

Angl. version

<https://www.youtube.com/watch?v=K8gV05nS7mc>

Did Time Start at the Big Bang?

Matt O'Dowd

Začal čas u velkého třesku?

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I will give my opinions on Mr. Matteo's lecture in red font (the translator will translate it)

00:00

(01) Thank you to LastPass for sponsoring PBS Digital Studios Our universe started with the Big Bang. But only for the right definition of our universe and "started" for that matter. In fact, the Big Bang is probably nothing like what you were taught. A hundred years ago, we discovered the beginning of the Universe. Observations of the retreating galaxies by Edwin Hubble and Vesto Slipher, combined with Einstein's - then - brand-new general theory of relativity, revealed that our universe is expanding and if we reverse that expansion far enough - mathematically - purely according to Einstein's equations, it seems inevitable that all space and mass and energy should once have been compacted into an infinitesimally small point - a singularity. It's often said that the universe started with this singularity and the Big Bang is thought of as the explosive expansion that followed. And before the Big Bang singularity, well, they say that there was no 'before' because time and space simply didn't exist. Now, if you think you've managed to get your head around this bizarre notion, then I have some bad news: that picture is wrong. And at least according to pretty much every serious physicist who studies the subject. The good news is that the truth is way cooler, at least as far as we understand it Now, before a certain crowd starts with "all the scientists keep changing their minds - they don't know anything", or "the Big Bang Theory is just a theory" Let me be very clear, the evidence for a hot dense early universe is practically incontrovertible. The Cosmic Microwave Background is a direct line of sight to the universe as it was Only a few hundred thousand years after the hypothetical beginning of time. We can see pretty much directly that all space and matter in the universe was once crunched at least a thousand times closer together There's also the relative abundance of simple elements hydrogen and helium in particular Whose ratio is exactly what we expect if the entire universe was a dense billions of degrees nuclear furnace for the first several minutes of its existence In fact, There's powerful evidence that we should not rewind Einstein's equations that far, at least without introducing some very new physics For one thing there's also convincing observational evidence that the time before around 10^{-32} seconds Included a period of extremely rapid expansion called cosmic inflation We've talked about the reasons we need inflation in previous episodes and I'll come back to it in a bit adding that initial growth spurt solves a couple of the big problems with the Big Bang Theory, but it doesn't change the fact that Rewinding the expansion of the universe even at different speeds still leads us towards the $T=0$ singularity. I'm going to come back to why we need to forget the idea of this singularity Doing so will change the way we think about cosmic inflation and about the beginning of the universe But before we kill the whole idea of the Big Bang singularity, we need to understand what we're killing What does it really mean for all of space to be

compacted into a single point? This idea is especially weird if the universe is infinite. Now the universe may or may not be infinite but if we can understand this for the infinite case. Then getting all of this for the finite case is baby stuff at least by comparison. It's tricky to talk about the size of an infinite universe. Instead of the overall volume or radius we talk about the size of an expanding infinite universe in terms of the scale factor. That's the distance between any two points in space at some moment in time. Relative to their distance at some other reference moments that reference moment is typically taken to be right now. So the scale factor of the universe is currently one. Several billion years ago, the scale factor was half, all points in the universe were half as far apart as they are today. So when I talk about rewinding the expansion, I mean running the clock backwards to track a shrinking scale factor. One way to do that is to keep halving the scale factor. Do that enough times and any two points, no matter how far apart they were, will end up as close together as you'd like. Do it enough times and the universe could end up as hot and dense as you like. But it'll still be infinite, spatially, the scale factor is incredibly small. But an incredibly small number times infinity is still infinity. Rewinding the universe this way doesn't leave us with a singularity. The singularity is when all points are not just next to each other but literally in the same spot at which point temperature and density are infinite. That last tiny step is a doozy. The scale factor goes from incredibly small to zero. So the infinite universe becomes infinitesimal, all points become the same point and three-dimensional space becomes zero dimensional. That's the singularity. We say that it didn't happen in any one place because a point

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(01)- Thanks to LastPass for sponsoring PBS Digital Studios. **Our** universe began with the Big Bang. ("**Our**" Universe, the one after the Big Bang, began in the sense of the beginning of the passage of time and the beginning of the unfolding of space-time and the beginning of the genesis of the structure of matter from the simplest form to the most complex). But only for the correct definition of our universe and the "beginning" of it. **In reality** the big bang is probably nothing like what you've been taught. One hundred years ago we discovered the **beginning of the universe**. (They discovered the beginning of "our" Universe in the sense of the beginning of the passage of time and the beginning of the unfolding of space-time, in which "our Universe" began the genesis of the "transformation of everything") Observations of receding galaxies by Edwin Hubble and Vesta Slipher combined with Einstein's - then brand new general theory of relativity , **revealed that our universe is expanding**, (**Hubble and Vesta** estimated the expansion. I believe that after more careful examination, it will be clarified that it should be an "unpacking" of the dimensions of space-time http://www.hypothesis-of-universe.com/docs/c/c_071.jpg) and if we sufficiently reverse this expansion - mathematically - purely according to Einstein's equations, it ***seems*** inevitable that all space, matter and energy **should have once been compressed into an infinitesimal point - singularities.**

I would propose the big-bang by an "inflationary jump" in the sense of an "instant" change of state from the original flat Euclidean smooth 3+3D space-time before the Bang to an extremely curved 3+3D non-zero location - our future Universe after the Bang..., while the ""event"" state changes are not related to time as such..., they occur "anytime", and the location of the new "curved dimensions" occurred "in the previous" infinite flat 3+3D, and the location is arbitrarily large, because units cannot be determined in the infinite state of cp. And it must be added right away that Time is just an artefact = quantity "the name of a static state", where the flow of time occurs only when it begins to move "along time dimensions" = to move the observed object-subject. Time does not run for us, but we run "after" time, along the time dimension, and as we cut off those time intervals, we perceive it as the passage of time. Before the Bang, "time did not run" because there was "nothing" to run along the time dimension. After

the Bang, there was a "boiling vacuum" and objects from the dimensions were packaged in it and they "started" to move along the time dimension..., etc. as HDV says. Since the Big Bang, **A**) the global unwrapping of plasma = the "boiling" state of 3+3 dimensions and **B**) the packing of 3+3 dimensions into more and more complex systems have been going on simultaneously, so that the more complex and even more complex ones are "born" less and less http://www.hypothesis-of-universe.com/docs/aa/aa_037.pdf ; http://www.hypothesis-of-universe.com/docs/g/g_041.pdf ,... that is, there is the least amount of the most complex matter in the Universe (and that is precisely on Earth - see the pyramid). What I mean is that ***first*** there must be a "production of those arrangements = higher complexity of the system" so that ***then*** the entropic phenomenon can occur, i.e. the thermodynamic arrow of "unpacking = disintegration" of the highly complex = ordered into curvature complexity into less complex - a more ordered state with a smaller set of curvatures, i.e. the state (most) ordered to less ordered systems. The transformation-transformation of the state of "most ordered" = Euclidean flat 3+3D spacetime to the state of extremely chaotic = curved disordered happens in the universe by a "jump". And then entropy slowly happens - the unfolding of dimensions, i.e. states with higher order change to less ordered ones, entropy increases. So in space: there is always a "jump" change from "smoothness" to "curvature" and then slowly (over time) the curvature changes to smaller and smaller curvatures. Why? I don't know that yet. The first "jump" happened in Třesk...and others and others followed.

In the macro world, all three dimensions of time and length expand - you say the 3+1 universe expands, I say the 3+3 universe expands. But in the microworld of Planck intervals there is a "boiling foam" of dimensions, which can be understood as a chaotic transformation of curvatures when, if you "walk along the dimension", we move the press along the dimension, you go one moment "forward" and the next moment along the same dimension "backward", dttto after each dimension from 3+3 D, that's why it's foam where time doesn't go in one direction like in the macro world. This foam has not been chaotic since the Bang; in this foam it is born creating "geons" = packages" of precise shapes using different amounts of dimensions, the packages then conglomerate together to form a more complex mass. Each package = elementary particles of matter then has a different number of dimensions and with different packing curvatures...then the package is a "clone" = a frozen entity to the "foam shake". The packages connect - connect into conglomerates = atoms, which then into molecules, compounds, chemistry, biology, etc. up to DNA. These "foamy" dimensional structures then "float" in less curved 3+3D space-time. There are, there are probably only four or five such "unwrapped" curved space-times (gravitational field, electromagnetic field, weak field, gluon field, Higgs field, etc.); in these fields, those clusters-conglomerates of packed dimensions "float" and... and 4 fields then "float" in the basic Cartesian, non-curved, Euclidean grid - yarn - raster (I don't know how to say it better) of totally flat 3+3D. - - So physicists, for now !!!, do not need more time dimensions in the macroworld of fields, but when they search for the essence of matter, they will need more dimensional states of Existence) for now there is only one, time dimension and we can travel in time only one direction, **I** in the macro world, time, i.e. all three dimensions of time and length, unfolds in only one direction, but in the micro world, the direction of the "flow of flow" in that foam "pulsates" in chaotic directions. A new shift in thinking in HDV is that the 3+3D smooth-flat non-curved space-time is just...just the basic existential "substrate-substrate-raster" for the realization of the dynamics of transformations of matter and space-time into each other in curved states...that "curved states of 3+ 3D space-time "floats, they are nested" in that "grid, flat Euclidean space-time" ...; so **TIME doesn't run for us, it's a dimension, but we-objects "made of wrapped dimensions" run along that time dimension**, along that grid, and we cut into the dimension time intervals, which we then perceive" as the flow of time. **Time**

does not run to us, but we run to it, we run "after it". Physicists lack precisely this new insight-view to understand the multidimensionality of time. They lack the humility and judgment to at least read this vision of the HDV universe and then examine the idea to see if it can be real. 

The early Universe after the Big Bang had to start its activity with a "boiling foam dimension" that had topological defects from its very birth. Topological inhomogeneity http://www.hypothesis-of-universe.com/docs/c/c_168.gif 3+3D "boiling vacuum" http://www.hypothesis-of-universe.com/docs/c/c_428.jpg *transmitted* even after "inflation" to cosmic dimensions http://www.hypothesis-of-universe.com/docs/c/c_222.jpg in accordance with the principle of alternating symmetries with asymmetries. Why? I don't know. But if that was the case, then these defects are the motive for the **dramatic genesis of other states... until the "birth of man" was reached.** As I have already said elsewhere, even here "in the beginning", there is a principle of alternating symmetries with asymmetries - topological defects are proof of that. Before the Big Bang, there were no topological defects, although the Universe was there. Maybe except for one and that was the big bang. Why? I don't know... **but it's clear** that the Bang was "only" a jump-change of state according to the rule about alternating symmetries... I consider the force field, like any field, to be a "space-time of a certain curvature of dimensions 3+3", in which a packed ball-wave-wave packet of packed dimensions = elementary particles "floats". A simplified picture is here (I don't have another, more suitable one) http://www.hypothesis-of-universe.com/docs/c/c_426.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_416.jpg in the force field represented by the "basic 3+3D grid", a grid with little curvature, elementary particles float and vibrate as packages made of dimensions, so you have to imagine it yourself http://www.hypothesis-of-universe.com/docs/c/c_416.jpg I already feel like a moron when I have to repeat these visions over and over and over , every document, in every description, going crazy just because no one reads it and I need someone to read it and not so alone and alone on the creativity of HDV's vision. So again and again, like in secondary school →

The quantum world rules on the scales of the microworld, because this state is "crumpled-packed space-time itself", it is a "foam" of dimensions, an interaction of crooked states of dimensions. The quantum field on the retina of the human eye is such an "image - projection" onto the plane of the observer, who sees "a kind of" discontinuous state of "dots and gaps"; "zero and one" ; "nothing and something" ; "clusters and non-clusters" ; condensates and dilutions. -- Do you finally get it?-- The quantum world is passing from the microworld to the gravitational macroworld, so-and-so, that the curvatures of the cp are "unpacked" into precisely defined curves of "gravitational fields", i.e. a slightly curved dimension. It is therefore a "transition" from very crooked states of cp to less and less crooked states of cp..., the universe is expanding, its curvature is unfolding, which is supposed to disappear sometime in the "big-crunch". That is: Big-bang is such a "quick-jump transition" from the state of flat cp (before the big bang) to the opposite state = very curved = "foam cp" and..and then a smooth transition to the big-crash occurs, i.e. genesis now occurs changes-changes (alternating symmetries with asymmetries) of these curvatures in the direction "from the "foam of the Bang" to the flat empty vacuum in the big-crash". It is still interesting, however, that between these two end states of the dynamic Universe, i.e. "initial state = big-bang" and "end state = big-crunch" what is happening, according to the principle of alternating symmetries with asymmetries, not only the "unwrapping" of the "foam" dimensions " into the global-space-time (between galaxies), but in that "initial foam" there is also the packing of 3+3 dimensions np into those "packages-geons-balls" = elementary particles of matter, where in addition those elements are also transformed pyramidally - conglomerationally they cluster into more complex structures, i.e. into atoms, molecules, compounds. At the same time, the

pyramidal sequence of assembly also "runs" into a series - clusters of dust + stars + galaxies. And even in the middle of the genesis of the universe from the big-bang to the big-crash, the initial foam is not only "consumed" by the "unwrapping" of the curvature, but another new "foam" is even "born" in a vacuum, i.e. on smaller and smaller time-space scales, the foam in this vacuum is even finer than the "initial post-Bang foam"... as if another new space-time is being born "from the depths of the Planckian vacuum", from micro-singularities.

Hořava lamented that although CERN produced the higgs boson, nothing else*, that he expected the discovery of some symmetries, super-symmetries, which would help explain why we live in such a slowly evolving universe. I will add to this: for many years in HDV I have suggestions for alternating symmetries with asymmetries, which leads to the genesis of transformations by collaborations of curvatures of dimensions **a)** packed into packages=material elements in the microcosm with **b)** those 3+3 unpacked unzipped into the macrocosm. Even today, in every place of the universe, the foam of boiling dimensions still "emerges" "from Nothingness", i.e., from the vacuum on the Planck scales, and then part of it "unwraps" part of it sinks = disappears in the curvature singularity http://www.hypothesis-of-universe.com/docs/c/c_241.jpg at every point of the Universe, the boiling vacuum expands like this (the foam is not in the picture)

Each cycle starts with a big bang but doesn't end with a big crunch, Penrose says, **calling these cycles eons**. Maybe yes, the universe ends by "dissolving", unfolding the curvatures of space-time dimensions into Euclidean flatness, so that this 3+3D state (without matter, without fields, without the flow of time, without expansion) is ready for a new Bang, i.e. for a sudden change in the curvatures of dimensions to an extremely packed-packed, into an extreme foam of dimensions, in the form of a plasma, an extreme boiling space-time, which is shown as "quantized" by "projection" (e.g. into the grid plane) or "in section"... it is a view of "zeros and ones", to "points and spaces", to "nothing" and "something", to extreme granularity, because the projection of packed-packed dimensions is a view of some quanta. **But at the end of the eon you rescale and compress all that Hawking radiation together**. And isn't the simpler HDV interpretation that : at the end of the eon, which is the unfolding of all the curvatures of the spacetime dimensions "outside" matter and "inside" matter, that there will be a totally Euclidean flat 3+3D space-time, which ""anytime and anywhere"" explodes again with a big-bang, I say **in HDV there will be a change from the pre-Bang state to the post-Bang state**, i.e. the flatness with a jump (phase?) will change to extreme curvature of all dimensions - seething, chaotic, dense froth of dimensions = plasma. And now the genesis in that foam: packing into frozen geons-packages = elementary particles and... and unpacking those dimensions into the global environment of clusters of galaxies. - - but no one is reading this, Mr. Penros... I have already sent thousands of e-mails to the whole world and no one has heard back, no one has sent **even a sentence** : shove that HDV up your *ass*.

I ask for patience and intolerance in the translation by the translator. Sometimes Czech expressions are quite different in English.

Penrose - Second law of thermodynamics: **entropy increases**. **Entropy theory is a beautiful thing...**but there is also **"something" that is the opposite of entropy!** ! and that is the "making of matter - elements and matter" of more and more complex entities as we end up in protein biology with DNA. We see it increasing. But the fact that entropy is increasing means that it must have been less in the past. **And the least entropy had to be in that "chaotic foam of dimensions", after the Bang, in which the genesis of increasingly complex and complex matter,.. and the genesis of physical fields,.. and the genesis of large-scale galactic structures, ... and the genesis of interactions in the microworld,...and the parallel genesis of laws and rules and principles...** The universe must indeed have started with very little entropy, otherwise we simply cannot explain what we see. O.K. , "foam = plasma" = crumpled space-time and it begins to -u n w r a p- (to wrangle) into webs - into macro-scale webs http://www.hypothesis-of-universe.com/docs/c/c_362.jpg = http://www.hypothesis-of-universe.com/docs/c/c_241.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_344.jpg (13.8 billion years after the Big Bang) and simultaneously -p a c k a g e- into those geons = elementary particles, http://www.hypothesis-of-universe.com/docs/c/c_283.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_266.jpg , then into atoms, molecules, compounds → all this is **organized space-time**. http://www.hypothesis-of-universe.com/docs/eb/eb_002.pdf .

Conclusion : Mr. Matt O'Dowd, no, time did not start with the Big Bang, it existed before the Big Bang, but with the Big Bang, time "began to tick", time began to unfold, time began to run-flow, time began to unfold "on a global level" , began to perceive time that flow of the passage of time, complex matter structures with their interactions, and then living organisms such as trees, ferns and humans. They began to perceive the flow-flow of time because the Earth floats and flows along the time dimension, cutting off intervals of time. **And that's enough**. I don't have the strength anymore, I can't say it 100x...1000x to the empty audience of the hall...to the blank stares...

05/22/2022

Note (citation + com): **However, the masses of elementary particles all come from the Higgs field, says Penrose** (*) I have a different interpretation of this. http://www.hypothesis-of-universe.com/docs/aa/aa_188.pdf ; http://www.hypothesis-of-universe.com/docs/aa/aa_176.pdf ; http://www.hypothesis-of-universe.com/docs/aa/aa_175.pdf ; ((Just a sentence about that: *mass is a property of matter, i.e. after a package is packed using several selected dimensions and this package is "connected" to another wavepacket and then another connection and another (in a network of 3+3D dimensions)... each configuration of the used and packed dimensions then indicates the mass of the given conglomerate of multi-packed dimensions (atoms, molecules, compounds)..*))

I describe the origin of the big bang here :

http://www.hypothesis-of-universe.com/docs/aa/aa_178.pdf here side 4

http://www.hypothesis-of-universe.com/docs/aa/aa_174.pdf

http://www.hypothesis-of-universe.com/docs/aa/aa_171.pdf

http://www.hypothesis-of-universe.com/docs/aa/aa_159.pdf here side 6 + side 9 + side 13

http://www.hypothesis-of-universe.com/docs/aa/aa_161.pdf

http://www.hypothesis-of-universe.com/docs/eng/eng_047.pdf

http://www.hypothesis-of-universe.com/docs/aa/aa_148.pdf here side. 7+8+9

http://www.hypothesis-of-universe.com/docs/aa/aa_147.pdf

http://www.hypothesis-of-universe.com/docs/aa/aa_145.pdf

http://www.hypothesis-of-universe.com/docs/aa/aa_144.pdf

http://www.hypothesis-of-universe.com/docs/aa/aa_130.pdf

and then there are more and more reflections on the topic of the Big-bang, on other web-sites.

What is before the Big Bang

http://www.hypothesis-of-universe.com/docs/aa/aa_046.pdf ;

http://www.hypothesis-of-universe.com/docs/aa/aa_054.pdf ;

http://www.hypothesis-of-universe.com/docs/aa/aa_065.pdf ;

http://www.hypothesis-of-universe.com/docs/aa/aa_067.pdf ;

http://www.hypothesis-of-universe.com/docs/aa/aa_089.pdf ;

http://www.hypothesis-of-universe.com/docs/aa/aa_147.pdf ;

http://www.hypothesis-of-universe.com/docs/eng/eng_054.pdf

Note (citation + com):

The universe is often said to have begun with this singularity, and the Big Bang is thought to be the explosive expansion that followed. And before the Big Bang singularity, well, they say there was no "before" because time and space just didn't exist. **Exactly opposite. Before the big bang, there was only a two-dimensional state of space-time. I proposed an "inflationary jump" for the big-bang in the sense of an "instantaneous" change of state from the original flat Euclidean smooth 3+3D pre-Bang spacetime to an extremely curved 3+3D non-zero location - our future post-Bang Universe.** Now if you think, that you managed to navigate this bizarre idea, then I have bad news: the picture, the vision is wrong. At least according to almost every serious physicist who studies this topic. The good news is that the truth is much colder, at least as far as we understand it. Now, before a certain crowd starts saying "all scientists keep changing their minds - they don't know anything" or "the big bang theory" is just a theory", let me be very clear. The evidence for a hot and dense early universe is virtually irrefutable.

After the Bang, there was a "boiling vacuum" = plasma, and objects from dimensions were packaged in it. Since the Big Bang, the following has been going on: **A)** the global unwrapping of plasma = the "boiling" state of 3+3 dimensions and **B)** the packing of 3+3 dimensions into more and more complex and complex systems, and then the more complex and even more complex "are born" "less and less" http://www.hypothesis-of-universe.com/docs/aa/aa_037.pdf ; http://www.hypothesis-of-universe.com/docs/g/g_041.pdf .. In the macro world, all three dimensions of time and length expand - you say the 3+1 universe is expanding, I say the 3+3 universe unfolds. But in the microworld of Planck intervals, there is a "boiling foam" of dimensions, which can be understood as a chaotic transformation of curvatures when you "go along a dimension" one moment you go "forward" and another moment along the same dimension "backward" dtto after each dimension of 3+3 D, that's why it's foam where time doesn't go in one direction like in the macro world. And this foam is not still chaotic since the Bang; in this foam it is born creating "geons" = packages of precise shapes using different amounts of dimensions, the packages then have conglomerating shapes. Each package = elementary particles of matter then has a different number of dimensions and with different packing curvatures...then the package is a "clone" = a frozen entity to the "foam shake". The packages connect - connect into conglomerates = atoms, which then into molecules, compounds, chemistry, biology, etc. up to DNA. These "foamy" structures of dimensions then "float" in a less curved 3+3D space-time, there are apparently only three to four (gravitational field, electromagnetic field, weak field, gluon field, higgs field, etc.); in these fields those clusters-conglomerates of packed dimensions "float" and... and 4 fields then "float" in the basic Cartesian grid - a yarn - a grid of totally flat 3+3D. - - So physicists for now !!! they do not need more time dimensions in the macroworld of fields, but when they search for the essence of matter they will need more dimensional state of Being).

The Cosmic Microwave Background is a direct line of sight into space as it was only a few hundred thousand years after the hypothetical beginning of the **flow** of time. We see quite directly that all the space and matter in the universe was once compressed at least a thousand times closer together. ***Plasma is an extremely curved state of space-time dimensions.*** There are also relative abundances of simple elements, notably hydrogen and helium, the ratio of which is exactly what we would expect if the entire universe was a dense nuclear furnace at a temperature of a billion degrees during the first few minutes of its existence. In fact, there is strong evidence that we shouldn't push Einstein's equations that far, at least without introducing some **brand new physics**. **HDV**. For one thing, there is also compelling observational evidence that the time around 10^{-32} sec ago. includes **a period of extremely rapid expansion called cosmic inflation**. **This inflation is not proven just assumed**. We talked about the reasons **why we need inflation** in previous parts **need to examine my proposal** : http://www.hypothesis-of-universe.com/docs/c/c_239.jpg and I'll go back a bit and add that the initial growth spurt solves a few big problems with the Big Bang Theory, but that doesn't change the fact that rewinding the expansion of the universe at different velocities still leads us **to T equals the zero singularity**. Also, I don't think that "our" post-Cod universe originates in the zero singularity. The initial state of the post-Big Bang universe is a location with an extreme "density of crooked dimensions" and this *location* both : **a) expands and b) collapses...** and this explains the size **of the location** = "singularity", it is arbitrarily large, the space-time here "foam-swells" " " and thus also changes the "density" of the curvature of the dimensions...which simultaneously expand and collapse; I'm not a mathematician so I can't put it better.

I will return to why we must forget the idea of this singularity. If we do, it will change the way we think about cosmic inflation and the beginning of the universe. **However, before we kill the whole big bang singularity idea, we need to understand what we are killing**. What does it really mean that all space is compressed into a single point? This idea is especially strange if the universe is infinite. **If the line is infinitely long, (from minus infinity to plus infinity), then ask yourself the question: how big is the nearly infinite line segment on this line? or how big is the almost zero line segment on this line? → Near-zero = near-infinite.** And it doesn't even matter the choice of the size of the units. Now the universe may or may not be infinite, **However, the author means "our Cod universe"...**; the pre-Bang universe is an infinite 3+3D space-time in which a "near-infinite = near-singular" location "snapped" in which the curvatures of the dimensions changed by leaps and bounds. Before the Bang, only non-curved dimensions, after the Bang "is born" a location (("nearly infinite = near-singular = near-zero")), with extremely crooked dimensions and ... and the genesis of the unfolding of time and length dimensions into the "global-universe and ... and the collapse of dimensions into matter, but **if we can understand it** **HDV** for the infinite case, then getting all this for the finite case is child's play, at least in comparison. It is difficult to talk about the size of the infinite universe. Instead of total volume or radius, we talk about the size of the **expanding** infinite universe in terms of scale.

O.K. + **the packing** of dimensions into geons = balls, which are mass elementary particles, which then conglomerate together a) into chemical, biological structures...b) into stars and galaxies and dust-gas formations. This is the distance between any two points in space at a certain moment in time relative to their distance at some other reference moment, the reference moment is usually considered to be right now. So the scale factor of the universe is currently one. A few billion years ago the scale factor was halved, all points in space were half as far apart as they are today. ?? So when I talk about **rewinding the expansion**, I mean turning back the clock, **today, looking at the large scale of the universe, we find ourselves in an "unpacked" space-time (unpacked dimensions of time, unwrapped space), in which "float"**

packed packages of matter - elementary particles further interconnected by physical reactions , chemical or biological...etc. to keep track of the shrinking factor. One way to do this is to keep halving the scale factor. Do this often enough and any two points, no matter how far apart they were, will end up so close to each other, or collapse today's space-time and you will gradually (through the relict density of the world) arrive at *dimensional foam*, i.e. the starting plasma and the two points will also be closer and closer and closer... as you would like. Do this enough times and the universe can end up as hot and dense as you want, but it will still be infinite, spatially, the scale factor is incredibly small, but an incredibly small number of times infinity is still infinity. OK. If you take a Euclidean flat 3+3 spacetime and "squeeze any volume of 3+3D dimensions into it into extreme curvature, the outer spacetime will still be flat, infinite. The crooked states of the sites will "float" in infinite 3+3 space-time as atoms float. Molecules, compounds... and so how stars and galaxies float (the crooked dimension) in that expanded space-time. Rewinding the universe in this way does not leave us a singularity. A singularity is when all points are not just next to each other, but literally in the same place, in which the temperature and density are infinite. That last little step is insane The scale factor goes from incredibly small to zero. . So the infinite universe becomes infinitely small, all points become the same point, and three-dimensional space becomes zero dimension. That's the singularity. We say it didn't happen in any place because period

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(02)- is zero dimensional there weren't spatial dimensions for it to happen in At the same time we say the Big Bang happened Everywhere at once because even the tiniest fraction of a second later The universe has infinite size and everywhere is expanding equally Even if the universe is not infinite then whatever space there is Comes into being at the same time from that singularity. But what happens to time at the Big Bang singularity? To get that you can't think about the universe as having one big clock that Rewinds and then winks out of existence of the Big Bang or into existence if you're going forward No, you have to think about time in the way Einstein Intended there is no universal clock time is relative Clocks are attached to each observer each moving frame of reference to see what time does at the Big Bang We have to trace a path through space and time back to the singularity We trace a path called a geodesic which in general relativity is the shortest path between two space-time coordinates These are the grids we use to map space-time Remember that in our rewind all points in the universe get arbitrarily close together before merging at T equals zero Well, that's the same as saying that all geodesics in the universe converge at the Big Bang singularity In the same way all lines of longitude converge at the North Pole so each Geodesic tracks earlier and earlier times as it approaches the Big Bang infinite clocks rewinding toward zero and then they all converge and Then what? well, then nothing.All geodesics end at the Big Bang singularity and their timelines end with them Or they start depending on how you want to think about it The point is that in the pure Einsteinian picture There is no before the Big Bang because no time line in this universe can be traced there. This is called geodesic in completeness and it also happens at the singularity in the center of a black hole all timelines end this time in the forward direction The analogy with the North Pole is a good one and Einstein himself used it.Lines of longitude end at the North Pole and it's meaningless to ask what is north of the North Pole? from the pure Einsteinian point of view It's meaningless to ask what happened before the Big Bang or after reaching the black hole Center? Okay, so I'm taking my time to explain something I already told you is wrong But it's important because the extreme weirdness of the Big Bang singularity is part of what tells us. It's wrong Any time you encounter a singularity in the mathematics of a physical theory you have good reason for skepticism It's probably telling you that your physical theory is incomplete and that you push that theory too far That's what's happening here We used general relativity to rewind the

universe, but we already know that despite its incredible successes GR is an incomplete theory? At the crazy densities and temperatures of the Big Bang singularity, and just after, GR comes into terrible conflict with quantum mechanics. We've talked about that conflict and its possible resolutions before. But the upshot is that we just don't know how the universe behaves in those conditions. But we do know that pure general relativity is not a good description and so he probably shouldn't believe its prediction that all space was compacted into a single point and that this is where Time started. Ok. So what are the alternatives? Can we really track Geodesics? and the timelines they embody through the Big Bang and out the other side? If so, what do we find there? There are several possibilities and they deserve their own episodes and we'll actually get to those soon. But to whet your appetite, first up, cosmic inflation can offer a temporary reprieve from the singularity. Eternal inflation suggests that our universe appeared as a regularly expanding bubble in an unimaginably larger continuously inflating space-time in that case before the Big Bang was a period of exponential expansion that could have lasted indefinitely. We'll get to the nitty-gritty of that with its inflow tongs and bubble universes real soon. There are also various cyclic universe options. The first cyclic universe idea was the Big Bounce in which the Gravitational attraction of all matter in the universe was enough to cause it to re-collapse and then presumably bounce outwards again. We now know that there isn't anywhere near enough matter to do that unless we bring in string theory. The Steinhardt-Turok model suggests that our universe floats in a higher dimensional space living on geometric objects called branes. Collisions between those branes initiate cycles of expansion of contraction. Then there's Roger Penrose Conformal cyclic cosmology. It's even weirder.

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(02)- because the point is zero dimension, **there were no spatial dimensions**, for this to happen. **But your interpretation is a mistaken view of the "shrinking" of space-time intervals. A more elegant and the only possible way is to bend the dimensions and pack them into "extreme foam" ... which after the Big Bang immediately begins to unpack and simultaneously pack into small geons = balls = elementary particles of matter.** At the same time, we say that the Big Bang - **happened Everywhere at once** , O.K. **it happened in the in pre-bang space-time, not everywhere, but anywhere, in an arbitrarily large location (near-infinite = near-zero) where the dimensions were extremely shriveled-coiled...etc.** because even the smallest fraction of a second later the Universe has an infinite size **reasoning error: The universe before the Bang is different than after the Bang. and expands the same everywhere. Not. Each "selected" volume from the Universe from anywhere has a different curvature of dimensions and always has a different state of matter in it.** http://www.hypothesis-of-universe.com/docs/c/c_240.jpg **Time runs at a different pace in any location of the universe (see OTR and according to STR) and a different pace of expansion = expansion of space-time runs in each location.** Although the universe is not infinite, any space that exists arises simultaneously from this singularity. **No, it's not.** But what happens to time at the Big Bang singularity? **TIME is a quantity that has dimensions, and only when "someone-something" moves "along the time dimension" does it cut intervals on it and then we perceive them as a flow, the passage of time, we objects run along that time dimension, after that 3+3D grid by the way the time dimension expands, it changes its curvature.** To achieve this, you can't think of the universe as having one big clock that spins and then blinks to stop exist after the big bang, or were created if you go forward. **No, you have to think about time in the way Einstein intended: there is no universal clock time, **time is relative.****

Relativity is an unfortunate *name*, an unfortunate word, a fortunate choice of naming a "phenomenon". The pace of time changes when we observe it from the Observer system on

other bodies in both uniform (STR) and accelerated (OTR) motion. And the fact that the tempo of the passage of time changes cannot be called "relativity". Clock = a mechanism for producing precise intervals, it ticks the same everywhere, i.e. even on a rocket that flies véé → céé, where we "think" that time dilated on the rocket, that the commander there - Pavel ages more slowly than Peter on Earth... no, no, the atomic clock ticks the same everywhere, even on the rocket, only we here on Earth from the rocket receive "rotated" information, rotated systems with dilated intervals on the time dimension. We perceive the STR of the rocket commander, we observe the dilations because the rocket's own system S(2) has rotated with respect to our chosen-base system S(1).

In my opinion, the reason **is the rotation of the systems a)** STR is the "stoic" rotation of the systems (in uniform motion always in some "stop-state of speed"), **b)** gravity is the "parabolic" rotation system during accelerated motion. And how do you verify this statement (mine) using those experiments from 1960 + 1971 + 1997 + 2010 ?????? How do you verify that the Universe is not expanding axially, (see the flawed Hubble), but is expanding, http://www.hypothesis-of-universe.com/docs/c/c_065.jpg ; therefore, the curvatures of 3+3 dimensions of that space-time are unfolded and they are unfolded "from every point" http://www.hypothesis-of-universe.com/docs/c/c_223.jpg of the microworld (foam of dimensions http://www.hypothesis-of-universe.com/docs/c/c_168.gif) while there are billions of "points" from which the code unfolds per square meter, and innumerable in the entire universe, i.e. in every point of the entire world there is a micro-universe (foamy) expands into the form of the macroworld (with gravitational curvature np around matter http://www.hypothesis-of-universe.com/docs/c/c_190.jpg or between bodies such as stars and galaxies) http://www.hypothesis-of-universe.com/docs/c/c_241.jpg ; the unfolding of macroscales is both regular and irregular, chaotic..., inhomogeneous unfolding of numbers → http://www.hypothesis-of-universe.com/docs/c/c_222.jpg ; it is not Hubble axial expansion. http://www.hypothesis-of-universe.com/docs/c/c_176.jpg Why? **A)** the time dimension bends, everywhere, always; **B)** the pace of the passage of time is not the same everywhere in the stop-state; **C)** Perhaps the pace of the passage of time changes even during the aging of the universe; these questions have never been investigated by science-physics).

A clock is attached to each observer to each moving frame of reference to see what time is doing at the big bang. Clocks are just a mechanism by which we measure (intervals), some observed rate of passage of time and compare it to selected "clock" intervals, units. We must trace the path through space and time back to the singularity. That is the path "against unwrapping" the dimensions of time... We trace a path called geodesics, which is generally the relativity shortest path between two space-time coordinates. What we call ourselves here on Earth and what is different in every location of the Universe... These are the grids we use to map spacetime. Remember that in our time rewind, all points in space will arbitrarily approach each other before merging at T equals zero. If, after the Big Bang, the "boiling foam" = plasma of dimensions 3+3D had not been "unwrapped" again and again, this state would have remained "for a long time", the "right-left flows of time" would have remained "equalized"... foam it wouldn't "take" one direction of unwrapping and therefore time would not flow... Well, that's the same as saying that all geodesics in the universe converge at the Big Bang singularity. In the same way, all lines of longitude converge to the North Pole, so that each geodetic follows earlier and earlier times as the infinite clocks wind up to zero near the Big Bang, and then they all converge; and then what? well, nothing. All geodesics end at the Big Bang singularity and their **timelines** end with them. Or they start depending on how you want to think about it. The point is that there is nothing in the pure Einsteinian picture Before the Big Bang, faulty reasoning, there is pure flat infinite space-time with no matter, no fields, no unwrapping of time, no unwrapping of space...; all this will happen only after the big

bang, when there will be a sudden change in the curvature of the dimensions...etc. etc. see hundreds of interpretations in HDV... because there **is no time**, (there is TIME, but it does not "run", there is no Observer, / which can also be a cursor on the network /, which, according to "another Observer", moves along the time dimension as well as along the length dimension.) a line can be traced there in this universe. This is called geodesic in its entirety and also happens in the singularity at the center of the black hole, all timelines end in the forward direction this time. The North Pole analogy is a good one and was used by Einstein himself. Lines of longitude end at the North Pole, and it makes no sense to ask what is north of the North Pole? from a purely Einsteinian point of view. **There is no point in asking what happened before the Big Bang.** Of course, **nothing "happened"** there, because there is no genesis there, because there is neither matter, nor fields, nor the expansion of space nor "aging", i.e. the flow of flow time ..., it's not there, but the "state-of-being" is there before the Bang! or after reaching the center of the black hole? Okay, so I'm taking the time to explain something that I've already told you is wrong, but it's important because the extreme strangeness of the Big Bang singularity is part of what it's telling us. It is bad. Whenever you encounter a singularity in the **mathematics** of physical theory, you have good reason to be skeptical.

Have you wondered what a "singularity" looks like **any large location** in an infinite flat Universe??, http://www.hypothesis-of-universe.com/docs/h/h_051.pdf , i.e. that this "locality non-singular" can be in a state of different dimensional curvatures than the surrounding infinite flat spacetime ??! This probably tells you that your physics theory is incomplete and that you are pushing that theory too far. That's what's happening here. We used general relativity to **rewind** the universe, but we already know that despite its incredible achievements, GR is an **incomplete theory?** At crazy **densities and temperatures, which are properties** of the multicurved state of spacetime dimensions = boiling froth of dimensions of the Big Bang singularity and just after that, GR comes into dire conflict with quantum mechanics. http://www.hypothesis-of-universe.com/docs/h/h_082.jpg We've talked about this conflict and its possible solutions before, but the result is that we simply don't know how the universe behaves under these conditions, but we do know , that pure general relativity is not a good description, http://www.hypothesis-of-universe.com/docs/h/h_082.jpg and so he probably shouldn't believe its prediction that all timespace has been compacted =**curved packed** into a single point and that Time began here. The "flow-flow of time" began, because the dimension of time began to expand, or from another point of view-preview: the observer began to move along the time dimension and thereby cut off time intervals...

OK. So what are the alternatives? Can we really track geodesics? and the timelines they embody during the Big Bang and beyond. If so, **what will we find there?** **The location of extremely warped – collapsed 3+3 dimensions of two quantities : TIME and Length, i.e. 3+3D space-time.** There are several possibilities **and they deserve their own episodes HDV too ...** and we'll actually get to those soon. But to whet your appetite, first cosmic inflation may offer temporary relief from the singularity. Eternal inflation suggests that our universe appeared as a regularly expanding bubble http://www.hypothesis-of-universe.com/docs/c/c_239.jpg in an unimaginably larger continuously inflating space-time in that event than the Big Bang a period of exponential expansion that could last indefinitely, with its inflow pincers and bubble universes really early, There are also **various possibilities HDV** of a cyclic universe the first idea of a cyclic universe was the Big Bounce in which the gravitational attraction of all matter in the universe was enough to collapse again and then probably bounce out. Again, we now know that there isn't enough matter anywhere to prove this unless we bring in string theory. The **Steinhardt-Turok** model suggests that our universe **floats in higher dimensional space** and lives on geometric objects called branes collisions

between these brains initiate cycles of expansion contraction. Then there's **Roger Penrose - Conformal Cyclic Cosmology**, which is even weirder.

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(03)- because it postulates the infinite future boundary of an eternally expanding universe Looks like the Big Bang of a new universe Mathematically so our heat death is someone else's Big Bang? There are some less abstract ways to get a new universe out of an old one for example an extreme quantum fluctuation could initiate a new Big Bang given infinite time or The same amount of time could lead to all particles randomly converging back to the same spot Or maybe black holes birth new universes as in Lee Smolin's "Fecund Universe" hypothesis. There's a poetry to that last one. The geodesics approaching the black hole singularity Become the geodesics emerging from the new Big Bang singularity people love cyclic and regenerating universes They appeal to our sense of narrative which might be a reason to be wary of these hypotheses Now they also appeal to our intuition for causality Things happen because prior events caused them many of our ideas Just push back the uncomfortable something from nothing moments physicists have a thing or two to say about that from quantum fluctuations from nothing - Stephen Hawking's timeless interpretation of internal inflation that draws on the holographic principle all things we'll discuss in the future as we travel beyond the beginning of Space-Time. A big thank you to LastPass for sponsoring previous digital studios LastPass remembers your passwords for you by Auto filling your usernames and passwords LastPass is designed to store the count walkouts, which means you won't need to answer security questions like 'What is your favorite childhood pet's name?' or, 'what street did your paternal grandmother live on growing up?' they protect your data and give you the power to make your passwords impenetrable You could also easily and safely share passwords through LastPass if others need to access your accounts the service works on mobile sites and on apps for iOS and Android

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(03)- because it postulates an infinite future limit of an ever-expanding universe. It looks like the big bang of the new universe, mathematically, so is our heat death someone else's big bang? There are some less abstract ways to get a new universe out of an old one, **for example an extreme quantum fluctuation or an extreme jump-leap from 3+3D Euclidean flatness to maximum curvature to a "foam" likeness..** could initiate a new Big Bang in infinite time or The same amount of time could result in **all particles randomly converging back to the same place not even a madman can think that, there is about 10^{56} kg of baryonic matter in the universe, which is about 10^{82} pcs, e.g. protons** or perhaps black holes give birth to new universes as in **Lee Smolin's** "Fecund Universe" hypothesis. There is poetry for the latter. Geodesics approaching the black hole singularity. Become a geodesic coming out of the new Big Bang singularity humans love cyclical and regenerating universes, appeal to our sense of narrative, which may be reason **to be wary of these hypotheses**. Now they also appeal to our intuition about causality. Things happen because previous events have triggered many of our thoughts in them Just push an inconvenient something out of nothing when physicists have something to say about it from quantum fluctuations out of nothing - a timeless interpretation of Stephen Hawking's internal inflation that draws on the holographic principle. things we will discuss in the future when we travel beyond the beginning of spacetime. Big thanks to LastPass for sponsoring previous digital studios LastPass remembers your passwords for you by auto-filling your usernames and passwords LastPass is designed to save the number of

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Resume:

Time is an artifact-physical quantity-phenomenon of Existence (both before the Bang and after the Bang)... so it doesn't "run". But after a material object (or a cursor, etc.) begins to move along the time dimension, with that shift "through time" it cuts off intervals that can be observed and evaluated "as the flow of time".

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JN, kom 25.05.2022

Translated into the English version on 07.11.2022 and certainly with some errors + the terminology is slightly different.