https://www.youtube.com/watch?v=mty0srmLhTk
https://www.youtube.com/watch?v=mty0srmLhTk
Beyond the Observable Universe [4K]
Mimo pozorovatelný vesmír

SEA
555 tis. odběratelů
130 543 zhlédnutí 23. 12. 2022 nyní je 24.12.2022 22:17h ; polovinu komentáře jsem udělal v lednu 2023 a druhou polovinu prosinec 2023. Pak hned na to překlad do angličtiny 17.12.2023.
it is now 12/24/2022 10:17 p.m.; I made half of the comment in January 2023 and the other half in December 2023. Then immediately after that the translation into English on 17.12.2023.
Our view of the cosmos is limited to the observable universe- the slice of space containing all the galaxies that can be seen from Earth. But what we perceive to be the edge of our universe is not the actual edge of the universe- with most scientists in agreement that more space lies hidden beyond what we're able to see. Last time out, we travelled to the very edge of our observable universe. But today, we will be going even farther, as we wade out into the darkness of the unobservable universe. Watch Part 1 (Journey to the Edge of the Universe): https://youtu.be/QhM5zAVvOI4 If you use these videos for sleeping, check out the Sleeping Space Playlist! It's a collection of my most chilled out and audible videos, suitable for shuffling. https://youtube.com/playlist?list=PLk... Join my Discord Server: https://discord.com/invite/sea Support the Channel on Patreon: https://www.patreon.com/sea_media Become a channel member on YouTube: https://youtube.com/seaMedia/join Merchandise: https://the-sea-store.creator-spring.com Business Enquiries: SEA.Enquiries@gmail.com Soundtrack by CO.AG Music: https://www.youtube.com/@co.agmusic1823 - Taboo-Inspired Intro Track: https://youtu.be/YA3yfPh38mc - Strange Days Ahead: https://youtu.be/QaGsRzO-2EA - The Last Breath: https://youtu.be/AekcHz0ZdjU - The Monolith: https://youtu.be/XK_iQLGpId0 - ESP Background Track: https://youtu.be/rT2ONCrdtVU - Encounter: https://youtu.be/vxdlSXZvxL0 - Direct Space: https://youtu.be/G7-3crlxDDE - Do You Understand: https://youtu.be/BXmPuHqXUzc - Phonon: https://youtu.be/2Mgk6jem7Zg - Dark Enigma 13: https://youtu.be/mGFxASTdnhc - Book of the Dead: https://youtu.be/6X3RYrOy1RE FOOTAGE: The space scenes in this video were captured using SpaceEngine Pro, a virtual universe simulator: http://spaceengine.org/ Get SpaceEngine on Steam: https://store.steampowered.com/app/31... Other graphics, including images, videos and visualisations, are public domain content provided by NASA and the ESA. NASA GSFC: https://www.nasa.gov/goddard ESA: https://www.esa.int The Logarithmic Observable Universe Graphic was provided by the following channel: https://www.youtube.com/channel/UCPOu... Multiple graphic sequences were provided by Vecteezy.com Pro License Holder: https://www.vecteezy.com/members/sea-... SOURCES OF INFORMATION: - Critical Density Definition: https://astronomy.swin.edu.au/cosmos/... - Old Critical Density Estimates: http://hyperphysics.phy-astr.gsu.edu/... - Our Flat Universe: https://www.symmetrymagazine.org/arti... - Multiply Connected Shapes: https://mathematica.stackexchange.com... - Time in a Toroidal Universe: - Torroidal Universe with Time: https://evolvingsouls.com/blog/toroid... - Why the Universe Probably Isn't Shaped

Like a Donut [Forbes]: https://www.forbes.com/sites/startswi... - ESA Interview with Joseph Silk re the Size & Shape of the Universe: https://www.esa.int/Science_Explorati... - Oxford Estimates for the Size of the Universe: https://arxiv.org/pdf/1101.5476.pdf - Cosmic Inflation & Before the Big Bang [Forbes]: https://www.forbes.com/sites/startswi... - Primordial Gravitational Waves / GWB: http://www.icg.port.ac.uk/~mikewang/M... - Dark Energy & Dr. Adam Riess' Quote: https://sciencesprings.wordpress.com/... Chapters: 0:00 Welcome Back 1:50 Beyond the Cosmic Horizon 5:42 The Shape of the Universe 7:51 Universal Curvature 12:35 Critically Dense Flat Universe 15:18 Drawing Triangles on the CMB 18:52 The Flatness Problem 22:19 Multiply Connected Universe 27:19 4D Hyper Torus 29:17 Curved on a Large Scale? 31:50 Cosmic Inflation 37:09 Closing Statements (NON-ENGLISH VIEWERS) To get subtitles in another language, click the [CC] button in the bottom right corner of the screen, then click the Settings (cogwheel) icon next to it, click "Subtitles / CC" and click "Auto-Translate", and select your language from there.

(01)- Our view of the universe is restricted; curtailed by its finite age, and the travel time of the light reaching the Earth, which conceals its true, majestic form from us. What we observe to be the edge of our universe is not the actual “edge” of the universe- with most scientists in agreement that more space lies hidden beyond what we’re able to see. Last time out, we travelled to the very edge of our observable universe…but today, we will be going even farther, as we wade out into the darkness of unchartered territory- dispensing with the notions of redshift and light delay, as we finally get to know the nature of the cosmos beyond our observable universe. Our last journey concluded at the Cosmic Light Horizon- the optical boundary of our observable universe, and of every point in space, in fact. Any observer’s view of the universe ends with a Cosmic Horizon, beyond which the light from distant galaxies has not had enough time to reach that observer, in the 13.8 billion years since the birth of the universe. Therefore, our optical view of space starts to fade to an all-encompassing curtain of darkness, which shrouds the observable universe. But this curtain is not quite the “edge” of our universe- undercutting it slightly, in the radio spectrum, we find the Cosmic Microwave Background- the omnipresent relic radiation left behind by the Big Bang. As our universe’s oldest and most complete detectable light signal, this map represents the holy grail of modern Cosmology. There may be a couple of other, even older signals from earlier in the universe’s life, such as the Cosmic Neutrino Background, but these signals propagate at vanishing rates of energy far too ghostly for humanity to presently detect. For all intents and purposes, the Cosmic Microwave Background marks the “edge” of our observable universe. And it allows us to gage the properties of the space that may lie beyond, for one key reason- on the largest cosmic scales, the universe appears strikingly smooth and broadly isotropic, its contents evenly distributed with only local degrees of randomness. And so, according to the Cosmological Principle, lying beyond the Cosmic Horizon, we find… more of the same, quite simply, galaxy clusters and voids which comprise the Cosmic Web. In the absence of light delay to curtail our view of space at a certain distance, the all-encompassing cosmic horizon would start to fade, revealing a much larger and more chemically evolved cosmos, branching for more than a hundred billion light years. The farthest, earliest galaxies, like GN-z11, HD1 and Glass-z13, today lie at depths in excess of 33 billion light years, having been cast to almost treble their original distance by the cosmic tide. These earliest galaxies would no longer appear as torrid pockets of primordial stars and gas, and would probably instead appear similar to the galaxies in our

Local Volume, like the Milky Way, the Andromeda Galaxy, and the Silver Coin. Or perhaps they may resemble late-stage giant elliptical galaxies, like Messier-87, containing several-trillion stars, but lacking star-forming gases. Together, these two types of galaxies would make up the majority of what we'd find beyond the cosmic horizon. In reality, the question of "what" lies beyond is relatively straightforward. The bigger, and harder-to-answer question is, how much is out there? But answering that question requires understanding the shape of the universe at large. For the longest time, dating all the way back to Aristotle, humanity believed the universe to assume the shape of a sphere- with Earth contained somewhere on the inside, sectioned off from a wider plane by a physical boundary where space "stops", much like our observable universe. But mathematics is the programming language with which our cosmos was written, and even the greatest minds and machines alike have found it near-on impossible to describe what would happen at a universal boundary, or how such a boundary would even manifest in the first place. Furthermore, we don't see any indications of a such a barrier. There doesn't seem to be anywhere in space, aside from black holes, where photons of light "run aground". And thus, we now believe that, no matter what size or shape the universe is, it almost certainly won't have a physical edge, like our observable universe. Instead of its contents being enclosed within the volume of a sphere- it is more like we are mapped to the outside surface area. The surface of a sphere is both finite in extent and without boundary, take the Earth for example.

…….

(01)- Our view of the universe is limited; limited by its finite age and the travel time of light falling on the Earth, I think that what is "seeing" that it is abundantly enough for research, to understand "what" we see. Why rush for the horizon, somewhere, when what we can see is enough for us to explore, which hides its true, majestic form from us. What we observe as the edge of our universe is not the actual "edge" of the universe - most scientists agree that there is more space hidden beyond what we can see. I repeat: maybe there is more "beyond the horizon" space, but what about it? Isn't it enough to see them? Last time we traveled to the very edge of our observable universe...but today we will go even further as we wade through the darkness of uncharted territory - freeing ourselves from the notions of redshift and light lag, when we finally get to know the nature of the cosmos beyond our observable universe. Our last journey ended *at the cosmic light horizon* – the optical boundary of our observable universe, and indeed of every point in the universe. O.K. **any** ??? observer's view of the universe ends at the cosmic horizon, So you're saying there is no observer older than 13.8 billion years ? Yes? Are you saying that if I make an imaginary cut through the entire universe in the position of the Earth, stop-state, that all the observers there on that cut will be 13.8 billion years old? Are you saying that the pace of the passage of time was and is the same everywhere in the universe? Are you saying that on the timeline towards the beginning, the big-bag, (the axis of the Earth - big-bng) the pace of the passage of time never changed?, only the "expansion pace" of space did? Are you saying that our Earth-Singularity aging axis is the same for all Observers "inside the sphere of the universe"? http://www.hypothesis-of-universe.com/docs/c/c_240.jpg There would be many more questions, but even these proposed ones will make your head spin beyond which light from distant galaxies has not had enough time to reach this observer, in the 13.8 billion years since the birth of the universe. Therefore our optical view of space begins to fade into the all-embracing curtain of darkness that envelops the observable universe. http://www.hypothesis-of-universe.com/docs/c/c_229.jpg You see only darkness here too? But this curtain is not quite

the "edge" of our universe - cutting it slightly in the radio spectrum, we find the cosmic microwave background - the ||ubiquitous relic radiation|| left behind by the Big Bang. Relic radiation is random **" stop-state" of development**|| universe, not something directly left behind by the big bang. As the oldest and most complete detectable light signal of our universe, this map, spherical map, represents spherical surfaces from an arbitrary "point observatory" at a time of 13.8 billion years. If the Universe allowed the point Observer to observe the "stop-states" younger and younger, the "image" of such a baby-relic should get from the spherical surface of the projection, somehow ?????, to the "big-bang" as a singular point. But how? how does the edge of the observable universe, the spherical sphere, turn into a "point" ??

the holy grail of modern cosmology. There may be a few other, even older signals from earlier times in the life of the universe, such as the cosmic neutrino background, but these signals propagate at vanishing energy rates too eerily for humanity to detect at present. For all intents and purposes, the ||means the cosmic microwave background "edge" of our observable universe. And it allows us to ||measure the properties of the space that may lie beyond it, for one key reason - **at the largest cosmic scales, the universe appears surprisingly smooth and broadly isotropic, its contents evenly distributed with only local degrees of randomness.** Yes, the relic radiation map 280,000 years after the Big Bang is almost the same as the map of the large scale global universe with galaxy networks. http://www.hypothesis-of-universe.com/docs/c/c_481.jpg And even those "maps" are very similar to the maps of the "boiling vacuum"... And so according to the Cosmological Principle, lying beyond the Cosmic Horizon , we find more of the same, simply put, clusters of galaxies and voids that make up the Cosmic Network.However, perhaps the reason for the "invisibility beyond the horizon" is not the said "light delay", but the global curvature of "present and past" space-time, which is still being unpacked from The Bang. http://www.hypothesis-of-universe.com/docs/c/c_457.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_481.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_302.jpg → relic radiation. Without the light delay to limit our view of the universe to a certain distance, the all-encompassing cosmic horizon would begin to fade away, revealing a much larger and more chemically evolved cosmos that branches out over a hundred billion light years . ????? If you compare the relict radiation "map" (280,000 years old) to the "present day" relict radiation map (13.8 . 10^9 years old), where are the horizons of the young one and the old one and the future horizon map in 100 billion years time by Bang ?? The most distant and oldest galaxies, such as GN-z11, HD1 and Glass-z13, today lie at depths exceeding 33 billion light-years, having been thrown out by the cosmic tide almost three times their original distance. This was not a "cosmic tide", this was an "unwrapping" event of space-time dimensions. These oldest galaxies would no longer appear as parched pockets of primordial stars and gas, and would likely instead appear much like galaxies in our Local Volume, as is the Milky Way, the Andromeda Galaxy and the Silver Coin. Or perhaps they may resemble late-stage giant elliptical galaxies like Messier-87, containing several trillion stars but lacking star-forming gas. Together, these two types of galaxies would make up most of what we would find beyond the cosmic horizon. In fact, the question of "what" beyond that is relatively straightforward. The bigger and more difficult question to answer is how many ? Um, what the ? is it out there But answering this question requires understanding the shape of the universe as a whole . OK Now I will only speculate : If there were no stars and galaxies in the universe, there would be only one single galaxy, and space-time as a global reality of 3+3

dimensions, would unfold similarly to a spiral galaxy. And in this (abstract) matterless space-time "unfolding", only one galaxy would unfold according to "from what distance, from what position" the Observer would observe it. Not **"when"** he would be there, but **"where"** he would be there. The ideal shape of the universe is a "clam", with its "unwrapping" shape. But he is a universe full of billions of galaxies, so the unwrapping is inhomogeneous, see the picture. That's why we see that "cosmological web" of galaxies. The void between the galae expands differently than the space-time inside the galaxies. This phenomenon has already occurred, it is visible in the period of relic radiation, already there the "matter" localities expand more slowly than the "empty" localities. For the longest time , until Aristotle, mankind believed that the universe assumed the shape of a sphere - with the Earth somewhere inside, separated from the wider plane by a physical boundary where space "stops", much like our observable universe. But mathematics is the programming language in which our universe was written, and even the greatest minds and machines have found it nearly impossible to describe what would happen at a universal boundary or how such a boundary would even manifest itself. Furthermore, we see no indication of such a barrier. There doesn't seem to be anywhere in space, except black holes, where photons of light "run aground". And so we now believe that regardless of the size or shape of the universe, it will almost certainly not have a physical advantage like our observable universe. Instead of its contents being enclosed in the volume of a sphere - it's more like we're being mapped onto the outer surface. The surface of a sphere is finite and without boundaries, let's take the Earth for example.

…….

(02)- Even though it is finite, you could still fly a plane indefinitely around its expanse without meeting an edge. You would never run out of Earth to fly across, as its gravity would simply bring you back round to your starting point. And it is now thought that the gravity exerted by the universe's matter induces the same effect. Therefore, the universe won't have "edges", but it might have a curvature. The curvature of the space is its local deviation in geometry to that of boundless, infinite 3D Euclidean Space. In other words, if the universe is not infinite, then it should curve at some large extent to close itself off, much like the surface area of Earth. And if we could detect such geometry from within the frame of our observable universe, we could use it to make reasonable estimates about the global shape, size, and even eventual fate of the cosmos. This curvature is fundamentally tied to the energy-density of space, and therefore the universe's Density Parameter, represented by the Greek character Omega, can tell us about the curvature of space on large scales. Einstein showed us that mass-gravity curves spacetime. And so, a universe dominated by the self-gravitation of its cosmic web should curve all the way round so to speak, completely closing off its finite volume, like the sphere example we mentioned earlier. Such a universe would have a positive curvature, with an Omega value greater than one- representing a high density for gravity-inducing matter and dark matter. In a positively-curved universe, two parallel photons of light would eventually converge at some extremely distant point, not least because they would eventually be brought back within range of each other by a universe destined to collapse. A universe that is dominated by the gravity of its cosmic web is capable of both halting its expansion and reversing the process within a finite amount of time, as gravity triumphs over the expansionary force. This is theorised to trigger a period of runaway contraction- eventually crushing the Cosmic Web as it is cramped back into a comparably miniscule area, returning it to a hot and dense state, reminiscent of its earliest moments. It's an interesting possibility, and the one scientists believed for the longest time. However, in 1997, it became apparent

thanks to the Hubble Telescope that the universe is not on a path to a Big Crunch any time soon- as its expansion appears to have accelerated with time. But a universe dominated by gravity cannot speed up its expansion- that would be like throwing a ball into the air on Earth, and watching it fly off to escape the atmosphere at an ever-increasing rate. Instead, Cosmic Acceleration implies that the universe is not dominated by gravity on the largest of scales, and must instead be powered by an anti-gravity-like force, which we call Dark Energy. Dark energy is attributed to the repulsive vacuum energy of empty space, which exerts negative pressure tension that smooths out and inverts spacetime, where gravity would otherwise curve. If the lion's share of the universe's energy owes to this Dark Energy, then it would mould space into a bizarre, open-ended, unclosing hyperbolic universe. In a universe that is negatively curved, with a Density Parameter less than 1, the gravity exerted by the cosmic web would be too insubstantial to halt the universe's growth, leading to a period of runaway expansion that proceeds for an eternity. Such a universe would have an irregular, peculiar saddle or funnel-shape, or perhaps a horn shape, all of which are difficult to describe and enumerate. Such a universe could be infinite, or finite in an ever-expanding future, and thus two parallel photons would soon diverge as they barrel off to infinitum, with the universe's expansion giving rise to new space forever more. And then finely balanced on a cosmic knife-edge between these two eventualities, we have a universe at the Critical Density- where Omega is exactly equal to one, about 5.7 hydrogen atoms per cubic metre of space. At this cosmic density, the positively-curving influence of gravity is perfectly poised and balanced with the negative, inverting tension released by dark energy- resulting in no significant global curvature, and a flat geometry. A so-called "flat" universe without curvature is not capable of closing itself up to curtail its volume, and therefore is the geometry we'd expect to find in a universe that is truly infinite. Euclidean Space would apply on all length scales- as two parallel photons of light would remain parallel for eternity, encountering new space forever, like a boundless, unending sheet of cosmic paper. With gravity and dark energy balanced at equilibrium, a universe

…….

(02)- Even though it is finite, you can still fly the plane indefinitely around its expanse without hitting an edge. You would never run out of Earth to fly over it, because its gravity would simply send you back to your starting point. And it is now believed that the gravity exerted by the mass of the universe produces the same effect. Therefore the universe will not have "edges", but it may have curvature. The curvature of space >is its local deviation< in geometry to the boundless, infinite 3D Euclidean space. !!! This is already an opinion-vision that is close to mine. A word of **clarification** is needed here. According to the OTR, space-time curves... "at a locality around a material body". That "locality" is billions of stars and billions of galaxies in the universe, the "cosmic network". http://www.hypothesis-of-universe.com/docs/c/c_481.jpg just everywhere you look, there is a location of crooked dimensions, a location more crooked and.,.and a location less crooked, in which some star or galaxy floats. Every curvature is different, and all ! !, all those curvatures "float" in the basic grid, raster, in the basic yarn, |network, Euclidean geometry|, i.e. in flat space-time. **Defacto everywhere we look in space, there are locations, and the basic 3+3D grid is "none" "to be seen",** locations are 100%, grid is 0% Only| space-time before the big-bang is totally flat, |a Euclidean 3+3D network, because there is no matter. Matter will be created by "curving dimensions". And the big-bang is "the first biggest jump of dimensional curvature, from one

extreme curvature = 0 to the other extreme curvature = ∞ . After the big bang >by packaging dimensions< the Universe itself realizes=produces mass elementary particles. Packets are then "frozen clones" ...floating in less warped states of space-time and interacting with each other in the tumultuous topping of boiling space-time … etc. The explanation of this is in 22 years on **10,000 pages** of my "net-webovek". http://www.hypothesis-of-universe.com/index.php?nav=home . In other words, if the universe is not infinite, then it should curve to some extent, to close itself, much like the surface of the Earth. And if we could detect such a geometry within our observable universe, you refuse to study, investigate, let alone "look for" such a geometry of the universe (HDV).. ha, ha, see wrong Hubble linear equation **$v = H_0 . d$** we could use it to reasonably estimate the global shape, size, and even eventual fate of the cosmos. This curvature is fundamentally linked to the energy density of space, of course...and therefore the space density parameter, represented by the Greek symbol Omega, can tell us about the curvature of space on large scales. Einstein showed us that mass-gravity curves space-time. And so the universe controlled by the own gravity of its cosmic network should curve, so to speak, Well sure! Take your abstract glasses and creative brain and in the "global network" maps, replace matter, all galaxies and stars with "only 3+1D spacetime" (although I believe in 3+3D, I do not intend to upset the community of idiots who swelling never thought about the eventuality of 3+3D), what will you see according to OTR? a map of the Universe, a map of the diversity of curvatures of dimensions (3+1)(3+3), you will not see a sphere, you will not see a paraboloid, but you will see a relic radiation, a map **p r e s e n t i n g the inhomogeneity of curvatures of dimensions 3+1** (3+3D) and when you scale down you get relic radiation and…and when you scale down you get 3+3D vacuum foam. Understand now that this large-scale map of the "network of galaxies" is nothing more than a "network of locations with variable dimensional curvature" of matter floating in a Euclidean floating network of 3+3 numbers, but only "localities of curved dimensions" floating in less curved states of space-time. Matter is built from 3+3 dimensions… to completely enclose its final volume, such as the sphere we mentioned earlier. Such a universe would have a positive curvature with an Omega value greater than one – representing a high density of gravity-inducing matter and dark matter. In a positively curved universe, two parallel photons of light would eventually converge at some extremely distant point, Sure. If the Big Bang was an "instant" change of state, from a state of non-curved dimensions 3+3 to a state of "terribly" curved dimensions 3+3, then...then only the "unwrapping" of such a "singularity" could occur. (This finite singularity of warped dimensions = our Universe "floats" in infinite Euclidean 3+3D chassis space = Universe pre-big-bang, infinite flat with no matter, no passage of time. …etc. because everything on this topic I have already written 100 times). And yet it is still "a little" different, not least because eventually the collapsing universe would bring them back into each other's range. The universe, which is controlled by the gravity of its cosmic web, is able to both stop its expansion and reverse the process in a finite amount of time because gravity wins over the expansion force. This is theorized to trigger a period of fleeting contraction—eventually crushing the Cosmic Web as it is squeezed back into a comparatively miniature region, returning it to a hot and dense state reminiscent of its earliest moments. It's an interesting possibility, and scientists have believed in it for the longest time. However, in 1997, thanks to the Hubble telescope, it became clear that the universe is not on the way to a big collapse anytime soon - its expansion seems to be >accelerating over time. I personally don't believe it. E.g. there are hypotheses that time "ran" in the past at a different, slower pace. Then today "time runs" at a faster pace and this would also reflect the "accelerated state of expansion", although the accelerated "aging in the flow of

time" is not. But a universe governed by gravity cannot accelerate its expansion - that would be like throwing a ball into the air on Earth and watching it fly away to escape the atmosphere at an ever-increasing speed. Instead, Cosmic Acceleration implies that the universe is not governed by gravity on **the largest of scales**, in a large-scale cube (as seen in the cluster mesh images) gravity is mixed with accelerated expansion, "slowing" expansion sites are mixed with by other "local" locations accelerating the expansion - it simply has to be studied deeply (er, and it won't work without HDV) and instead must be powered by an anti-gravity force we call Dark Energy. Dark energy is attributed to the repulsive energy of the vacuum of empty space that creates a vacuum tension that flattens and inverts space-time where gravity would otherwise curve. Each author "before thought" has "his intention". What is the intention of this author? Be that as it may (according to the author, gravity develops overpressure tension) and energy is a state of matter, and matter is created by "curving dimensions", *__so__* if it emerges in a vacuum "from Nothingness" - from empty space (dark) energy , i.e. matter, ***then it is due to the fact*** that in the empty space a "curved" space emerges, curved state of dimensions, foam of dimensions . http://www.hypothesis-of-universe.com/docs/c/c_223.gif .This image shows the "emergence" of warped dimensions - foam from a vacuum, from a single point B(1), but readers (I don't another image available) you have to remember that those *B(n)* points (they are tiny cubes) are billions "next to each other"...in the whole universe everywhere *(everywhere around us, beyond Venus , beyond Alpha Centuri, beyond the milky way, beyond the next galaxy, simply everywhere, up to the horizon of visibility)* points B(n), n = infinite number, with crooked dimensions emerge and "dark energy" is recruited there.

If the lion's share of cosmic energy owes to this Dark Energy, *Universe* with higher density it is closed and should start to collapse in the future. This concept was introduced at a time when the existence of dark energy in *the Universe* was not known then it would shape the space into a bizarre open-ended hyperbolic universe. In a universe that is negatively curved, with a density parameter less than 1, the gravity exerted by the cosmic web would be too insignificant to stop the growth of the universe, leading to a period of uncontrolled expansion that lasts for eternity. Such a universe would have an irregular, odd saddle or funnel shape, or perhaps a horn shape, all of which are difficult to describe and enumerate. Such a universe could be infinite or finite in an ever-expanding future, so the two parallel photons would soon diverge as they hurtle to infinity, with the expansion of the universe giving birth to new space forever. And then delicately balanced on a cosmic knife edge between these two possibilities, we have a universe with a critical density, critical density $\rho_c = 3H^2/8\pi G$ - **where Omega is exactly equal to one**, about 5.7 hydrogen atoms per cubic meter of space. (WIKINA so 8×10^{-27} kg.m^{-3}) At this cosmic density, the positively curved influence of gravity is perfectly balanced and balanced with the negative, inverse tension released by dark energy – resulting in no significant global curvature and a flat geometry. The so-called "flat" universe without curvature is unable to close to reduce its volume, and therefore the geometry we would expect in the universe is truly infinite. **What the author says here does not conflict with my idea of that after the big bang the curvature of the dimensions is extremely high, and that the "curvature" of the dimensions is matter-forming. At every stage of age and state of evolution of the universe there is a foam of dimensions that "produces" "dark energy". Dark energy in the universe is increasing, "quantitatively", but in relation to the volume, the TE density is kept constant. So: all the baryonic mass that is in the universe today, 10^{52} kg, was created in the initial foam = plasma, and the new one that "increases" in the universe is born precisely

"in a boiling vacuum" - only virtual pairs, only "occasionally" jump out of the "pair" " particles of "real" matter and... and that is, as the author says here, 5.7 hydrogen atoms per cubic meter (**although the author does not say how many atoms per time..**!!!???) . There is nothing in conflict with the statement that there is a boiling vacuum on the Planck scales (everywhere around us), which means that there is a state of chaotic curvatures of dimensions - foam, and that every curvature of dimensions is matter-forming... so dark energy on the Planck scales also belongs here . The curvature of dimensions on Planck scales translates into the global curvature of the universe http://www.hypothesis-of-universe.com/docs/c/c_485.jpg Euclidean space would apply on all length scales OK , so Euclidean flatness does not apply in a boiling vacuum - because two parallel photons of light would remain parallel for eternity. Here you can see the difference between the Euclidean flat universe before the Big Bang and after the Big Bang... here in today's universe we have a totally flat space-time only as a "substrate, as a grid, as a yarn of dimensions, as a net" in which our "material" "floats" universe, i.e. "curved" universe, i.e. states-localities with variable curvature dimensions of two quantities. Summary: In my opinion, we only have one universe, both before the Bang and after the Bang. Before the Bang in a state of infinite flat 3+3D space-time, without matter, without the flow of time, without fields, without expansion-unpacking. After the Big Bang, there is the same Universe with the difference that **in the infinitely 3+3D flat** space-time there was a change of state = "bang" state change in the finite location = **for the finite location** = our "material universe". I've already explained what I imagine it is and how big a "3+3D finite location" is in an "infinite 3+3D" spacetime. And I already explained here how meaningfully the Big Bang is connected with the principle of alternating symmetries with aymeria. The genesis of this universe, the genesis of "everything" did not begin with the Bang, but already with the state before the Bang. Etc. and they would forever meet the new space like an endless, endless sheet of cosmic paper. From the Bang, the curved 3+3D space-time expands... until it reaches the state of a totally expanded space-time = Euclidean and a "new Bang" comes = a change in the state of flat dimensions to maximum curved dimensions... and the cycle repeats itself, right? and that "with one universe still the same" = 3+3D. With gravity and dark energy balanced, O.K.. Universe global
……..

(03)- at the Critical Density is smooth, and not capable of reversing its expansion. Rather, a flat universe sits on the boundary for re-collapse- a strange, theoretical state where the universe's self-gravity would eventually be sufficient to bring its expansion to a halt, without causing it to collapse, but only after an infinite amount of time… i.e. like the negatively-curved universe, a flat universe would be destined to expand forever With these three equally-tantalising eventualities on offer, scientists were keen to ascertain the geometry of space. But how exactly does one measure the curvature of the universe? Well, we have two main methods. The first is to sum up the total energy densities in the universe, by observing its various large-scale properties. The discovery of the nearly-uniform microwave sky in the '60s sewed suspicions that the universe must be comparable to the Critical Density. And the 1997 discovery of cosmic acceleration demonstrated that space must be either be negatively curved, or very close to flat indeed. The second, and more accurate method for deducing curvature is to probe the edge of our observable universe, the CMB. This leftover radiation from the closing moments of the Big Bang is like a "screenshot" of the entire observable universe from when it was only 379,000 years old. Therefore, if curvature exists to be found anywhere in space, it'll probably be found here. mentioned, the CMB is strikingly smooth-

appearing similar from all directions, with only minor, localised fluctuations in its nearly uniform average temperature** [2.725K].These fluctuations have a number of different causes, but they mostly owe to density gradients arising in the early universe's plasma.These gradients manifested on remarkably consistent scales, and so by measuring the angular sizes and distances between the various hotspots, we can search for signs of "lensing" causing apparent distortions in the radiation. Scientists can then plot lines through these areas to form a triangle, and determine the universe's curvature by measuring the interior angles. In a spherical, positively-curved universe, these angles would add up to more than 180 degrees. Whereas, in a saddle-shaped, negatively-curved universe, they would sum to less than 180*. And in an infinite, flat universe, with no significant curvature, these angles would sum to exactly 180*. Using this technique, the BOOMERanG Probe was the first to map the CMB's anisotropies in enough detail to reveal its geometry, and it concluded Omega to be exactly 1, with only a 10% margin of error- further-fuelling long-held suspicions that the universe may actually be "flat". Shortly after, NASA's flagship CMB mapping mission, the Wilkinson Microwave Anisotropy Probe, started to return its first estimates of the universe's density and curvature, and by 2006 had reaffirmed to an even greater degree of precision that the universe is largely flat and critically dense. In 2010, this probe was decommissioned to coincide with the launch of the European Space Agency's Planck Satellite, which gave us our most extensive and detailed dataset of the early universe to date. It also drew the same conclusion, that the universe must be very near the Critical Density for Flatness. And in the years since, a number of follow-up experiments have independently verified this assertion. As far as we can tell, the universe is flat, with a density matching the Critical Density. And with that, the new crisis in cosmology was well and truly established. The question remains, why is the universe so perfectly balanced in this knife-edge state? Even if it is not bang-on the Critical Density, and does have a slight curvature, either positive or negative, the fact astronomers still cannot determine which after almost 14 billion years suggests it must've been impeccably close to critical at the moment of the Big bang, as any slight disparity would be magnified over time. Why the universe was born with such perfect properties, and has to managed to maintain said properties for so long, is known at the Flatness Problem- and understanding its cause is a frontier in 21st century cosmology. What we do know is that there are three possible solutions to the Flatness Problem. Either, the universe is actually flat, and therefore likely extends infinitely. Or perhaps it is curved, but on a scale too large for us to detect. Or it may have a topology which hides its true shape as a continuous object. The first of these possibilities is the most profound- that the universe is truly flat, Euclidean in all directions, and likely infinitely-extending. The idea of an infinite cosmos carries its own terrifying existential possibilities, but one does have a hard time imagining how an expanding universe could've reached infinitude in a finite time, if the universe really did start out small.
……

(03)- at critical density $\Omega = 1$ is smooth is almost smooth and is not able to reverse its expansion. **Increase of** 5.7 hydrogen atoms per cubic meter of space **makes the "global curvature of expansion" smooth**, not that every location of spacetime is smooth http://www.hypothesis-of-universe.com/docs /c/c_484.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_483.jpg Flat Universe The two authors seem to be glossing over the meaning of terms here… rather it is on the verge of collapsing again - a strange, theoretical a state where the universe's own gravity would eventually be enough to stop its expansion,

expansion is - it seems - something different from unwrapping. A possible global unrolling of spacetime (3+3 dimensions) does not unroll the "curved dimensional localities", both sympatry and fields, even elementary particles without causing it to collapse, but only after an infinite amount of time... ie as a negatively curved universe, a flat universe would be destined to forever expand. He unwrapped. Did he rob or expand?? erm… Need to discuss. With these three equally exciting possibilities on offer, scientists wanted to figure out the geometry of global space. ((global curvature is parabolic and even in that "global parabolic state", there are billions of locations where each has a different curvature than the "global = averaged" curvature. http://www.hypothesis-of-universe.com/docs/c/c_240.jpg)) But how exactly is the global not local curvature of the universe measured? **(?)** Well, we have two main methods. The first is to **summarize** add up ? the total energy density in the universe by observing its various properties on a large scale. http://www.hypothesis-of-universe.com/docs/c/c_481.jpg And how could-should the curvature of the early universe be determined after the Big Bang? when this space-time is extremely curved, it's a foam of dimensions it's a boiling vacuum (?) ahem ? How ? The discovery of a nearly uniform microwave sky in the 1960s led to the suspicion that the universe must be comparable to a critical density. OK But matter itself is also "warped-collapsed" space-time...mathematical dimensions (?)

And the discovery of cosmic acceleration in 1997 showed that space must be either negatively curved or very close to flat indeed. A second and more accurate method for inferring curvature is to probe the edge of our observable universe, the CMB. This residual radiation from the closing moments of the Big Bang is like a "screenshot" O.K. it is that "homogeneous foam" of curved 3+3D spacetime http://www.hypothesis-of-universe.com/docs/c/c_485.jpg the entire observable universe from when it was only 379,000 years old. Screenshort of plasma = boiling vacuum, foam vacuum, in which elementary particles are already "built-built" into the ""chosen"" topological configuration of the "package". (*) So if curvature exists anywhere in the universe, it is likely to be found here. (http://www.hypothesis-of-universe.com/docs/c/c_240.jpg) You curve what? **What else can you choose to curve from the three options you have and the universe has: MATTER, TIME, SPACE ? ?)). Your sentence has stupid logic.** As already mentioned, CMB is surprisingly smooth. Yes, from a global point of view !! ; microscopically, it is a seething chaos of warped dimensions - appearing similar from all directions, with only small, localized fluctuations in its nearly uniform average temperature [2.725 K]. These fluctuations have a number of different causes, but mostly they are caused by **emerging gradients** of density. Densities of matter, which is the same as volume densities of foam by the curvature of dimensions, because both are the same; **matter is curved spacetime**.
In the plasma of the early universe. These density gradients manifested themselves on remarkably consistent scales, and so by measuring the angular sizes and distances between different hotspots, we can look for signs of "lensing" causing the apparent radiation distortion. Scientists can then draw lines through these regions to form a triangle, **and determine the curvature of the universe** in the chosen "stop-state" from the Bang by measuring the interior angles. In a spherical, positively curved universe, these angles would be more than 180^0 degrees. Whereas in a saddle-shaped, negatively curved universe, their sum would be less than 180^0. And in an infinite flat universe with no significant curvature these angles would be exactly 180^0. All this from the "global observatory" as well. Even the parabola is a straight line when I look at it from close enough...even the sea level on the horizon is a straight line

when I look at it very close and it is a wave in a storm when I get off the boat on it. These are scale effects.

http://www.hypothesis-of-universe.com/docs/c/c_011.pdf ; http://www.hypothesis-of-universe.com/docs/c/c_028.jpg ; http://www.hypothesis-of-universe.com/docs/c/c_037.jpg → for example this is the equation of a parabola ☺ Using this technique, the BOOMERanG probe was the first to map the CMB anisotropy in sufficient detail to reveal its geometry, concluding that **Omega is exactly 1**, only with 10% error, which further reinforces the long-held suspicion that the universe may in fact be "flat". Yes, globally it is flat, and so is "boiling foam" when viewed from far enough away and...and quantum the foam continues to expand http://www.hypothesis-of-universe.com/docs/c/c_171.jpg ; Shortly thereafter, NASA's flagship CMB mapping mission, the Wilkinson Microwave Anisotropy Probe, began returning its first estimates of the density and curvature of the universe, and by 2006 had reconfirmed with even greater precision that the universe globally, not in billions of locations is mostly flat and critically dense. **O.K. So no accelerated expansion or expansion takes place. O.K.** In 2010, this probe was decommissioned to coincide with the launch of the European Space Agency's Planck Satellite, which provided us with the most extensive and detailed dataset of the early universe to date. The same conclusion was also reached, that the universe must be very close to the critical density for flatness. And in the years that followed, this claim was independently verified by a series of follow-up experiments. So far we can say, the universe is flat, with a density corresponding to the critical density.

Global curvature is flat $\Omega = 1$ in the sense of "expansion rate". But. Our local finite closed Universe with matter, with flowing time, with crooked dimensions, **floats ! !** in a totally flat Euclidean infinite 3+3D space-time, (it's a grid, a yarn, a net), which was here in such a form before the Big Bang and in which there was no matter, no field, and in which time did not pass, and therefore which, as infinite, did not expand-unexpand, and no sequence of laws and rules was born in it. **And thus a new crisis in cosmology was well and truly established. Finally** ! ! ! In 22 years of presenting my HDV vision on the Internet, no one (no one decent and decent) wanted to talk to me about it. **Nobody wanted a decent dialogue without insults**. So I didn't have the opportunity to discuss my vision in depth, e.g. "what is this global crookedness", what is local, etc.?! and why..The question remains, why is the universe in this knife-edge state so perfectly **balanced?** Because the initial chaotic foam (of warped dimensions) was linear, and it begins to unfold using the principle of alternating symmetries with asymmetries http://www.hypothesis-of-universe.com/docs/g/g_073.pdf ; http://www.hypothesis-of-universe.com/docs/h/h_082.jpg and the linear chaos of QM gradually turns into the non-linear parabola of OTR (I'm not a mathematician **and no one has ever helped me** express this well mathematically). While the "chaotic foam" in the microworld as linear "jumps" continues (exchange particles).

Although it does not hit a critical density and has a slight curvature, either positive or negative, a fact that astronomers still cannot determine, after nearly 14 billion years, suggests that it must have been perfectly close to the critical moment of the Big Bang, as any slight difference would have magnified over time . We'll talk about "balanced" another time. Why the universe was born with such perfect properties and has to maintain those properties for so long is known in the Flatness Problem - and understanding its cause is a frontier in 21st century cosmology. What we do know is that there are three possible solutions to the flatness problem. Either the universe is actually flat and therefore probably expanding infinitely. Or

perhaps it is curved, but on a scale too large for us to detect. Or it may have a topology that hides its true shape as a continuous object. The first of these possibilities is the most profound—that the universe is truly flat, Euclidean in all directions, and probably infinitely expanding. The idea of an infinite universe has its own terrifying existential possibilities, but one has a hard time imagining how an expanding universe could reach infinity in finite time if the universe really did start small.

……..

(04)- The Big Bang Theory lends itself to a cosmos of finite volume- and our universe has other properties you'd expect to find only in a finite universe as well- namely, limiting factors. On scales of the sky greater than 60 degrees, the Planck Satellite confirmed that the level of variability in the CMB's Power Spectrum starts to flatten out significantly, assuming a stubborn invariability and homogeneity; implying a cut-off in wave strength on scales larger than our observable universe. But we would not expect such a limiting scale in a universe that is not limited or scaled, and it is statistically improbable, though not impossible, that such a wave-strength limit would arise naturally in an infinite cosmos.This is one of the major arguments in favour of a finite universe, whatever size it may be. And so, the universe's apparent flatness is more likely to have an alternative underlying cause. For example, the universe at large may comprise a shape which hides its true dimensions to inside observers- with a complex multiconnected topology. So far, most of the possible forms we've visualised for the universe have been simply connected- meaning a line could be drawn to connect any two points, and be contracted to a single point without needing to tunnel through the overarching topology, as is the case for the surface of a sphere, but not for a 2D circle. A multi-connected topology, on the other hand, is one which describes a sophisticated, non-trivial shape for the universe, with interlinking holes, gaps and co-planar extensions that render it impossible to bridge certain disparate point pairings. The simplest, best and most popular example of a multiply-connected space is the doughnut-shaped universe, known more scientifically as the Toroidal Universe. Tori are a fundamental shape of geometry, arising in many natural settings, most notably in magnetic fields. And in 1984, a pair of Soviet physicists, **Yakov Zeldovich** and his student Alexei Staronbinsky, proposed a manifold model of the global universe, describing its shape as a 3Torus- that is, one where all of its faces are connected. And it is the way in which these faces are "connected", that holds the key to understanding how a toroidal universe can appear flat and smooth, while also being finite and positively curved. Geometrically, a torus is what we get when we "close" a flat, simply-connected surface, like a sheet of paper or open-ended cylinder, so that it may assume a finite volume. In the context of 3D space, we can achieve this by rolling up our sheet of paper to connect its opposite edges, which gives us our open-ended cylinder, that we can then deform further by bending it back on itself to connect the faces. This gives us our closed, rounded, 3D doughnut shape, with a finite volume and positive curvature- but this "shape" is simply a means to an end- a consequence which the torus inherits from its place in its wider environment. In 3D space, there is no way for us to connect the faces or edges of a flat space without curving it. But in the context of our universe, which is mapped to the surface of the torus, the wider plane of 3D space doesn't exist. And from all other vantage points bar the exterior, the space in a toroidal universe would appear no different to the flat, simply-connected sheet it started off as- the only difference now being that the sheet is closed, in a way that going far enough in any direction causes you to "pop out" the other side, like a game of Pacman. And so, instead of

experiencing the apparent positive curvature associated with the torus at large, the CMB photons would simply appear as having streamed through flat, Euclidean space- barrelling indefinitely through a dark, endless cosmic hallway, despite traveling in closed loops around the torus' geometry.This would explain why the CMB looks the same everywhere- as the seemingly unnatural scale of its smoothness would likely be the result of tiling projections of a smaller, more diffused volume of space, repeating around the torus. But if that were the case, we would expect to find repeating patterns of photons reflected in the Background Radiation. Alas, no such sequences have ever been identified in one of the CMB datasets. But in truth, this expectation would rely on the global torus being smaller than the perceived extent of our observable universe. In the arguably more likely event that the torus is larger, but not incomparably larger than the observable universe, say around 300 billion light years by its largest extension, then it would fit reasonably well with a number of observed properties seen in our apparently flat, simply-connected universe. But the story of the doughnut universe doesn't end there, either, because we can also factor in the flow of time to give us the Hyper Torus.

…….

(04)- The big bang theory fits a universe of finite volume - and our universe has other properties that you would expect to find only in a finite universe - namely, constraint factors. On sky scales greater than 60 degrees, the Planck satellite confirmed that the level of variability in the CMB power spectrum begins to flatten significantly, assuming stubborn invariance and homogeneity; which means limiting wave power on scales larger than our observable universe. However, we would not expect such a limiting scale in a universe that is neither bounded nor scaled, and it is statistically unlikely, though not impossible, that such a limit to wave power would arise naturally in an infinite cosmos. This is one of the main arguments in favor of a finite universe, regardless of its size. So the apparent flatness of the universe has a rather alternative root cause. For example, the universe as a whole may contain a shape that hides its true dimensions from internal observers—with a complex multiple topology. So far, most of the possible forms we've visualized for the universe have been simply connected—meaning that you can draw a line connecting any two points and it will collapse to a single point without having to tunnel through an overarching topology like e.g. .the case for the surface of a sphere but not for a 2D circle. On the other side of the many-connected topology is a topology that describes a sophisticated, non-trivial shape of the universe with interconnected holes, gaps, and coplanar extensions that make it impossible to bridge certain disparate pairs of points. The simplest, best, and most popular example of a multi-connected space is the donut-shaped universe, scientifically known as the toroidal universe. Tori are a basic form of geometry, occurring in many natural environments, especially in magnetic fields. And in 1984 a pair of Soviet physicists, **Yakov Zeldovich**. They were both in Prague at some conference, I remember it (For the first time in Prague, a physicist, i.e. Zeldovič, said that the universe arose from nothing) and his student Alexei Staronbinskij, proposed a diverse model of the global universe, describing its a shape like a 3Torus - that is, one where all its faces are connected. And it is the way these faces are "connected" that is the key to understanding how the toroidal universe can appear flat and smooth while being finite and positively curved. Geometrically, a torus is what we get when we "enclose" a flat, simply connected surface, such as a sheet of paper or an open-ended cylinder, so that it can assume a finite volume. In the context of 3D space, we can achieve this by rolling up our sheet of paper to join its opposite edges, giving us our open-ended cylinder,

which we can then further deform by bending back on itself to join the faces. This gives us our closed, rounded, 3D donut shape with finite volume and positive curvature - but this "shape" is simply a means to an end - a consequence that the torus inherits from its place in its wider surroundings. In 3D space, there is no way to connect the faces or edges of a flat space without curving it. But in the context of our universe, which is mapped onto the surface of a torus, the wider plane of 3D space does not exist. And from all vantage points other than the exterior, the space in the toroidal universe would be no different from the flat, simply connected sheet that started out as—the only difference now is that the sheet is closed in a way that goes far. Enough in any direction will cause you to "jump" to the other side, like in Pacman. And so instead of experiencing the apparent positive curvature associated with the torus as a whole, the CMB photons would simply appear to be streaming down a flat Euclidean cosmic barrel through an infinitely dark, infinite space corridor, even though they were moving in closed loops around the torus. This would explain why the CMB looks the same everywhere - since the seemingly unnatural scale of its smoothness would likely be the result of >tiled, cube-like projections of a smaller, more diffuse volume of space< repeating around the torus. But if that were the case, we would expect to find repeating patterns of photons reflected in the background radiation. Unfortunately, no such sequences have ever been identified in one of the CMB datasets. But in reality, this expectation would rely on the global torus being smaller than the perceived extent of our observable universe. In the probably more likely case that the torus was larger but not incomparably larger than the observable universe, say around 300 billion light years at its greatest extent, then it would fit quite well with a number of observable properties seen in our apparently flat, simply connected universe . But the story of the donut universe doesn't end there either, because we can also factor in the flow of time to get the Hyper Torus.

……

(05)- In this case, each opening in the torus' topology represents the distant past and future horizon- with spacetime flowing unidirectionally from one side to the other. This explains the apparent expansion of the universe thus far, as simply spacetime following the Torus' geometry. Emerging from the past horizon hole associated with the Big Bang, space expands rapidly early on, before decelerating until it reaches a midpoint, where it starts to contract on route to the future horizon. Remember that Big Crunch we talked about earlier? Well, in this model, as spacetime begins to flow into the other opening of the torus, it contents becomes much smaller and more condensed- compressed into a state reminiscent of the one it started off in. But in the Hyper Torus, this isn't the end of the line- rather, the spacetime is blended, and recycled, as it is forced through back into its original half of the torus- where it re-emerges as a new Big Bang, born again a fresh repetition of a Cyclical Universe. If our universe really is shaped like a doughnut, then perhaps our entire existence is just one go round in an endless, oscillating cycle of universes being born, expanding, and then collapsing into Big Crunches; with the process repeating at infinitum…The final solution to the flatness problem is that our universe is curved, either positively or negatively, but on a scale too large for us to gage from within our observable universe- just as Earth is indistinguishable from flat on all ground-level vantage points. If the universe is positively curved and spherical to some extent, then it would need to be extraordinarily large in order to hide such a curvature. Estimates vary on how much larger, but we're talking hundreds of times the radius of our observable universe, and millions of times the volume- correlating to a whopping proper diameter in excess of 20 trillion light years. Alternatively, if the universe is

negatively curved, then it may be even larger, owing to its extreme runaway expansion. But in both cases- how has the universe managed to get this insanely larger, in only 13.8 billion years? One has a hard time making all this fit with the classical description of the Big Bang Theory, which postulates a physically microscopic, singular origin for the universe, with a maximal heat and density that suddenly began to expand. But if the story were that simple, then our universe would not be nearly as perfect as it appears today. A cosmos which began its journey at Planck-Scale temperatures would be expected to bear magnetic monopole particles, among other by-products and blemishes from its extreme primordial state. We would also expect to see contrasting temperatures on the largest scales, as disparate, causally disconnected regions of space would not have had the time to interact and diffuse their contents. And most of all, we would expect to see some kind of curvature, or topological defect in the universe following a classical Big Bang, as an expanding, Planck-Scale singularity would have no way to balance itself at the Critical Density for so long. Alas, the CMB bears none of these scars- it is so stunningly smooth and free from defects that cosmologists have often wondered if there's a physical reason behind it. And thus, in recent decades, we've tweaked our descriptions of the Big Bang Theory, challenging, among other things, the notion that the universe grew from a singularity. A singular-origin for the universe is simply what scientists arrive at when they extrapolate its expansion back to time zero, using the framework of General Relativity. invariability and pristineness of the CMB tells us that, between then, and the events we associate with the Big Bang, the universe must've been scaled up in size very vigorously and exponentially, before the events we know as Big Bang had time to occur. This scaling event is known as Cosmic Inflation- and it is cosmologists' contemporary answer to the Flatness Problem; explaining our universe's size, smoothness and apparent lack of curvature, without the need for any complex, non-trivial topology. Cosmic Inflation was a theory developed in the late '70s and early '80s, by MIT physicist Alan Guth, as a solution to the Magnetic Monopole Problem plaguing the conventional Big Bang model. He and a colleague, Henry Tye, theorised that a period of super-cooled expansion may've driven the universe to a size so enormous that its curvature was rendered indistinguishable from flat within the frame of the observable universe. They proposed this runaway expansion to be the result of a form vacuum decay, catalysed when …….

(05)- In this case, each hole in the torus topology represents a distant past and a future horizon - with space-time flowing unidirectionally from one side to the other. This explains the apparent expansion of the universe so far as simply spacetime following the geometry of the Torus. Space emerges from a hole in the past horizon associated with the Big Bang and expands rapidly early on before slowing until it reaches a midpoint where it begins to contract on its way to the future horizon. Remember that Big Crunch we talked about earlier? Well, in this model, as spacetime begins to flow into the second opening of the torus, its contents become much smaller and more condensed - compressed into a state resembling the one in which it started. But in the Hyper Torus, it's not At the end of the line - rather, space-time is mixed and recycled as it's pushed back into its original half of the torus - where it re-emerges as a new big bang, there is no limit to imagination and creation,… reborn as a fresh jump repetition of the cyclic Universe.

If the cyclical new step change of state from a totally flat to a totally curved state of dimensions, then of course it will take place on the bedrock, in a network of infinite flat

space-time, in which the "Location", finite, (our material universe) floats from a cycle of very curved to a cycle of little - crooked and it keeps repeating itself... I already talked about it above. If our universe is indeed shaped like a doughnut, then perhaps our entire existence is just one cycle in an endless, oscillating cycle of universes, not universes, but one still the same "Universe" as billions of localities that change and change and changes…into billions of alternating curvatures of billions of locations etc…etc….etc. which are born, expand and then collapse into large crunches; in pale pink, the same, however, only as "localities" with the principle of alternating symmetries with asymmetries of curvature ... and on and on with the process repeating ad infinitum… The ultimate solution to the flatness problem is that our universe is curved, either positively or negatively, but on a scale too large to measure from our observable universe - just as the Earth is indistinguishable from flat. All ground views. If the universe is to some degree positively curved and spherical, then it would have to be extraordinarily large to hide such curvature. Estimates vary on how much larger it is, but we're talking about a hundred times the radius of our observable universe and millions of times the volume, which equates to a massive proper diameter of over 20 trillion light years. I believe that even this interpretation still "respects" one Universe, one Heluniverse, even though "big Bangs with big Crunch-Crash" would alternate after the dimensions are unpacked at the end of one cycle. Still one Universe. There are enough "locations" in our particular universe, each with a different constellation of 3+3D curvatures. The location of the local network of galaxies, the location of the galaxies themselves, the location of the solar systems, the location of the "green planets", the location of biological reactions, the location of chemical reactions, the location of nuclear reactions, the location of boiling vacuum = plasma... and all of this exists in our "one" universe, the infinite " expanding and simultaneously collapsing' of space-time https://usagif.com/wp-content/uploads/gif/outerspace-55-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-42-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-2-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-17-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-9-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-56-preview.gif the galaxy is collapsed and expanded according to the location of the Observer and also according to the "stop-age" from which we will observe the galaxy, whether towards the past or the future; this is an animation of one site "collapsing", you imagine an animation of billions of sites, https://usagif.com/wp-content/uploads/gif/outerspace-42-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-2-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-17-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-9-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-56-preview.gif the galaxy expands and collapses according to the location of the Observer and also according to the "stop-age" from which we will observe the galaxy, whether towards the past or futures that are packed into "one universe" and... and now, in addition, imagine the global unfolding of space-time and together billions of locations that are "packed and unpacked" into one universe. Why should there be only "one" big-bang ??...; https://usagif.com/wp-content/uploads/gif/outerspace-7-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-60-preview.gif big-bangs are happening all around us (in a microcosm on sub-Planck scales), and "big bangs" emerge emergently from the "nothingness" of the vacuum and they expand https://usagif.com/wp-content/uploads/gif/outerspace-60-preview.gif and then when they are a little smaller, the

dimensions are packed into balls https://usagif.com/wp-content/uploads/gif/outerspace-22-preview.gif ; https://usagif.com/wp-content/uploads/gif/outerspace-45-preview.gif ….etc, as HDV says, as I have been explaining it for 22 years to the dullards of the physics community…
Alternatively, if the universe is negatively curved, then it may be even larger, due to its extreme uncontrolled expansion. But either way – how did the universe manage to get that insanely big in just 13.8 billion years? One has difficulty reconciling all of this with the classical description of the **theory** of the big bang, which **assumes** a physically microscopic, **singular origin of the universe** with maximum heat and density that suddenly began to expand. Here is the buried dog and the rigidity of thinking of physicists that they believe in Hubble's law $\mathbf{v = H_0 . d}$, which "guides" them to the singularity, thanks to which we observe the relic radiation over the entire spherical surface of the universe. We can quite easily abandon the Hubble doctrine if we demolish it with a better consideration of the "unwrapping" of the universe, the unwrapping of the "local" space-time in an infinite flat space-time. How big is "local" spacetime in infinite spacetime ??!!! **Locality** is large "almost infinitely", or it is "unity", or it is large "infinitely". The singularity was only as big as near zero and that was enough. The "almost infinitely large" location **floats** in infinite flat space-time and can "transform states of dimensional fluidity within. And the crooked dimension is the act = matter-forming phenomenon. It can occur ""at any time"", in any location, a stop-state in the original flat space-time, in which the zero curvature changes with a "whip of the flagellum" to the opposite state, i.e. to an extremely high dimensional curvature, namely in that "floating location" = boiling plasma = boiling vacuum = chaotic bubbling warps of dimensions. And this starts the unwrapping of curvatures in the "almost infinite locality" of space-time, as well as the packing of dimensions into balls = elementary particles, http://www.hypothesis-of-universe.com/index.php?nav=e both simultaneously, i.e. "production" of matter, the flow-flow of time starts = the curvatures of time dimensions unfold, the "sequence of production of laws" starts..., etc. **Hubble's singularity - the big-bang is rung**. But if the story was that simple, then our universe wouldn't be nearly as perfect as it seems today. A cosmos that began its journey at Planck-Scale temperatures would be expected to carry magnetic monopole particles, among other by-products and specks, from its extreme primordial state. We would also expect to see contrasting temperatures on the largest scales, because disparate, causally separated regions of the universe would not have had time to interact and spread their contents. And above all, we would expect to see some curvature or topological defect in the universe after the classical Big Bang, because the expanding Planck scale singularity would have no way to cope with the critical density for so long. We have the same language, the same letters, the same grammar, but we all think "from another Universe". Unfortunately, the CMB bears none of these scars - it is so amazingly smooth and defect-free that cosmologists have often wondered whether behind **it is not a physical reason.** It is ! (not physical, but physical)…it is the HDV structure of matter and the reason for genesis, e.g. read here http://www.hypothesis-of-universe.com/docs/aa/aa_011.pdf ;
http://www.hypothesis-of-universe.com/docs/aa/aa_078.pdf ;
http://www.hypothesis-of-universe.com/docs/aa/aa_112.pdf ;
http://www.hypothesis-of-universe.com/docs/aa/aa_227.pdf ;
http://www.hypothesis-of-universe.com/docs/aa/aa_112.zip ;
http://www.hypothesis-of-universe.com/docs/eng/eng_096.pdf
http://www.hypothesis-of-universe.com/docs/g/g_041.pdf pyramidal genesis
http://www.hypothesis-of-universe.com/docs/g/g_049.pdf genesis of compounding

http://www.hypothesis-of-universe.com/docs/eng/eng_009.pdf ;

And so, in recent decades, we have revised our accounts of the Big Bang Theory, challenging, among other things, the notion that the universe grew out of a singularity. The singular origin of the universe is simply what scientists arrive at when they extrapolate its expansion back to time zero using the framework of general relativity. The constancy and intactness of the CMB tells us that between that and the events we associate with the Big Bang, the universe must have expanded very vigorously and exponentially before the events we know as the Big Bang had time to occur. This rescaling is known as cosmic inflation – and it's cosmologists' current answer to the problem of flatness; explaining the size, smoothness, and apparent absence of curvature of our universe without the need for any complex, non-trivial topology. Cosmic inflation was a theory **developed ??** in the late 1970s and early 1980s by MIT physicist Alan Guth as a solution to the magnetic monopole problem , which plagues the conventional big bang model. He and colleague Henry Tye theorized that a period of supercooled expansion could have pushed the universe to a size so enormous that its curvature was indistinguishable from flatness within the observable universe.
If you look at the circle "up close", it is also straight like a straight line...right? See the globe as I look at the seashore at the horizon. Mandelbrot's fractal figures too, right? And if you look at the devil and his doublet, he looks like a rose, doesn't he? They proposed that this uncontrolled expansion. And if they proposed, as I do, that the early universe began to expand right after the Big Bang, http://www.hypothesis-of-universe.com/docs/c/c_223.gif they could we are long overdue for an explanation of "why" "from the vacuum" of 3+3D sub-Planckian scales dark energy emanates...and other amazing discoveries was the result of the breakdown of the vacuum into form that was catalyzed
…….

(06)- the Strong Nuclear Binding Force separated from he other fundamental forces, only 10^-36 seconds after the birth of the universe. For some reason, this enabled a rogue, high-energy quantum field to hijack the universe's scale factor, enlarging the small, primordial universe at a rate equivalent to billions of times the speed of light, scaling it up by a factor of at least 26. This event re-sized the miniscule, pre-inflationary contents of the universe, which was capable of diffusing, so quickly that its homogeneity would've been preserved for some time after. The only imbalances in this inflationary field would've been caused by quantum ripples, which also became caught up in the scaling of space. This seeded the universe with propagations of a variety of length scales, many of which would've been larger than the relative travel distance of light. At the end of Inflation, just 10^-31 seconds after time zero, this field is believed to have decayed into the first subatomic matter, releasing its enormous potential energy in the process and re-heating the universe to the levels associated with the Big Bang. Space was then flooded with a hot plasma, which followed the density gradients sewn by inflationary ripples- many of which propagated across distances far exceeding their respective light horizons. And burned into the CMB to this day, are abundances of these super-horizon fluctuations. These fluctuations are one of the great pieces of observational evidence for cosmic inflation, proving, if nothing else, that larger-than-light propagations were indeed a reality in the early universe. This event may've left other evidential imprints into the microwave background as well, including an "aftershock" signal even older the Cosmic Neutrino Background. The same process by which Inflation seeded the universe with density propagations, should also have released a series of primordial gravitational

waves, which may still be vibrating the universe to this day, alebit at a vanishing rate of energy. For now, however, and like the CNB, this Gravitational Wave Background lies well beyond the capacity of our current wave-detecting technology. But even without this smoking gun of a signal, Cosmic Inflation has nonetheless established itself in the Standard Model, and is now an accepted reality among most cosmologists- being the simplest all-encompassing solution to the Flatness Problem, addressing all of the universal properties we've covered today, without the need for fancy traits or unlikely shapes. And, though the hunt for more definitive proof goes on, it would seem that a new variant of the process is on the rise again in our present-day universe. In fact, it was Alan Guth himself, along with Alexei Staronbinsky, who first described an anti-gravity field exerting negative pressure, to explain cosmic inflation… the same type of field we today use to describe dark energy driving the universe's acceleration. A lot more research needs to be conducted to establish what, if anything, links the fields driving these periods of expansion… but it would seem that "going rogue" and accelerating its growth, against all the odds, is a peculiar natural instinct our universe was born with. To quote an email from one of the discoverers of Dark Energy, Dr. Adam Reiss, "maybe the universe does this from time to time?" And with that, I wish you all a very merry Christmas and I'll see you in 2023.

……

(06)- The strong nuclear binding force separated from the other fundamental forces, just 10-36 seconds after the birth of the universe. **For some reason** , **see my genesis sites and at the principle of alternating symmetries with asymmetries** this allowed a rogue, high-energy quantum field to hijack the scale factor of the universe and enlarge the small primordial universe at a speed equivalent to billions of times the speed of light and **enlarge***** it by a factor of at least 26. → enlarge=expand length dimensions, or an even more amazing, "crazier" vision-abstraction: "wrap" at some stage after the Bang by a factor of 26 time, time dimensions into matter, into the lightest nuclei of matter. That is why today in the stars and in the Sun, fusion runs on its own, which we cannot sustain in the Tokamak, in the ITER, for more than half a second. **Collapsed dimensions of time are unrolled in the Sun, and fusion is taking place.** This "unpacking" event of time changed the size of the tiny pre-inflationary contents of the universe, which was able to diffuse so rapidly that its homogeneity would be preserved for some time. The only imbalance in this inflationary field would be caused by the **quantum ripples** also stuck in the shrinking universe. This seeded the universe by the spread of different length scales, the scale does not spread after all…; the cancer is spreading, but the scale? ? ? many of which would be greater than the relative distance of light.

It is hypothesized that at the end of inflation, just 10^{-31} seconds after time zero, this **field decayed into primordial** subatomic matter, **?**
http://www.hypothesis-of-universe.com/docs/c/c_221.jpg I don't understand this and I have to think about it before I go to bed while it released its enormous potential energy **??** and reheated the universe to levels associated with the Big Bang. ? So the "packing" and unpacking of dimesions alternated?, by a factor of 26 ? Space was then flooded with hot plasma that followed density gradients stitched by inflationary ripples—many of which propagated to distances far beyond their respective light horizons. http://www.hypothesis-of-universe.com/docs/c/c_222.jpg + http://www.hypothesis-of-universe.com/docs/c/c_229.jpg ; **And many of these superhorizon fluctuations are still burned into the CMB today**.

http://www.hypothesis-of-universe.com/docs/c/c_240.jpg These fluctuations are one of the largest observational lines of evidence for cosmic inflation and they prove, if nothing else, that propagation beyond light was indeed a reality in the early universe. The event may also have left other evident imprints in the microwave background, including an "aftershock" signal that is even older than the cosmic neutrino background. The same process by which inflation seeded the universe by spreading density should also have unleashed a series of primordial gravitational waves, which may still be vibrating through the universe today but with a vanishing energy rate. For now, however, like CNB, this gravitational wave background is well beyond the capabilities of our current wave detection technology. But even without this smoking gun of a signal, cosmic inflation has established itself in the standard model and is now an accepted reality among most cosmologists - it's the simplest all-encompassing solution to the flatness problem, On the macro level, flatness = almost flatness, (the curvature of the initial parabola has almost straightened out,) and...and on the mini level, the problem of vacuum foam, boiling dimensions on sub-Planckian scales - "then" after the Big Bang and "today" when the vacuum is still a foam of dimensions, a field of boiling dimensions, plasma...even today in the vacuum it "boils" with the chaos of curvatures and rampant curvatures of dimensions, even today here and around us everywhere, in the kitchen, on the sidewalk, in the forest on a walk...everywhere the vacuum is boiling where virtual particles are born, and perhaps even real particles which resolve all universal properties. yes, the diverse variety of curvatures resolves the properties of both matter and fields and also co-shapes laws (laws did not arise all at once after the Big Bang...even laws they generate sequentially).
which 'covered today without the need for fancy features or improbable shapes. And while the hunt for definitive proof continues, it would appear that a **new variant of the process is once again on the rise in our current universe.** ?? I'm one ear Actually it was Alan Guth himself along with Alexey Staronbinsky who first described an anti-gravity field exerting negative pressure, guessing it from a crystal ball** to explain cosmic inflation… the same type of field we use today to description of the **dark energy**, which is just emerging from the foaming vacuum..,, my theorem: **"curvature is matter-forming".** Without the act of **curving 3+3D there would be was** the state of the Universe as it was before the big-bang. which drives the acceleration of the universe. Much more research needs to be done to find out what, if anything, connects the fields that drive these periods of expansion... but it would seem that getting "angry" and accelerating your growth, against all odds, is a strange natural instinct our universe. was born with To quote an email from one of the discoverers of dark energy, Dr. Adam Reiss, "maybe the universe does that from time to time?" And with this, I wish you all a merry Christmas and see you in 2023.

JN, 25/12/2022 to 01/01/2023 and with text corrections and text additions until 01/12/2023. So there is no strict flow of thought.

……

Frebel, Anna

Faculty, Principal Investigator

Professor of Physics

Head of Astrophysics Division

37-664C

Contact Information

afrebel@MIT.EDU

Physics Faculty Page

Einstein a kvantum: Zapletení a vynoření

Einstein and the Quantum: Entanglement and Emergence

http://www.hypothesis-of-universe.com/docs/eng/eng_137.pdf