divisions that we are familiar with, seconds, minute's hours etc. These are arbitrary measurements.

The second is the "rate of flow of time". (Rt = E/M where Rt is the rate of flow of time, E is energy and M is matter). Consider the analogy of a clock face; it is divided into a number of divisions. If we imagine that the distance between the divisions represents the "rate of flow of time" and the number of divisions representing time we can see that if the clock face is larger then the distance between the divisions is also larger (the rate of flow

of time is slower). This isn't a bad analogy as the clock hands sweep out a larger representation of space time.

The third aspect is direction. Time is a natural outcome of the universe and the direction ("the arrow of time") is governed by the Second Law of Thermodynamics. Time is the measure by which things change. It is derived from the fact that the useable energy (low entropy) in the universe is continually being used and transformed into high entropy (low quality energy

Rt = E/M This ratio is continually changing. For example stars convert their mass into high quality energy, thereby changing the mass/energy ratio (lowering entropy). This energy makes the universe expand, (increasing entropy)

Time can flow at different rates; the arrow of time can point forward, backward or be double ended.

We are used to time seeming to be a constant in our little part of the universe but on a larger scale this is not so.

General Relativity allows for both relativistic time dilation and mass to affect the rate of flow of time. Mass slows the rate of flow of time as does traveling near the speed of light.

"Gravitational time dilation *This has been demonstrated by noting that atomic clocks at differing altitudes (and thus different gravitational potential) will eventually show different times. The effects detected in such experiments are extremely small, with differences being measured in nanoseconds."*

From Wikipedia, the free encyclopedia

Gravity waves

General relativity predicts that large events such as supernova should produce gravity waves. Why don't we see them? They probably do exist but wash over us undetected. The gravity wave itself is exactly canceled by a coinciding change in the rate of flow of time "wave". They arrive together as they are both different aspects of the same thing; one is superimposed on the other.

The predictions of Rt = E/M-Ma

Let's consider three hypothetical universes, one containing energy but no matter, one containing matter but no energy and one containing both matter and energy.

Consider a hypothetical universe made of energy but no mass (matter).

In a universe containing a finite amount of energy but no matter (mass) the arrow of time will be double ended and the rate of flow of time will be infinite. Energy likes to dissipate therefore such a universe would expand towards the infinite and cool until the temperature dropped to absolute zero (high entropy).

Another way of looking at this is if there is no matter then there is no arrow of time. Maybe energy can exist outside of time as predicted by quantum mechanics, energy of the vacuum.

Energy gives time a rate of flow which is infinite in both directions unless moderated by mass (matter or antimatter). Matter or antimatter give the arrow of time a direction and the blend of matter/antimatter and energy govern the rate of flow of time. In this universe there is no causality because everything happens all at once

It may be more accurate to think of this as not a universe at all but more the normal state of the vacuum.

Energy without matter or antimatter means there is no distinct arrow to time, time does not exist. Mass, matter and antimatter, give time a rate of flow.

In this "universe" there is no causality as everything happens all at once.

Consider a hypothetical universe made of (mass) matter but no energy
The arrow of time will point forward but the clock will never tick. Such a universe will in effect be a black hole. Matter gives the arrow of time a direction, energy a rate of flow. In this frozen universe there is no causality because nothing ever happens. There is no entropy. (All of the same arguments would apply to an antimatter universe but relative to us the arrow of time will point backwards). To a distant hypothetical observer this universe would last forever.

Note
Neither of the above hypothetical universes could ever exist. In the matter only one, the black hole universe would decay and create energy. In the energy only one, energy could create pair particles. Also, if the net energy of any universe is required to be zero and taking energy as being positive, gravity as being negative then neither universe can have zero energy. In the matter only universe gravity can be thought of as exerting negative energy.

Mass provides an arrow to time. Mater makes the arrow point forward. Antimatter makes the arrow point backward.

Energy provides a rate of flow.

For the concept of time to have any real meaning, the universe must contain both energy and matter.

Our universe, one that contains energy and matter
The above arguments taken to their logical conclusions, explains much of the mechanics of our universe, one that contains both mass and energy. Gravity is trying to make the universe collapse; energy is trying to make it expand. Together they equal zero energy.

Energy although indirectly affected by gravity is actually "**THE** repulsive force" causing the expansion of the universe and can be thought of as positive or a "positive force". Gravity can be thought of as the negative "force" trying to make the universe smaller.

The size of the universe is dependent upon two factors, the amount of energy from the original creation event and the ratio of energy/matter.

Added together the repulsive force of energy and the gravitational force of mass equal zero. (As the ratio of energy to matter is variable it would seem that the 'net" energy can not remain zero but there are other factors at work here. If energy is increasing (low entropy) and matter decreasing then energy will drive the universe to expand (high entropy). The other factors to be taken into account are the rate of flow of time changing and the strength of gravity changing. All of these factors taken together probably do combine to return the net energy to zero.)

The rate of flow of time in the universe equals the speed of light squared.

The speed of light will remain fairly constant over a large range of mass: energy ratios. It seems probable that the mechanics of the universe only allow for a limited range of ratios.

The rate of flow of time (Rt) sets the upper limit to how fast anything can happen in the universe. As Rt = C2 nothing can exceed the speed of light. A photon of light experiences no passage of time. The hands of a clock traveling at the speed of light would never move. If the clock could travel faster than the speed of light, the hands would rotate backwards.

The rate of flow of time and the speed of light
Common sense requires the speed of light to remain constant regardless of the rate of flow of time.

If mass (matter or antimatter) give the arrow of time a direction and energy a rate of flow then the rate of flow of time (Rt) is directly proportional to Energy (E) divided by Mass (M)
Rt = E/M
From relativity we get E = MC2 or C2 = E/M
So we can see that Rt = C2 = E/M
The speed of light is allowed to be a constant because the rate of flow of time is a variable.

"the universe that started off very hot and cooled as it expanded is in agreement with all the observational evidence we have today. Nevertheless it leaves a number of important questions unanswered … Why is the universe so uniform on a large scale? Why does it look the same at all points of space and in all directions?'

Stephen Hawking

Read on for the answers to both questions.

What happens when matter and antimatter are in equal quantities?
From Rt = E/M-Ma
We can see that if matter equals antimatter they cancel each other and the arrow of time is equally double ended. The rate of flow of time is infinite in both directions. Were it not for the matter and antimatter the expansion would be infinite. With matter and antimatter in balance **the universe undergoes a finite period of inflation in which there is no causality.** The result being the universe appears homogenous and isotropic.

In the Very Beginning

The first cycle or, perhaps more correctly, half cycle of the universe

In the very beginning the vacuum spat forth a truly mind bogglingly huge amount of baryonic matter both matter and anti-matter in equal quantities (as allowed by quantum mechanics). Most of the matter and anti-matter mutually annihilated. Matter and anti-matter particles that managed to escape the annihilation were gravitationally sorted. Matter attracted matter. Antimatter attracted antimatter. Matter and antimatter repelled each other. The separation resulted in the formation of two universes from the original quantum creation event. Both going forward in time relative to themselves but going in opposite directions relative to each other. At any given point in time, the total time that they have existed, as a pair, is always equal to zero. Unlike in the Big Bang theory, Time Symmetry is not broken. The theory also explains why the universe appears to have baryon asymmetry; our matter universe is only half of the picture.

If we apply the above points about time to the beginning of our cycle of the universe then we can see that the rate of flow of time at the start was much faster and slowed as the matter and antimatter universes separated from each other. At the very start the arrow of time was equally double ended and the rate of flow of time infinite (in both directions). This was the actual cause of **inflation** as mentioned in the Big Bang. The other significant factor at work here is the universe becoming **isotropic** due to the lack of causality in the inflation phase. As the universes separated each had its own arrow of time pointing forward and the rate of flow of time slowed. As the arrow of time took on a specific direction so inflation slowed and stopped.

Cosmological Constant
As energy is the positive "force" causing the expansion of the universe there is no need to conjure up an exotic force of repulsion. No cosmological constant is required.

As the early universe was opaque, photon pressure on the plasma added to the overall pressure of expansion.

Inflation
The inflation at the start of the universe took place outside of time. This explains why the universe is homogenous and isotropic. In subsequent cycles matter is balanced by antimatter and in a sense inflation took place outside of time and therefore with no causality.

The universe has no center
Other than the very first cycle of the universe, all of the following cycles did not originate from a single singularity but inflated from "many" black holes. As such the universe has no center.

The red shift in the early universe is being wrongly interpreted.
If the rate of flow of time in the young universe was faster and subsequently slowed then the observed red shift of distant quasars does not mean that the universe is expanding at the perceived rate. That is the universe may be expanding a lot more slowly than it appears.

Energy creates matter, matter creates energy and energy makes the universe expand
Eventually the basic building blocks of matter started to form hydrogen. Gravity caused clouds of hydrogen gas to collapse. The heat thus generated created the first generation of stars and some of the hydrogen was converted into helium. It is speculated that this first generation of stars were giant but short lived. At the end of their lives, these giant stars went supernova creating heavier elements and scattered their remnants through space. Subsequent generations of stars created all of the elements. **Energy** created by burning nuclear fuel caused the expansion to accelerate. This expansion is being helped by the energy being created by black holes as they convert matter into antimatter which is being annihilated. Antimatter, whilst it still exists will also add to the repulsive force.

Eventually all of the nuclear fuel will be burnt and the universe will be cold and dead. (As the point at which balance occurs is the relationship between energy and mass the expansion may well stop before the last stars extinguish?)Energy is the "repulsive force" driving the accelerating expansion and with no new energy this expansion will cease. If the universe is "closed" as proposed then gravity will come to the rescue. The universe will gravitationally collapse and re-heat. Black holes re-cycle matter into antimatter. When there are equal amounts of both, the arrow of time becomes double ended. Eventually there will be more antimatter than matter and the arrow of time will have reversed in a new cycle of the universe.

Matter universe followed by antimatter universe followed by matter universe ad infinitum. We live in one of those cycles.

Apart from the original act of creation of the universe, this removes the need for a singularity at the start of each cycle. .

The violation of information law

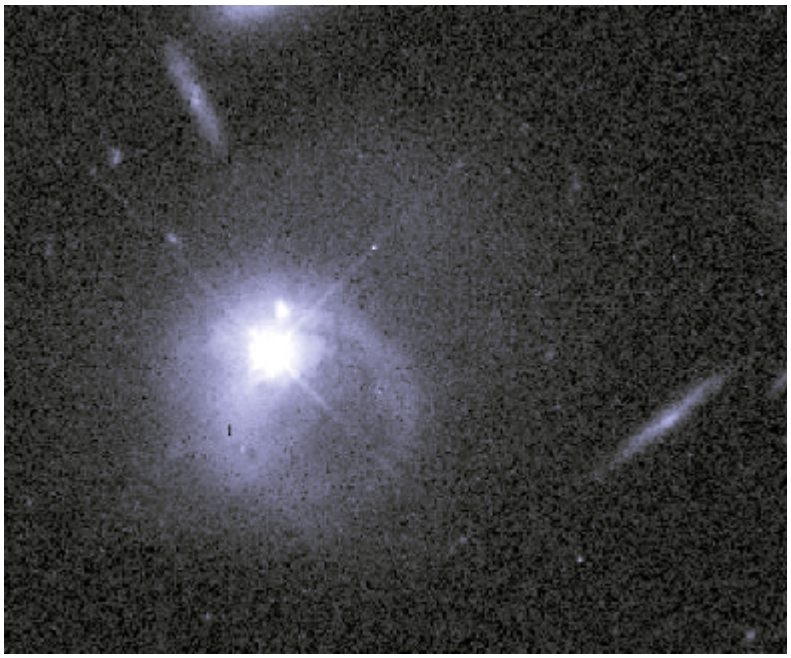
Black holes destroy all information and ensure there cannot be communication of any kind between subsequent universes. The only information that can be inferred is that the previous universe contained the same amount of mass/energy as the present. (The First Law of Thermodynamics is not being broken.) If there are many black holes at the end of one universe then there will be an equal number of white holes in the new universe. Perhaps that is enough to stop the violation of information law from being violated. Any matter not devoured by black holes will be mopped up by newly created antimatter.

Quasars and White Holes

As well as being the very first (furthest) objects in the Universe, quasars (white holes) have remained the brightest of visible objects. (A "quasar" as referred to here is a white hole.) A white hole is very bright as it has no event horizon and is ejecting material at relativistic speed.

Quasars from the very beginning of the universe, apart from their great distance, should be clearly visible, as they would be free of dust which hadn't had time to form.

If the Universe was created by the outpouring of white holes why can't we see them? Well, perhaps we can……..



"A Quasar - Galaxy Collision?
Credit: *NASA, HST, John Bahcall, Institute for Advanced Study.*

Explanation: *In 1963 astronomers were astounded to discover that certain faint, star-like objects have very large redshifts. The large redshifts imply that these objects, now known as quasars (QUASi-stellAR objects), lie near the edge of the observable Universe. To be visible at such extreme distances of billions of light years, they must emit tremendous amounts of energy. Where does the energy come from? In the most widely accepted model, a quasar is the bright nucleus of an active galaxy powered by a central, super massive black hole. This Hubble Space Telescope image shows a quasar known as PKS 2349 (the star-like object near the center) and a galaxy (surrounding fuzzy patch), but the quasar is not at the galaxy's center! In fact, the galaxy and quasar seem to be colliding or merging. This and other recent HST observations suggest that astronomers' standard ideas about quasars may be wrong."*

Unlike Nasa's explanation I believe the above picture shows a quasar (white hole) that has been expelled from the galaxy that it created.
In the Phoenix Theory quasars from the very early universe are white holes pouring vast quantities of matter into the present cycle of the universe. These white holes were black holes in the preceding universe cycle but direction of time reversed.

Galaxy Quasar ejection

Eventually the mass (matter) of the galaxy will exceed that of the quasar (antimatter white hole) at its centre and the quasar will be gravitationally ejected from the galaxy. The quasar will continue to feed the galaxy with material until it has converted all of its mass, at which time it will expire without trace.

Once the quasar that formed the galaxy has expired then it is probable that a black hole would form at the centre of the then middle aged galaxy.

Whilst it is easy to see the mechanism by which a white hole can be ejected from a galaxy, it is very difficult to imagine what mechanism could eject a black hole.

Why do quasars seen outside of but apparently connected to galaxies appear to have a greater red shift than the associated galaxy?
One would think that, if this type of quasar is a white hole then light leaving the quasar would be gravitationally blue shifted not red shifted as seen.
The explanation, this theory predicts, is both the galaxy and the quasar are massive objects having their own (local) independent rates of flow of time. If the white hole still contains a substantial amount of antimatter it will be trying to reverse time in its vicinity (slowing the rate of flow of time). This mass of antimatter will not be balanced by the produced matter particles as they will have been gravitationally swept up by the galaxy.
Rt =E/M-Ma
Matter is being removed as soon as it is being created. This imbalance reduces the rate of flow of time surrounding the white hole, the result being light leaving it is red shifted.

If this is true then the difference in red shift between the galaxy and the white hole is an indicator of the amount of mass (antimatter) left in the white hole. It may be better to use the galaxy as an indicator of distance than the quasar.

Wormholes

Some scientists have suggested that a black hole in our universe may be connected via a wormhole to a white hole somewhere else in the universe or even to a different universe. The Phoenix Theory maintains that a black hole at the end of our universe will become a white hole at the start of the next universe (cycle). No wormhole is necessary as black and white holes are the same object, one time reversed to the other.

On a very large scale foamy filaments

Gigantic white holes at the start of a universe cycle would create vast bubbles of plasma around themselves which due to the repulsive force of gravity would be very distant. The bubbles when compressed by the repulsive force of gravity (white holes) and contracted by the attractive force of gravity become "foamy filaments" the birthplace and home of galaxies. When the giant white holes that created these features ran out of fuel they would vanish without trace leaving large voids, which is exactly what we see.

On a much smaller scale how a Quasar (White Hole) creates a spiral galaxy

The jets from a quasar (much smaller white hole than above) produce two large gas clouds. If the whole arrangement started to rotate in the plane of the gas clouds with the jets rotating then it would form a barbed spiral galaxy with the quasar at its centre, exactly what we see. Perhaps the mechanism for creating the rotation is precession?

Not all Quasars represent the same physical processes at work, so when the Phoenix Theory refers to "quasars", it is referring primarily to "white holes" which probably only appear in the very early Universe. Latter "quasars" are black holes in the centers of galaxies.

Black holes obviously have spin and have been observed to have large jets. The jets are generally believed to consist of some of the accrued matter being expelled along the axis. The Phoenix Theory predicts that the jets will contain large quantities of antimatter. What similarities can we expect white holes to have? The food for the previous black hole has been devoured so the jets will mostly consist of matter particles traveling at relativistic speeds. White holes should be relatively brighter than comparable black holes as they have no event horizon and are ejecting mass unlike black holes which devour mass and do have an event horizon.

A very brief history of the universe.

A quantum fluctuation creates (provides) energy, energy creates mass; energy divided by mass creates the rate of flow of time.
Rt = E/M-Ma (before the separation = zero time)
This separates into two universes, both of which are undergoing inflation before and as they separate, one of matter, the other of antimatter. Each universe relative to itself traveling forward in time but going in opposite directions in space time relative to each other. The total time, at any time, that they as a pair have existed, is always equal to zero. If one considers energy to be positive and gravity to represent negative energy then the total amount of energy in each universe is equal to zero.
After the separation Rt = E/M in the matter universe
And Rt = E/Ma in the antimatter universe. (Intelligent beings in their antimatter universe would consider it to be made of matter and time would flow forward but from our perspective we would consider their universe to be made of antimatter and time [relative to us] to flow backwards.)

Let's consider one universe, one made of matter.
After inflation, once the universe has cooled sufficiently, atoms of hydrogen form.

Gas clouds gravitationally condense and heat. Stars form.

Nuclear fusion produces energy and creates all of the elements and galaxies.

Giant black holes form in the centers of galaxies and produce antimatter.

Matter and antimatter mutually annihilate creating more energy. Before annihilation, the repulsive force of gravity between matter and antimatter help to drive the expansion.

Energy is **the** repulsive force that drives the expansion of the universe.

The creation of more energy along with the decrease in matter causes the acceleration of the expansion.

Eventually all of the nuclear fuel is exhausted and no more energy is created. (Maximum size of the universe and maximum entropy)

Expansion slows under the influence of gravity and the universe contracts and re-heats.

More black holes are formed.

Black holes recycle the matter of which they are made into antimatter.
Matter and antimatter particles continue to annihilate until matter particles have been exhausted.

What is left consists of black holes, antimatter particles and energy

When equal amounts of both matter and antimatter exist, the arrow of time becomes double ended. This is the end of the very first half cycle of the universe (matter)

Inflation

When the amount of antimatter exceeds that of matter the arrow of time will have reversed. This is the start of the next half cycle of the universe (antimatter)

Black holes have now become white holes.

White holes are producing antimatter.
Once the universe has cooled sufficiently, atoms of hydrogen form.

Gas clouds gravitationally condense and heat. Stars form.

Nuclear fusion produces energy and creates all of the elements and galaxies.

The white holes (quasars) are eventually gravitationally expelled from their galaxies but continue to feed them with them with antimatter until they have converted all of their fuel (matter) and cease to exist.

Giant black holes form in the centers of now middle aged galaxies and produce matter.

Matter and antimatter mutually annihilate creating more energy. Before annihilation, the repulsive force of gravity between matter and antimatter help to drive the expansion.

Energy is **the** repulsive force that drives the expansion of the universe.

The creation of more energy along with the decrease in antimatter causes expansion to accelerate.

Eventually all of the nuclear fuel is exhausted so no more energy is created.

The expansion slows and under the influence of gravity the universe contracts.

Black holes are formed.
Black holes recycle the matter of which they are made into antimatter.
Matter and antimatter particles continue to annihilate until matter particles have been exhausted.

What is left consists of black holes, antimatter particles and energy

When equal amounts of both matter and antimatter exist, the arrow of time becomes double ended. This is the end of the second half cycle of the universe (antimatter)

Inflation etc.

Points of the above in more detail
At the end of the "fuel burning" phase there is no "new" energy being produced. Stars and galaxies have died and are being consumed by black holes. Black holes not only consume the matter of the universe but consume energy. In the process they produce antimatter particles which mutually annihilate with matter producing energy.

At the end of the "fuel burning" phase the energy produced would have expanded the universe to its maximum size. (This is maximum entropy. The reduction in entropy due to burning fuel is balanced by the increased entropy of expansion.) As black holes consume matter and energy the universe starts to gravitationally collapse. The consumption of matter and energy by black holes exceeds the production of antimatter which is mutually annihilated by matter producing more energy. The universe continues to collapse until all that is left is one or more (probably very many more) black holes, antimatter particles and the energy produced by matter antimatter annihilation.

Rt = E/M-Ma
As energy increases from matter antimatter annihilation and matter decreases as antimatter increases the rate of flow of time increases. When the amount of antimatter is the same as matter, the arrow of time will be equally double ended and the rate of flow of time infinite in both directions.

At the end of the universe
If the rate of flow of time is infinite **in both directions** there is, in a sense, no passage to time but this is not the same as there being no time.

At the start of the next universe
In this phase of the universe, black holes have become white holes as the arrow of time has reversed giving birth to a (antimatter) universe. [As matter and antimatter are both relative terms so are forwards and backwards. A being in its universe (be it matter or antimatter relative to us) will perceive its universe as being made of matter and time flowing forward.]

Size of the universe
The factors that define the maximum "size" of the universe are the total amount of energy from the original creation event and the energy/mass ratio.

Expansion or contraction
When Rt is above a certain figure the universe is expanding, below it is contracting.

Energy of the vacuum, inflation and the production of particles
Quantum mechanics allows for energy to appear (move around) anywhere in the vacuum (quite possibly false vacuum) outside of time. When the arrow of time was equally

double ended there was a period when there was no causality (the arrow of time being double ended and the rate of flow of time infinite). Energy then caused the universe to inflate at an infinite rate. The rapid cooling thus caused would "pull' particles from the high energy field into existence.

Energy is high and matter low so the rate of flow of time is fast, becoming slower as more matter (hydrogen) is produced.

After the original creation event the universe proceeds with matter universe followed by antimatter universe ad infinitum

Each universe has 4 phases.

1) Between universes the arrow of time is double ended and the flow of time is infinite in both directions. Inflation without causality.
2) White holes produce all of the fuel (hydrogen) to power phase (3).
3) Fuel burning (stars) [E = MC2] produce energy and all of the heavier elements. This energy production along with an increase in the E/M ratio drives expansion and causes it to accelerate. At the end of this phase with no "new' energy the universe slows, stops and starts to collapse.
4) The gravity of billions of super massive black holes ensures the relentless collapse of the universe as they re-cycle their mass (matter) into antimatter. Initially this antimatter is annihilated by contact with matter and the resultant energy produced is consumed by black holes. The universe shrinks in size as energy is devoured. Black hole cannibalize black hole. The amount of antimatter produced is no longer being annihilated as stray matter has been consumed. Eventually the mass of antimatter particles will equal that of the matter bound in black holes. At this point the rate of flow of time will be infinite but the arrow double ended. Rt = E/M-Ma.

1a) Repeat point 1.

Supplementary notes

1a) If at the end of one universe, instead of there being just one black hole there are many (possibly billions), with inflation and no causality the resulting universe would appear to have no centre.

1b) If (1a) is correct then it follows that white holes would create a "foamy filament" universe with large voids exactly as we see it.

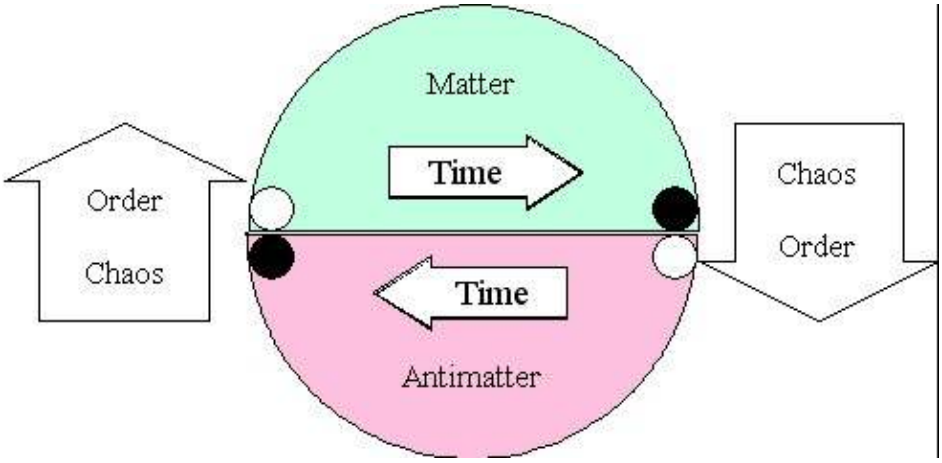
1c) When all of the stray matter (not in black holes) has been annihilated, as they can not be consumed by black holes, antimatter particles are no longer being annihilated. At some moment in the contraction of the universe there will be a point when the mass of antimatter particles equals that of the mass of matter contained in black holes. Although black holes have been devouring energy, matter/antimatter annihilation has been creating energy.

Looking at the structure of the universe it seems probable that the universe did not collapse to a single black hole but was halted when very many still existed. When the amount of antimatter equaled that of matter the arrow of time would be double ended and

the rate of flow of time would have been infinite in both directions. The universe would "inflate" until the arrow of time was not equally double ended. This would account for the universe being homogeneous and isotropic. It started with no center, underwent a period of inflation in which there was no causality.

This half cycle is continuously repeated alternating antimatter with matter, antimatter, matter etc.

A full cycle of matter/antimatter returns the time that they have existed to zero. When considered with the sister universe born out of the same quantum event, the total time, at any time, that they have existed is always zero. The total energy is always zero.



Perpetual motion

At first glance this theory appears to violate the Second Law of Thermodynamics as a cyclic universe would seem to be perpetual motion.

At the beginning of the universe there is order (low entropy). Nuclear fuel, primarily hydrogen, is consumed to produce energy and heavier elements. This continues until the fuel runs out. The energy is still there but unusable. This is a state of high entropy.

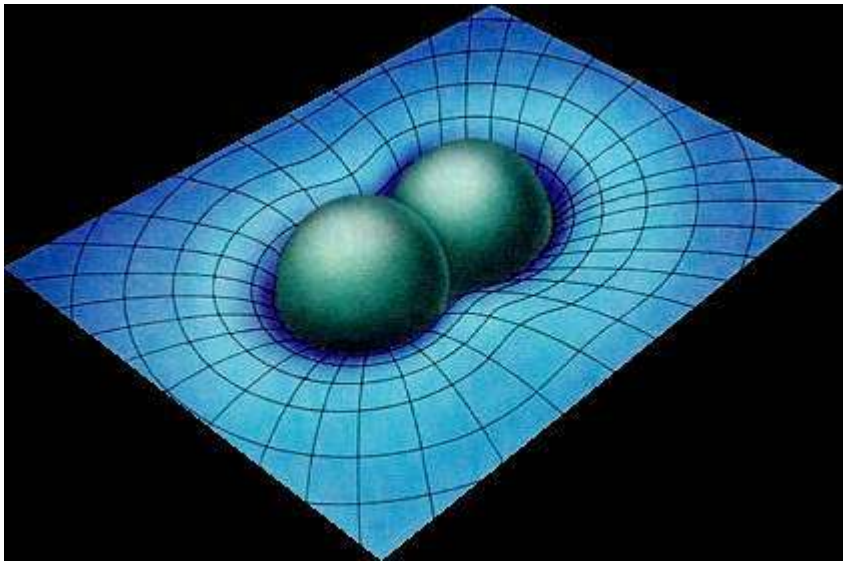
This theory maintains that the universe is cyclic, that is matter universe, followed by antimatter universe, followed by matter universe and so ad infinitum. I t does that without violating the Second Law of Thermodynamics.

The black holes converts their mass (matter) into antimatter. At some point all of the mass will be equally divided between matter and antimatter and the arrow of time will be equally double ended. As the balance changes from a predominance of matter to antimatter the arrow of time will have reversed. This is the start of a new antimatter universe cycle. The arrow of time in this new universe still points forward but is reversed relative to the preceding matter cycle.

Non violation of the second law of thermodynamics
The Second Law of Thermodynamics has not been violated because when the direction of the arrow of time is (actually) reversed "order to chaos" becomes "chaos to order".

A black/white hole is probably the only large scale object in the universe that can reverse entropy without violating the Second Law of Thermodynamics.

A Quick Look at Gravity



Here we see four dimensional space-time represented in two dimensions. Imagine a stretched rubber sheet with nothing on or under it. The sheet is flat. Place a heavy object (mass) on the sheet and it deforms downward. Place another small object near the original and the depression caused by the first object will cause the second object to be attracted to it by rolling down hill. This represents gravity at work deforming space-time.

Place one heavy object on the sheet and it sits in the well that it has created. Here we see two heavy objects and the wells have joined to become a trough. Pull the two objects apart slightly and it will still leave a trough joining them. Release the two objects and they will be attracted to each other rolling down the trough to the lowest point. Both matter and antimatter react in the same way, that is, matter is attracted to matter and antimatter is attracted to antimatter.

Now imagine that one of these objects is under the sheet pushing up. This is an antimatter object. Both objects instead of wanting to pull together want to push apart. (Matter rolls down and away from the hill created by antimatter) This is the repulsive force of gravity felt by one object made of matter and another made of antimatter.

What is gravity and how does it work?

The above is all very well but it does not explain the fabric of space time (the rubber sheet) very well. Gravity is long range and weak but does not appear to be a force in a conventional sense. What do we know about the universe that is long range and can explain gravity?
The flow of time permeates the entire universe as does energy and entropy as we have previously seen and we know that they are related.

We can think of the rubber sheet which represents space time as also representing an energy level of the universe or as representing the rate of flow of time (as they are related). Mass (matter) causes a dip in the sheet, the more mass, the greater the dip. Consider more than one object on the rubber sheet. If they can combine they create a lower dip (lower energy).

The above argument for matter also applies in an antimatter universe. However in our universe, antimatter, instead of trying to lower the energy level as per matter, increases it.

The universe is trying to reach the state of highest entropy or lowest energy (The Arrow of Time). Gravity is the natural outcome of that. All of the matter in the universe is trying to combine to cause the greatest dip (highest entropy) in the fabric of space time (energy). As energy, itself is sucked in, so the very fabric (space time) of the universe contracts.

If we go back to the analogy of the rubber sheet (space time) and cover it with marbles they will all tend to roll downhill and clump together (gravitational attraction). If the sheet rips or detaches all around the edge (mass {gravity} exceeds the strength of the sheet (energy) the marbles and sheet fall (are swallowed by a black hole).

False vacuum
If we imagine the universe with no energy, it still has gravity but if gravity is a result of mass (matter) lowering the energy level how can the energy level be lowered below zero? It seems probable that we live in a false vacuum universe, the true vacuum representing zero energy.

Local gravity and energy
Why don't we see gravity decrease locally by an input of energy? A truly huge amount of energy is required to produce a mass large enough to make a dip in the energy level even locally. Presumably the same amount of energy would be required to raise the energy level and perhaps the energy level would need to be raised over a large volume of space. For a mass of material to be sufficiently self gravitating in space, that is to form a sphere due to the force of gravity it needs to be 10km in diameter. That represents a lot of energy. If we are talking about the energy of the True Vacuum as opposed to the False

Vacuum then it makes even more sense. Perhaps the rubber sheet in the above examples represents not the energy of the False Vacuum but the energy of the True vacuum.

Mass and energy
In short energy is the "repulsive force" that causes the expansion of the universe and can be thought of a positive form of energy.

Mass (matter) creates gravity which can be thought of as a negative form of energy.

Together they cancel each other leaving the universe with net zero energy.

Mass (matter) warps the fabric of space time (energy) to reach the lowest possible energy level (highest possible entropy).

Expansion and contraction
Rt = E/M When Rt is above a certain figure the universe is expanding, below it is contracting.

Energy, mass, speed of light, time, gravity, acceleration, the size of the universe and entropy are all mathematically connected.

$E/M = Rt = C2 = 1/\Delta S$

This shows that **The Second law of Thermodynamics is not an independent law** as energy (E), matter (M), the rate of flow of time (Rt), the speed of light squared C2, gravity and the rate of flow of entropy ($1/\Delta S$) are all connected. Acceleration is also connected. There seems to be some kind of "Equivalence Principle" at work related to General Relativity.
It would appear that there is a missing law of nature here that might go "something" like this.

"The Law of Equivalence states that the energy of the Universe divided by its mass is proportional to the rate of flow of time, the speed of light squared, its size and inversely proportional to rate of gravity and entropy".

What Predictions does this theory make?

1. That the universe is not only "closed" but cyclic.
2. Energy although affected by gravity is actually THE repulsive force causing the expansion of the universe. In short energy is the "repulsive force" that causes the expansion of the universe and can be thought of a positive form of energy probably in the form of photons and neutrinos.
3. That antimatter not only appears to be ordinary matter going backwards in time but actually **is** ordinary matter going backwards in time.

4 An outcome of this is that, whilst mater is gravitationally attracted to matter, antimatter gravitationally attracted to antimatter, mater and antimatter will gravitationally repel each other.
5 Two universes were formed out of the original quantum creation event. Both going forward in time relative to them but going in opposite directions relative to each other.
6 At any given point in time, the total time that they have existed, as a pair, is always equal to zero.
7 Matter or antimatter gives the arrow of time a direction and energy a rate of flow.
8 Gravity can be thought of as a negative form of energy.
9 Gravity is caused by Mass (matter) warping the fabric of space time (energy) to reach the lowest possible energy level (highest possible entropy).
10 The expansion of the universe is accelerating because mass is being converted into energy. (a) In stars. (b) Black holes in the centers of galaxies are converting matter into antimatter which is then being annihilated by contact with ordinary matter. (c) Antimatter from [b] whilst it exists, exhibits a repulsive force of gravity.
11 The expansion of the universe will continue until there is insufficient fuel left to create new energy to balance gravity at which time it will start to collapse.
12 The rate of flow of time in the universe equals the speed of light squared.
13 Space and energy (in some sense) pre existed the start of the universe.
10 The rate of flow of time is equivalent to the inverse rate of flow of entropy.
11 The rate of flow of time in the **original** early universe was much faster; this is also true for the start of all subsequent ones.
12 The universe may be expanding a lot more slowly than it appears because of point [11]
13 Black holes loose mass much faster than has previously been envisaged. Not only black holes but white holes. **A matter black hole will gravitationally expel antimatter particles from its interior.** This being the case it will be a lot hotter than Hawkin radiation.
14 The universe is cyclic with antimatter universe following matter universe ad infinitum.
15 In a matter universe, after the end of its fuel burning stage, gravity will cause the universe to gravitationally collapse and re-heat. Black holes devour both mass and energy so entropy continues to increase. When there are equal amounts of matter and antimatter the arrow of time will become double ended. Eventually there will be more antimatter than matter and the arrow of time will have reversed in a new cycle of the universe.
16 Multiple black holes at the end of one universe become multiple white holes at the start of the next.
17 "Quasars" in galaxies in the very early universe are white holes.
18 "Quasars in middle aged or old galaxies are black holes.
19 Quasar white holes can be seen in the early universe, for example PKS 2349.
20 Early galaxies were formed by Quasar white holes which were eventually gravitationally expelled, for example PKS 2349.

21 Quasars expelled from galaxies are white holes and they feed the galaxy with matter.

22 A black hole at the end of our universe becomes a white hole at the start of the next universe (cycle). No wormhole is necessary as black and white holes are the same object, one time reversed to the other.

23 The universe is cyclic but does not violate the second Law of Thermodynamics. **When the direction of the arrow of time is reversed "order to chaos" becomes "chaos to order". Order to chaos happens in one universe, chaos to order happens in the next.**

24 Energy, mass, time, gravity, size and entropy are all mathematically connected and form a new Law of Nature.

25 The jets from a quasar (white hole) produce two large gas clouds. If the whole arrangement started to rotate with the jets rotating through 360 degrees then it would form a barbed spiral galaxy with the quasar at its centre.

26 Black holes obviously have spin and have been observed to have large jets. The jets are generally believed to consist of some of the accrued matter being expelled along the axis. This theory would predict that the jets will contain large quantities of antimatter.

27 What similarities can we expect white holes to have? The food for the previous black hole will have been devoured so the jets will mostly consist of matter particles traveling at relativistic speeds.

28 White holes have no event horizon so are expected to be brighter than black holes.

29 Inflation at the start of each universe cycle is a direct result of the arrow of time being double ended. With matter and antimatter in balance the rate of flow of time, energy (the expansion of space) is infinite.

30 The Second Law of Thermodynamics is not a complete law unto itself.

31 Another "Equivalence Law" needs to be formulated, one that connects energy, mass, time, gravity, entropy size and possibly acceleration.

32 When the ratio of energy to matter exceeds a certain threshold the universe is expanding, below that it is contracting.

33) The difference in red shift between a galaxy and its apparently connected quasar white hole is an indicator of the amount of mass (antimatter) left in the white hole. The red shift of the quasar will be steadily reducing.

Predictions in this colour should (at some point) be provable.

Point 3 is a sense has been proven, antimatter has been observed to travel backwards through time. Point 4 follows from point 3 but should be provable, one way or the other, in the very near future. The easiest way to prove point 4 is to "weigh" anti-hydrogen, not the easiest of tasks but I'm sure it will be done.
If point 4 is proved to be correct then most of the rest of the theory is a natural outcome of that.

Predictions in this colour, whilst not being directly provable, are a natural outcome of other points being correct.