The Model ©

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How can we arrange these changing conditions into a more user friendly graphic. The conditions we need to preserve are; (1) as the space unit gets larger the time unit gets smaller, and (2) the ratio of the space unit to the time unit is constant ($d/t = c$: $d = c \cdot t$). These conditions are necessary to insure that blob is conserved.

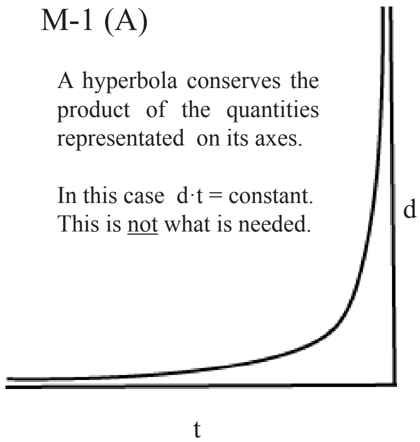
We first need to explain what happens to measurement when the size of the unit is changing. No matter what the state is of Blob, we only have a Blob amount of spacetime massenergy. That is easy to quantify if the size of the unit is not changing as with massenergy. The basic unit is the photon and its size doesn't change. But, the situation is different with space and time.

The hyperbola is a quadratic curve which has the property of conservation of the quantities it relates. The quantities we want to relate are massenergy and spacetime. Let's start with space and time. We want to arrange the graphic so that 1) d/t is constant and 2) as the space unit gets larger the time unit gets smaller.

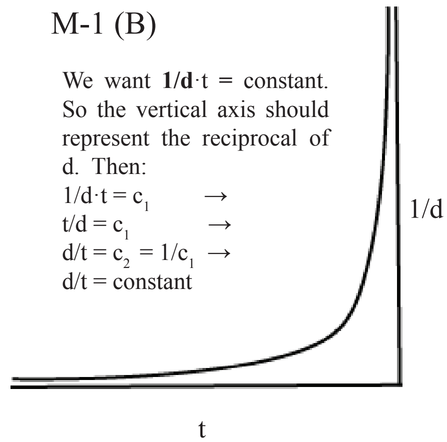
Figure M-1(A) shows the standard hyperbola configuration. If the vertical axis represents distance and the horizontal axis represents time, then the product of distance and time is constant ($d \cdot t$ = constant) This is **not** what we need. We need d/t to be constant.

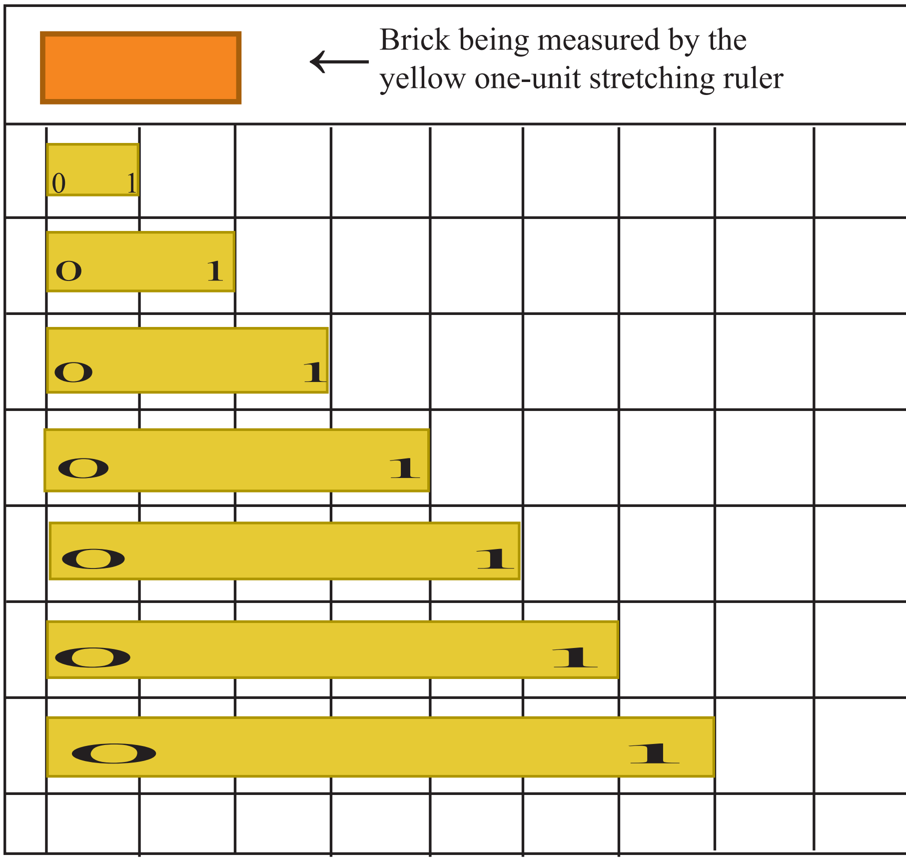
Figure M-1(B), on the right, shows how a hyperbola can be arranged to keep d/t is constant. The vertical axis

M-1 (A)



M-1 (B)





← Brick being measured by the yellow one-unit stretching ruler	Size of unit measuring brick	Number of units needed to measure brick
0 1	1/2 the size of the brick	2 Units
0 1	Equal to the size of the brick	1 Unit
0 1	3/2 the size of the brick	2/3 Units
0 1	2 times the size of the brick	1/2 of a Unit
0 1	5/2 times the size of the brick	2/5 of a Unit
0 1	3 times the size of the brick	1/3 of a Unit
0 1	7/2 times the size of the brick	2/7 of a Unit

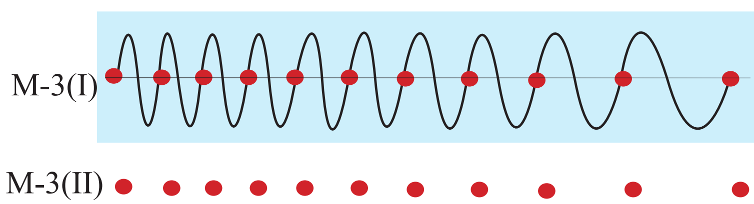
M-2 To measure a constant quantity when the size of the unit is increasing, the number of units needed to represent the constant quantity is the reciprocal of the size of the unit.

will represent the reciprocal of the distance unit and the horizontal axis will represent the time unit. Then, 1/d·t is constant ($t/d = c_1$). This can be converted into $d/t = c_2$, where $c_2 = 1/c_1$. The essential idea is that M-1(B) is a hyperbola which conserves d/t. So, we can say that d/t=c and therefore d=t·c. d=t·c is the essential conserving relationship between space and time.

Because our space and time units are stretching and shrinking, this hyperbola does not work like the familiar hyperbola taught is school. Normally, the numbers on a hyperbola represent multiples of a constant unit. The number 2 on an axis of the hyperbola would represent two of the same size units represented by the number 1 on the axis.

On our hyperbola the numbers on the axes represent the number of units necessary to measure Blob. Blob always has the same amount of spacetimemassenergy regardless of what state Blob is in. How are the numbers on the axes interpreted when the size of the units are varying? First, recall that the amount of space or time in Blob doesn't change. The size of the unit changes. So, what is the relationship between the numbers on the number line and the size of the unit?

Figure M-2 demonstrates the answer to the question "How many units does it takes to measure Blob when the size of the unit is changing?" If the unit has shrunk to only half the size of Blob then it takes two units to equal Blob. If the unit has grown to be the same size as Blob, then it takes just one unit to equal Blob. But, as the unit continues to grow, a whole unit is not necessary to equal the size of Blob. If the unit has grown to three times the size of Blob, then it only takes a third of the unit to equal Blob. If the unit is huge then only a small fraction of it is necessary to equal Blob. If the unit is very small then it takes a lot of them to equal the size of Blob. So, there is an inverse relationship between the numbers on the number line and the size of the unit. In fact they are reciprocals of each other.



M-3(I) shows a time unit which is increasing in size to the right. When it is too confusing to have the sine wave, M-3(II) will be used to show a time unit increasing in size to the right.

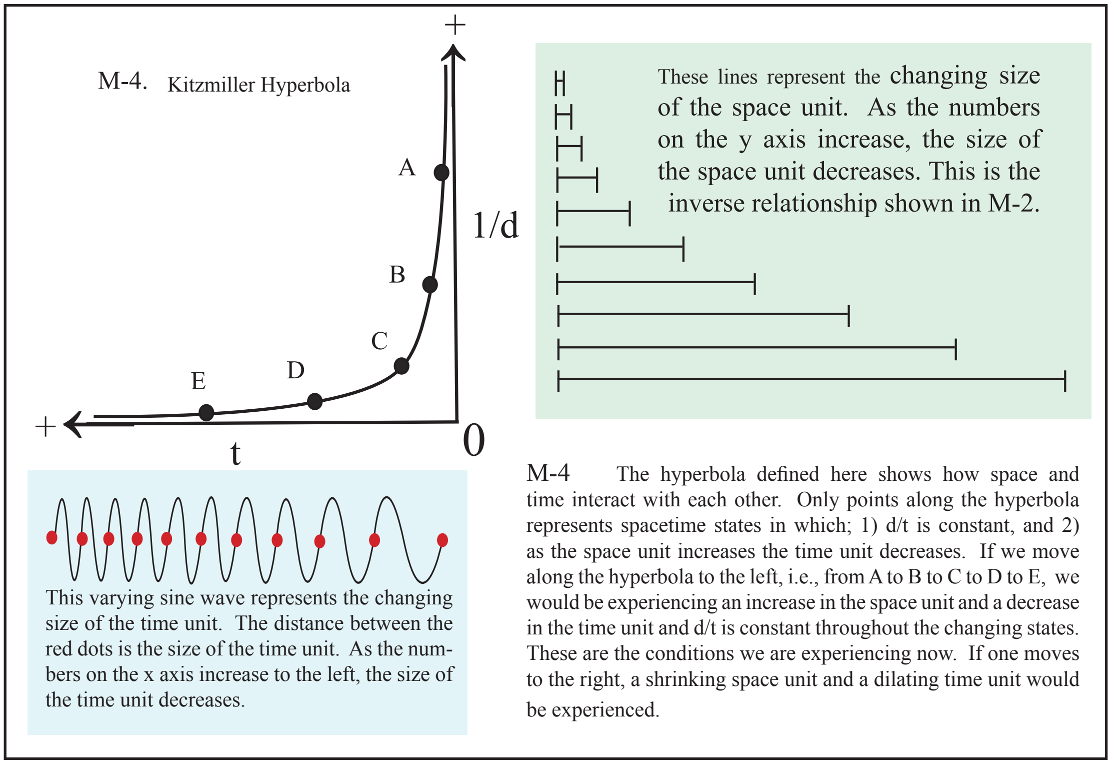
So, *as the numbers on the horizontal axis increase, the size of the time unit decreases.* We will show this relationship by including M-3(I) under the axis. The distance between the red dots represents the size of the time unit and decrease as the values on the number line increases to the left.

So, the hyperbolic relationships referred to in M-1 are expanded in M-4. Only points on the hyperbola satisfy the requirements that d/t is constant. Only points on the hyperbola satisfy the need that, as the size of the space unit changes, the size of the time unit changes in an inverse way. Since Blob is finite, no state of Blob can ever be infinite.

M-4 graphically represents the necessary relationship between space and time to conserve Blob. The numbers of the hyperbola's vertical axis, the y axis, increase in the **vertical** direction from zero to +∞. The size of the distance unit obeys the inverse relationship demonstrated in M-2 by decreasing in the vertical direction. The numbers on the hyperbola's horizontal axis, the x axis, increase to the **left** from zero to +∞. Obeying the inverse relationship in M-2, the time unit decreases in size to the left.

As Blob changes from state A to state B, the size of the distance unit increases and the size of the time unit decreases while d/t remains constant through out the whole transition. Blob smoothly transitions through all of its possible states while maintaining the required conserving conditions. Currently, the universe we see would be located is the vicinity of E. Our space unit is very large and the time unit is small and getting smaller. The effect of the shrinking time unit means that the space unit expands at an ever increasing rate. This result was recently proved by the recent Super Nova study. It showed that the expansion of the space unit is proceeding at a greater and greater pace. This is exactly how the data would appear when the time unit is shrinking. A shrinking time unit causes events to happen more quickly. While, a dilating time unit causes events to take longer and longer. (See Spaghettification)

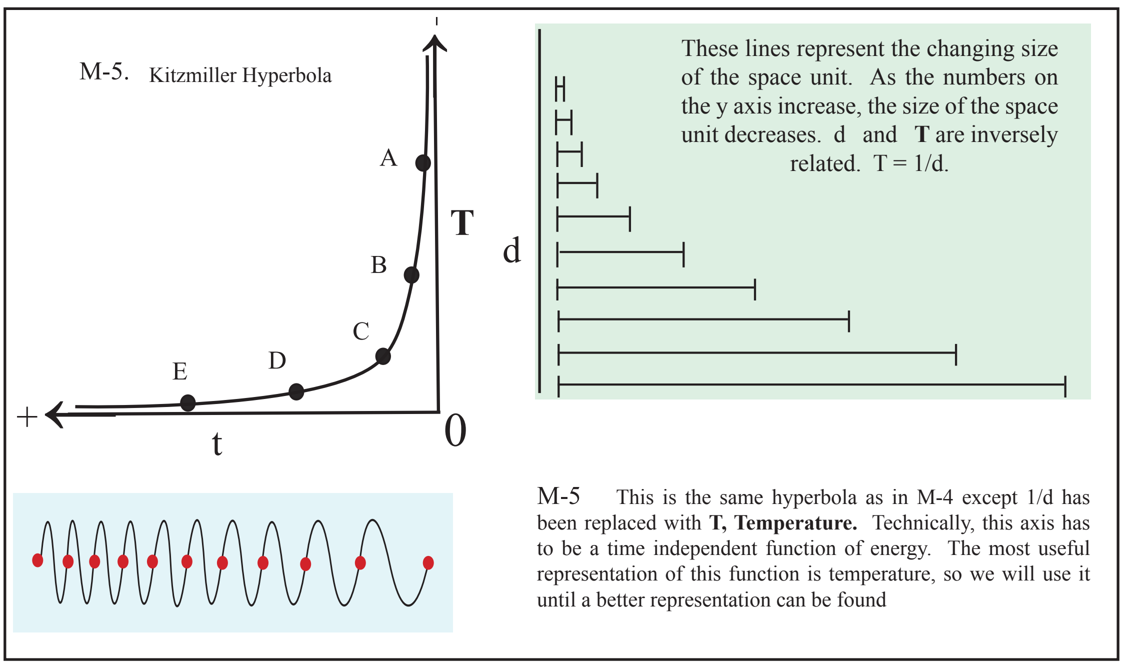
To incorporate massenergy into our graphic we can define what 1/d, the vertical axis, really represents. It must be a basic quantity which is the inverse of an expanding space unit. It is agreed that as the universe expands, the temperature decreases. So, as the universe's space unit increases, the temperature of that space drops. This is a



M-4 The hyperbola defined here shows how space and time interact with each other. Only points along the hyperbola represents spacetime states in which; 1) d/t is constant, and 2) as the space unit increases the time unit decreases. If we move along the hyperbola to the left, i.e., from A to B to C to D to E, we would be experiencing an increase in the space unit and a decrease in the time unit and d/t is constant throughout the changing states. These are the conditions we are experiencing now. If one moves to the right, a shrinking space unit and a dilating time unit would be experienced.

useful inverse relationship we can use in place of 1/d on the y axis.

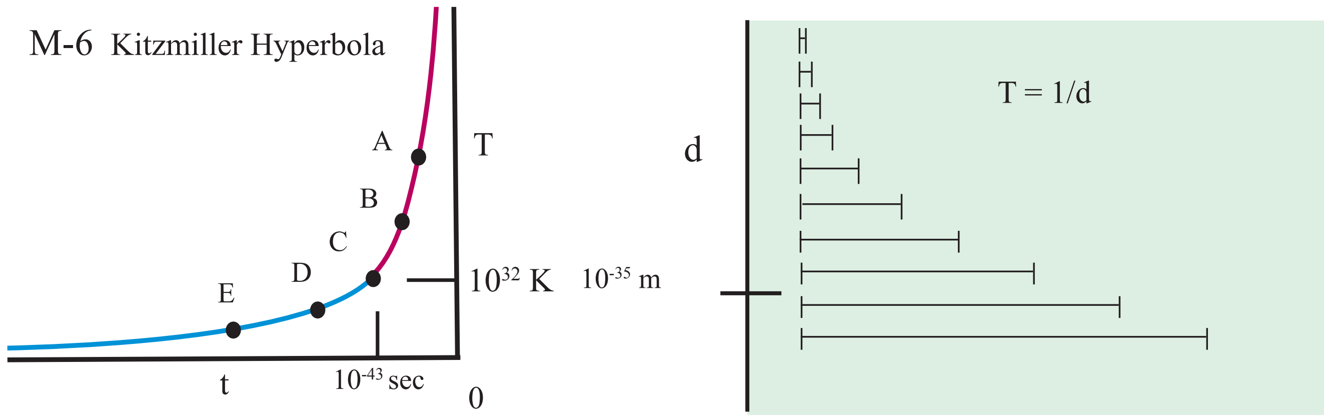
The change we made in the hyperbola adds the changing temperature we have measured as the universe expands. Transitioning from A through E, the universe expands in size as shown by the increasing size of the distance unit, the temperature drops, and the time unit shrinks. The temperature is a proxy for the free energy part of massenergy. So, as the temperature drops the amount of mass increases. See the chart at A-10 to see how these four entities, space, time, temperature (energy), and mass interact. On this hyperbola, we can show space,

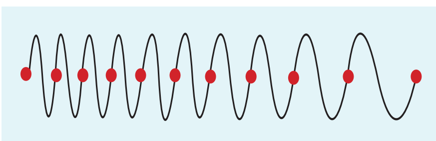


M-5 This is the same hyperbola as in M-4 except 1/d has been replaced with **T, Temperature.** Technically, this axis has to be a time independent function of energy. The most useful representation of this function is temperature, so we will use it until a better representation can be found

time, and Temperature (free energy) directly; mass has to be inferred. As the temperature drops we know that it is being converted to stored energy, mass, in order to conserve what space and time are doing.

An example of this interaction is the behavior of electrons with respect to the nucleus of an atom. An electron is a mass and when it approaches a nucleus it is moving into a more contracted space (such as from D to C) and the temperature (free energy) must increase. So, the electron releases a photon increasing the amount of free energy and reducing its mass by one photon. When an electron moves away from a nucleus it moves into a more





M-6 We have added Planck values to the axes of the hyperbola. At C the hyperbola is in equilibrium. The Planck time unit is 10^{-43} seconds and Planck length is 10^{-35} meters. This is the place we will put Planck's length and time units which are derived from properties of free space. It is estimated that the temperature of the universe at 10^{-43} seconds is 10^{32} Kelvins.

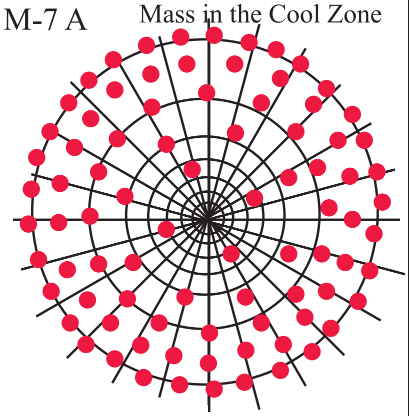
dilated space as from C to D. The amount of free energy must be reduced and so the electron absorbs a photon and increases its mass by one photon. When protons and neutrons come together to form nuclei, they give off photons, fusion energy, when they enter each others contracted space. A recent experiment showed that protons and neutrons 'weigh' less in a nucleus than they do when they are free. All masses behave in this way and that conserves Blob.

It would be informative to be able to identify some points on the hyperbola. The Planck time and distance units are useful. These units may not have been developed in a way consistent with these assumptions, but they provide markers for comparison with current thought in physics. In Graphic M-6 the Planck units of 10^{-43} seconds and 10^{-35} meters have been added at point C, the equilibrium point for the hyperbola. It has been calculated that the temperature of the universe cooled to 10^{32} Kelvins 10^{-43} seconds after the Big Bang. So, that information was added to complete what we know at the equilibrium point of the hyperbola.

The equilibrium point represents the conditions that Blob tries to conserve and maintain. When transitioning from C to D to E, etc., the space unit is increasing and the time unit is decreasing. Massenergy must undo this to conserve Blob. So, mass must contract space around it and dilate time around it as in M-7 A. By affecting spacetime this way, the creation of mass undoes what spacetime is doing. The increase in mass, stored energy, which is required by this process, naturally requires a reduction in free energy and the temperature drops. From point C to the left on the graph, the temperature is always less than the equilibrium temperature. We call this the Cool Zone. Out universe is currently in the Cool Zone. The Cool Zone is designated by the blue section of the hyperbola.

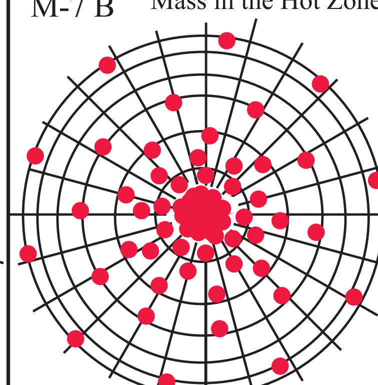
When the conditions of the universe move from C to B to A, the size of the space unit is reducing from its equilibrium condition and the time unit is increasing from its equilibrium condition. Therefore, the mass creating process (MCP) must do the opposite to conserve Blob. Mass must contract time around it and dilate space around it as in M-7 (B). The dilating of the space around a mass causes more free energy to exist between the masses and the temperature in between the masses increases to an amount greater than at equilibrium. We will call this area the Hot Zone and it is designated by the red section

M-7 A Mass in the Cool Zone



Since space is expanding and time is contracting, the mass creating process must do the opposite - contract space and dilate time around the mass.

M-7 B Mass in the Hot Zone



Since space is contracting and time is dilating, the mass creating process must do the opposite - dilate space and contract time around the mass.

M-8	Space	Time	Mass	Energy
Transition from C to D to E (Path I)	The space unit increases from 10^{-35} meters to a huge finite number.	The time unit decreases from 10^{43} seconds to a very small finite number causing all activity including expansion to accelerate to a very rapid rate. Because we are imbedded in it, we see all as 'normal'.	Conserving Blob requires that the mass creating process (MCP) decreases the space unit and dilate the time unit around the mass as in M-7(A). As the transition advances, the masses must increase their warpage of spacetime by absorbing more photons and increasing their mass.	The temperature, a proxy for free energy, drops from 10^{32} Kelvins to a very small finite number. Currently the temperature is 2.73 Kelvins. The energy is converted into mass according to $E = m \cdot c^2$. (On the grid, the Gravitational Constant (G) would be positive and increasing.)
Transition from E to D to C (Path II)	The space unit decreases from a huge finite number to 10^{-35} meters.	The time unit increases from a very small finite number to 10^{43} seconds. The enlarging time unit causes activity to decelerate.	Conserving Blob requires that the mass creating process (MCP) reverses the action in Path I. The process would relax the contraction of space and relax the dilation of time. Accordingly, the mass would release photons increasing the temperature.	The relaxation of the contracted space reduces the amount of mass and increases the amount of free energy until the temperature reached 10^{32} Kelvins. (G would be positive and decreasing.)
Transition from C to B to A (Path III)	The space unit decreases from 10^{-35} meters to a very small finite number.	The time unit increases from 10^{43} seconds to a huge finite number. All activity decelerates greatly. Seconds, because the time unit is huge, take eons to elapse.	Conserving Blob requires that the MCP contract time around and dilate space around the mass as in M-7 (B). This undoes the contraction of space between the masses. The dilation of space around mass continues the pushing of photons away from masses and into the space between.	The dilating of the space around the mass forces photons (free energy) away from the mass and increased the temperature between the masses so that it is greater than at equilibrium. (G would be increasingly negative.)
Transition from A to B to C (Path IV)	The space unit increases from a very small finite number to 10^{-35} meters.	The time unit decreases from a huge finite number to 10^{43} seconds. The decrease causes the eons long events to quicken some what as C is neared.	Conserving Blob requires that the MCP ease the contraction of time and dilation of space. Because the time unit is so big, all transition takes very slowly. Eventually, spacetime would transition back to being flat at Point C.	Free energy will move into the undilating space, dropping the temperature back down to the equilibrium temperature of 10^{32} Kelvins. (G will increase from a large negative number to zero at C.)

of the hyperbola.

So, as Blob transitions from A through B to C, the mass creating process starts with the dilated space and contracted time of the mass and eases the contraction of space and dilation of time until the space is briefly flat at C (at equilibrium). As our universe transitions from C to D to E the space unit is increasing and the time unit is decreasing. So, the mass creating process (MCP) inverts its activity by contacting space and dilating time around mass. This is what we experience.

The concept of a shrinking and growing distance unit is understandable in general. An inflating balloon is commonly used as an analogy. But how does a shrinking and growing time unit appear to us? In general, an adult human blinks his eyes between 2 to 10 times a minute. For simplicity we will use an average of six blinks per minute or one blink every ten seconds. If you and Helen, for example, were in a space ship orbiting a black hole, she and you would be in the same spacetime. You both would blink your eyes at approximately once every 10 seconds. If, however, she were falling into the black hole, she would be in a different spacetime. In Helen's spacetime, the space unit would be contracted and the time unit would be dilated. Let's assume that Helen's time unit has been dilated to 3 times the time unit of the space ship. Then her blink rate of once every 10 Helen seconds would appear as once every 30 spaceship seconds. She would appear to have slowed down. However, Helen would still be blinking her eyes once every 10 Helen seconds and would think that her rate was 'normal'. In fact, she would look at you in the space ship and observe that you were blinking every 3 1/3 Helen seconds. You, in the space ship, would appear to be sped up. On the Hyperbola, all points to the right of you, the observer, have dilated time units and observing activity in those areas will appear slowed down as if in Slo-mo. Conversely, all points to the left of you, the observer, will appear sped up like the Keystone Kops. Both feel that their spacetime is 'normal' and that the other is out of sync.

An example of how these time relationships are seen in the universe comes from the Super Nova study recently released. Astronomers discovered that the expansion of the universe was speeding up. That result is exactly predicted by the Kitzmiller Hyperbola. Let us assume that our current universe has the conditions indicated by point E. The Super Nova Study took measurements from earlier times by studying the light of various super novae. These super novae were distributed at different distances from Earth. On the Hyperbola, the super novas would be distributed from to the right from Point E through Point D toward point C (but, never reaching Point C). By studying the relative rates of recession for super novas at different distances from Earth, Saul Perlmutter, et. al., reasoned that the expansion of the universe was happening at an accelerating rate. If events are happening faster now, then they would be occurring at a slower and slower pace to the right. This is exactly what the astronomers would see if the time unit were dilating - slower and slower activity in the past. And that is what the dynamic time Hyperbola predicts. All activities to the right of the observer would appear slower and the farther to the right the more slowly they would appear to go. There is no need to conjure up Dark Energy to explain the acceleration in the expansion of the universe. Just allowing time to do its dynamic job of conserving Blob explains this phenomenon.

In order to understand more about these spacetime relationships let us first look at space in the Cool Zone. The smallest space unit in the Cool Zone is 10^{-35} of our local meters. Our current estimates of the size of an atom is about 1 Å or 1 x 10^{-10} m. The size of a proton is estimated to be a little less that .8 x 10^{-15} m. ($10^{-15} / 10^{-35} = 1/10^{20}$). So, the equilibrium state, 10^{-35} m is equivalent to 0.00000000000000000001 times smaller than a proton.) In fact, 10^{-35} m is so small that we have no ability to experience anything even close to that size.

10^{-35} m is the largest space unit in the Hot Zone. All of the conditions from C to B to A have space units which are smaller than 10^{-35} m. Clearly, the Cool Zone is characterized by having a vast abundance of space. The Hot Zone starts with a size 0.00000000000000000001 times smaller than a proton and then grows *smaller*. The Hot Zone never goes to zero in size, but compared to the Cool Zone, it is negligible in size. The Cool Zone represents virtually all the ***space*** in Blob.

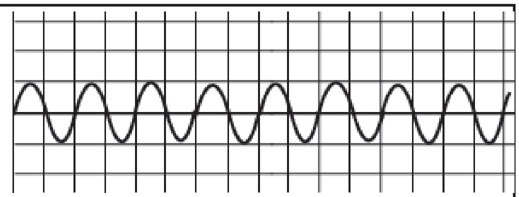
However, when the analysis turns to time, the situation is reversed. Since space and time conserve each other it makes sense that the consequences of their behaviors are opposite to each other. At equilibrium, the <u>size</u> of the time unit it 10^{43} of our seconds so its reciprocal 10^{-43} is indicate on the hyperbola. By current estimates, the Cool Zone has been in existence for approximately 13.5 billion years. This converts to 4.26 x 10^{17} seconds. If we assume that we are half way from evolving from C to D to E, them we would multiply by 4 to complete the evolutionary cycle back to equilibrium. That make the length of time spent evolving in the Cool Zone (C to D to E to D to C) equal to 1.7 x 10^{18} seconds. That sounds like a lot until it is compared to the Hot Zone The Hot Zone's smallest time unit is 10^{43} seconds. When the Cool Zone evolution is compared to the smallest Hot Zone time unit, the Cool Zone's existence is very brief. 1.7 x $10^{18}/ 10^{43}$ = 1.7 x 10^{-26}. This equals 0.000000000000000000000000017 of the smallest Hot Zone second and then the Hot Zone seconds increase in size to a huge, finite, number. The entire Cool Zone evolution is so brief as to be negligible. If someone outside our universe blinks, He would miss our entire existence.

In fact, we can say that *our universe spends all* of its time as a very small* (10^{-35} m), *very hot* (10^{32}K) *little Blob.* (The asterisk is the Cool Zone's brief existence.). So, Blob can get incredibly huge (the Cool Zone), but only if it does it for a very brief period of time.

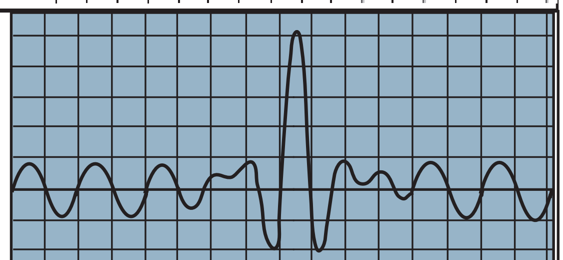
It should be noted that there is no chaos in the quantum world because when the space unit is that small, the time unit is huge. Those who proposed the chaos in the quantum world were using the wrong size time unit. They were using our time unit size rather than the one appropriate for such a small space unit.

For some time, physicists have believed that spacetime at these very small distances becomes grainy and is made up of tiny hot cells. The Planck length 10^{-35} is the size of the quantum cell and 10^{-43} is the length of time needed for light to cross this distance. This is why these two numbers are paired together at the equilibrium point on the hyperbola. A very small (10^{-35} m), very hot (10^{32}K) cell is an entity which belongs in the quantum world. It is described as the smallest unit into which space can be divided. The Kitzmiller hyperbola predicts that our universe, our Blob, is one of these quantum cells.

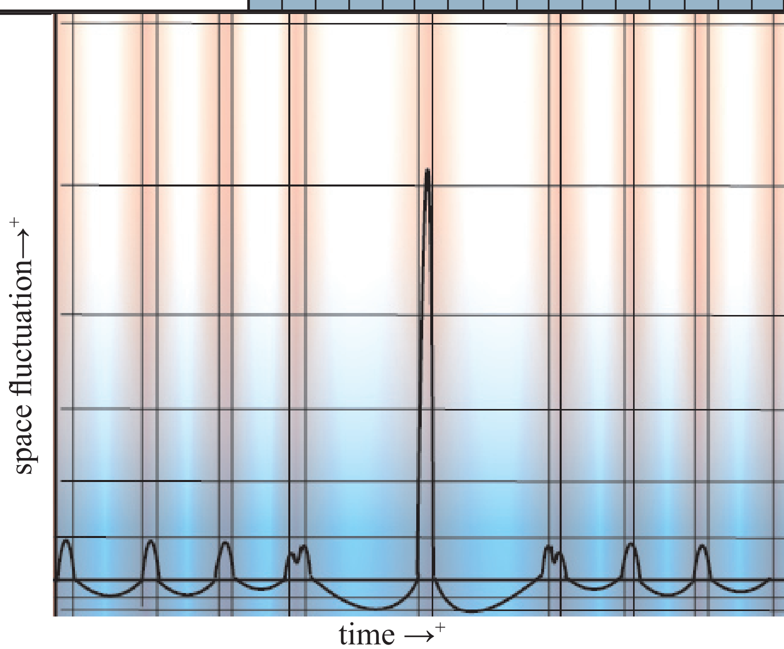
Erwin Schrödinger developed a system of wave equations which describes behavior in the quantum world. Dr. Alfred Osborne, et. al., have developed a modified version of Schrödinger's equations which have an unusual property. This quantum equation develops a random "rogue" wave. The normal fluctuations continue for a period of time. Then unpredictably, one of the 'normal' fluctuations develops a deep trough followed by a fluctuation with a gigantic amplitude followed by another deep trough. [M-9(B)] Surprisingly, the advent of satellite surveillance of the oceans surface has discovered that unusual nonlinear waves with this profile occur in the ocean.



M-9(A) This is a generic sine wave which we will use to represent a standard Schrödinger equation. Solutions to Schrödinger's equation can describe behavior in quantum states, molecular and macroscopic systems, and even the whole universe.



M-9(B) A modified Schrödinger equation, developed by Dr.. Alfred Osborne, randomly generates a 'rogue wave' which looms up and then disappears as time passes. It is characterized by a very large spike with deep troughs on either side. Satellites have seen this type of wave appear and disappear in the oceans.



M-9(C) If this 'rogue wave' concept is applied to our quantum Blob and the space unit and time unit are allowed to vary, we have one of the natural oscillations reaching gigantic heights while Blob still spends most of its ***time*** as a very small, very hot Blob. [The space units are increasing in size as the fluctuations rise above equilibrium. Time units dilate as the fluctuations fall below equilibrium and contract when the fluctuations are above.] [The changes in the units were chosen for ease of demonstration. In actuality, the changes would be much more extreme.]

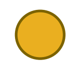
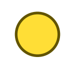
M-9(C) is a modification of M-9(B) where the size of the space unit has been increased above the equilibrium line and decreased below equilibrium. This action is shown by the changing size of the horizontal lines. The size of the time units is indicated by the spacing of the vertical lines. They have been modified by increasing their spacing when the distance unit is small and reducing their spacing when the distance unit is large. This is the process which conserves spacetime. Once again, when the space unit is large it must be brief. But the cell can be small for a longer time. This can be an explanation for the evolution of the macro world from the point of view of the quantum world. So, our Blob exists for most all of the time as a small quantum cell making small regular oscillations except for the random brief gigantic spike which represents our world.

There is an animation showing how the graphics in this section act together. It is labeled M-9

It is not hard to come to the conclusion that there are many little blobs. This is called quantum foam. If they all are conserved and follow the same rules as our blob, how would they interact with us? Figure M-10 shows 72 of the little blobs. If one of them should inflate as we are doing, it would encompass all of the other blobs. If the other blobs were to interact with our inflating blob, we would not exist. They are so hot that there would be no place within the inflation blob where the temperature was 300K. Our elementary particles require 300 K to hang together. Fortunately, our blob inflates and deflates so fast that the other blobs don't have a chance to notice us. You can't make snowflakes out of steam and we are definitely snowflakes.

There is an animation of the blobs in the Animations section. It is labeled M-10

M-10

Of these four states of Blob this is the biggest. so it is the briefest. It represents a state slightly larger (to the left of C) than the C position on the hyperbola.	1 
This representation of Blob represents a state just smaller than point C on the hyperbola. It has a time unit larger than 1. It evolves slower than 1 and faster than 3.	2 
Number 3 is a state between 2 and 4 at about the B position on the hyperbola It evolves faster than 4 and slower that 2.	3 
This very small state of Blob, as in location A on the hyperbola, has a huge time unit and so it takes a long time for Blob in this small state to evolve to a larger size. It changes slower than 1, 2, or 3.	4