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The Big Bang Theory | Roger Penrose, Sabine Hossenfelder, Sean Carroll, Chris Impey and more

Teorie velkého třesku (Penrose, Hossenfelder, Carroll)
14 994 zhlédnutí • 14. 6. 2021 • Roger Penrose, Sabine Hossenfelder, Sean Carroll, David Tong, Laura Mersini-Houghton, Chris Impey and Bjørn Ekeberg debate the Big Bang Theory.

(01)
[Music]
in the beginning there was a big bang except there wasn't here is a theory that tells us everything from the first fraction of a second to present day but that picture does not tell us what was there before that's the fundamental mystery of cosmology why was it like that these are all ideas which are hugely speculative based on a lot more interpretations and metaphysical assumptions than is commonly supposed that's the weak point of conventional cosmology and then we take those theories and just import them to the big bang where we see that they just fit all the observations perfectly there as well i'm going to start at the beginning and as you all know in the beginning there was a big bang except there wasn't this is not what the beginning of the universe looked like there was no bang in the big bang theory there's no explosion in the big bang theory in fact um and this may come as a bit of a surprise the big bang theory has absolutely nothing to say about the question of how the universe started what it does describe is what the universe looked like when it was very much younger and the entire theory is based on an extremely simple premise it's the following we look out in the universe around us and we see all the stars and the galaxies and all of those galaxies are moving further away so tomorrow they're going to be further away from each other than they are today the big bang theory really just winds the clock back and makes the very obvious observation that if you go back into the past everything's closer together so the big bang theory takes that and just pushes it to the most extreme limit imaginable it suggests the following as you squeeze things closer together they get hotter and the big bang theory says that if you take that to the limit there was a time in the very distant past it's about 14 billion years ago when there were no stars there were no galaxies there were no planets instead the entire universe was filled with a fireball this is the entire universe this is the the history of history itself that this uh sort of you know white blurry bit here is what we would colloquially call the big bang for the first period of the universe there was a fireball which filled the universe this is this kind of mottled green and blue uh color in the diagram here but at some point of course that the fireball cooled at around 380 000 years after the big bang and then when it cooled there was a bunch of stuff more or less just hydrogen atoms but very slowly over a long period of time the hydrogen started to gather and clump together it did this just because of gravity and as they got bigger the pressure inside the clump would get larger and larger after about 500 million years the pressure inside the clumps got so large that the hydrogen ignited this was the birth of the very first stars there are stars being born there are stars dying when they die they have these wonderful supernova explosions they spew out all these heavy elements that they've created into the void forms new stars it forms galaxies it forms planets and the reason we know it's true is because we can see it so this is the photograph of the fireball that filled the big bang in the early universe it's called the cosmic microwave background radiation there are bits in the fiber that are hot they're red and there

are .,bits in the fibers that are cold they're blue and there's information in these flickers 380 000 years after the big bang at this time the fireball is roughly 100 thousand degrees centigrade at a hundred thousand degrees centigrade atoms melt the electrons just can't cling on anymore so they get stripped away from the nucleus of the atom so at this temperature what you have is a gas not of atoms but a gas of the nuclei and then electrons which are which are flying around it's usually called a plasma rather than a gas so that that's what's going on so that's 380 000 years and now we wind the clock back and as we go backwards in time things get hotter until you reach a temperature we get this right of 10 000 million celsius
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(01) [Music] There was a big bang in the beginning, except there was no theory, but there was = HDV, but you were too lazy to read it which tells us everything from the first split second to the present, but this picture it doesn't tell us what was there before, that's the fundamental mystery of cosmology, why it was is that it's all ideas that are highly speculative O.K. , unfortunately for a long time they will be speculative… based on a lot more interpretations and metaphysical assumptions than is commonly believed to be the weak point of conventional cosmology, and then we take these theories and just import them into the big bang, where we see that they just there all the observations fit perfectly, I'll start at the beginning and as you all know at the beginning there was a big bang except that it wasn't what the beginning of the universe looked like that there is no bang in the big bang theory in fact there is no explosion in the theory of the big bang, and this may come as a bit of a surprise, the big bang theory your VT theory has nothing to say it has **absolutely** ugh nothing to say about how the Universe started, which describes what the Universe looked like when it was much younger and the whole theory is based on an extremely simple assumption that in the following we are watching the universe around us and we see all the stars and galaxies and all these galaxies are moving away, sure, but not in the way that only you imagine. HDV offers an unwrapping of space-time dimensions so that tomorrow they will be further apart than they are today, O.K. but like this http://www.hypothesis-of-universe.com/docs/c/c_032.gif ; the big bang theory really just turns back the clock and makes the very obvious observation that if you go back in time everything is closer together so the big bang theory takes that and just pushes it to the most extreme limit imaginable suggests the following , when you squeeze things closer together, they will be hotter Caution ! The scenario that a ball appeared after the VT = a singularity in which no matter was packed and thus could not even be hot is not excluded. If there was another scenario for discussion, that the Big-bang is only "a subtle inaudible change of the state of dimensions, the state of 3+1 (or 3+3D) flat, i.e. flat space-time to the opposite, i.e. extremely curved space-time, **then only**! !!! matter would be created, which would be a state of plasma, in which quanta čp = objects = packages, packed into balls, made of dimensions (!) as elementary particles would be separated GRADUALLY. Yes, dimensional warping is matter-forming and thus energy is a state of matter, so the state of extremely warped dimensions is boiling "burning" plasma. However, understand that no one supplied energy to this state, it is hot only because it is curved, curved dimensions are the essence of "hot matter". There are only two elements in the primordial plasma = quark packets U, D, then an electron and then a photon and maybe "already" gluons. Enough. This state weighs 10^{52} kg. = boiling mass of dimensions, not mass, but dimensions. Baryonic matter. (I am not evaluating exotic black matter yet. Black energy is easier to explain, because even today in a vacuum on Planck scales, curved space-time emerges emergently and curvature (as we know, is - the principle - of the structure of matter, i.e. energy. On scales of 10^{-43} m energy still emerges, the dark energy of the vacuum and brings the global universe into disequilibrium - the energy density is constant). Here is the cause, the birth-recruit of elements with mass. Mass will then be a "property" of matter, i.e. a property of wrapped

cocoons of dimensions. **Weight** is printed on packages only because they are "**curved dimensions**". We only have to wonder that 10^{52} kg of weight was born by "**instant** warp change" from "zero-curvature before Bang to "near-infinite-curvature" after the Bang and that this "flash change produced 10^{52} kg of baryonic matter , and the big bang theory says that if you take it to the limit, there was a time in the very distant past, it's about 14 billion years ago, when there were no stars, there were no galaxies, there were no planets, O.K., there was only plasma = boiling 3+3D dimensions of space-time – it was just that.., and only in Big-Bang did the unfolding of time begin. Before Big-bang, there was only stoic time, only infinite dimensions. Thanks to the **unpacking** warping of time dimensions instead the entire universe was filled with a ball of fire this is the entire universe this is the history of history itself you know this kind of white blur here is what we would colloquially call the big bang for the first period of the universe, a ball of fire that filled the universe, And that would correspond with my idea: So there will be interesting objections to my interpretation - the model in HDV that : before big-bang the 3+3D state is infinite, it is " Megauniverse" and in this infinite state the final location is created !!!, in the Megauniverse the "big bang" for "our little Universe" will take place, i.e. the change of non-curved **dimensions to curved dimensions**. How big is the location? This is a special question, isn't it? Well, arbitrarily..., if it is a locality of finite sizes 3+3D, then it can also be suggested that big-bang is not a singularity, not even a single point singularity, and this Big-bang actually continues here, even today, still in the microworld on scales of 10^{-44}m, that locality **f i n a l** emerges; So Big-bang is still always and everywhere. The formation of "our" universe is still ongoing. The location "our universe" is in the middle of the "Great Infinite Universe" ... in this logic, then Penrose's hypotheses **of many other universes could also apply, because they will = are all "curve-dimension locations" floating in infinite flat space-time** (still no matter) it's kind of a splotchy green and blue color in the diagram here, but at some point of course the fireball cooled down about 380,000 years after the big bang and then when it cooled where did the fireball go did it transfer its heat-energy?... it flew away in photons?..., and where if the reality is a) expanding space-time at a speed less than "c" and the heat-energy would have to go outside the location (?). . a lot of things were more or less just hydrogen atoms, but very slowly over a long period of time the hydrogen started to collect and clump together, O.K. Dimensional collapsing is "programmed" in such a dynamic FINAL universe… it only happened because of gravity and as they got bigger, the pressure inside the cluster got bigger and bigger after about 500 million years, the pressure **inside the clusters** got bigger and bigger , that hydrogen ignited, that was the birth of the first stars, stars are born, stars die, when they die, they have these amazing supernova explosions, they spew all these heavy elements that they have created into the void forms new stars forms galaxies forms planets model how in the "Location called our universe" he will realize the genesis, I will not analyze or attack this. I have no counterarguments. My pronoun was the vision that matter-matter will be realized by "curving the dimensions" of two quantities. What the geometry and topology will be is no longer "my research"…and the reason we know it's true is because we can see it, so this is a photo of a fireball that filled the big bang in the early universe, it's called cosmic microwave background radiation in the filament are bits that are hot, they are red and they are., the bits in the filaments which are cold are blue and in these flashes there is information 380,000 years after the big bang, at this time the fireball is roughly 100 thousand degrees Celsius at a hundred thousand degrees Celsius the atoms melt the electrons on which can no longer stick together so they separate from the nucleus of the atom so at this temperature you don't have a gas but atoms but a gas of nuclei and then electrons flying around is usually called a plasma rather than a gas so it is happening so it's 380,000 years and now we turn back the clock and as we go back in time things heat up until you reach a temperature we get this right 10,000 million celsius If this is true and if physicists "banally" pass it off as about trivial things, then they

shouldn't even be surprised that plasma can be a state of m+n dimensions numerically even hundreds of dimensions (mathematical processing without surprises...e.g. here, where 60 to 70 dimensions are revealed http://www.hypothesis-of-universe.com/docs/eb/eb_002.pdf (mathematical) How is this possible?, I don't know, I'm not a know-it-all...

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02) okay that's 10 to the 10 degrees um it takes a long time for things to get that hot long time going backwards um you reach this temperature only when you get to 100th of a second after the big bang itself but one hundredth of a second after the big bang you hit this temperature at this temperature nuclei melt that means that the nuclei contain protons and neutrons but when you hit this temperature they fall apart into just protons and neutrons they can't stick together anymoreokay that's one hundredth of a seconafter the big bang then we go further back in time until we reach one millionth of a second after the big bang one millionth of a second after the big bang the temperature is 10 to the 13 degrees and now the protons and neutrons melt when you get to a million for a millionth of a second after the big bang the higgs boson melts so these temperatures the higgs boson stops giving mass to everything else and all the other particles that are floating around suddenly become really kind of light and breezy and they they fly around this is the stuff that we're sure happened that we just we just know about and i'd like to explain why um it's because all the things that i've listed here to one degree or another we can recreate here on earth we can develop theories which will work perfectly for these situations and then we take those theories and just import them to the big bang where we see that they just fit all the observations perfectly there as well we know exactly what the universe was doing one minute after the very beginning of the big bang that first minute is a little bit up for grant might the big bang theory be mistaken sean would you like to to start right so to answer that we first have to say what we mean by the big bang theory because this phrase is meant in two very different contexts right we all know the universe is expanding so if you run the clock backwards if you run the film uh to the past 14 billion years ago it was in a hot dense state and we have something called the big bang model of cosmology which is simply the statement that 14 billion years ago the universe was in a hot dense state it expanded and cooled and went from being very smooth to relatively lumpy which it is right now with all these stars and galaxies and so forth that's the big bang model it is true there's no point in doubting the big bang model okay we don't let people up here on stage if they doubt that part of the big bang model but if you take seriously general relativity and you say well what happened at the very beginning what happens if so we know exactly what the universe was doing one minute after the very beginning of the big bang okay from one minute after to 14 billion years after we understand that first minute is a little bit up for grabs so uh classical general relativity the theory that einstein gave us for space and time would say according to roger and stephen Hawking that at that moment t equals zero at the very beginning there was a singularity but there's also this thing called quantum mechanics which gets in the way which is not part of general relativity so if you want to say the big bang event the big bang moment the beginning of everything we don't know whether that is right or not we have room as theoretical physicists and cosmologists to invent new scenarios and debate over which is right which is wrong and so that's where our disagreement comes in um i'm pretty agnostic to be honest about whether or not that moment because it's a moment in time the big bang not a place in space it's not an explosion in a pre-existing space it's the beginning of everything it's the moment before which there were no other moments and that's the model and the question is is that model right so i i have two favorite theories and neither one of them is roger's favorite theory so that gives us something to talk about um the one theory that i think is is very at least on the table is plausible is yes that is the beginning of the universe and it's because time and space themselves are not fundamental that when you get deep into the guts

of quantum mechanics you realize that all the stuff around us the tables the chairs space itself time itself are emergent approximate phenomena they're like talking about the air as a fluid with a temperature and a pressure rather than talking about the molecules maybe even time is just a good approximation and it started 14 billion years ago that's one possibility that i think is very plausible the other if time is truly fundamental if time is real and there and inextricable from the fundamental equations then i think it's very likely that the big bang was not the beginning in that case but i also think that as Roger

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(02) Okay, that's 10 to 10 degrees Celsius. It takes a long time for things to heat back up that long, um you don't get to that temperature until you get to the 100th of a second after the big bang itself, but a hundredth of a second after the big bang, at that temperature you hit that temperature, the cores melt, meaning nuclei contain protons and neutrons but when you get to that temperature they disintegrate into just protons and neutrons they can't stick together anymore that is one hundredth of a second after the big bang then we go further back in time , until we reach millionth of a second after the big bang a millionth of a second after the big bang the temperature is 10 to 13 degrees and now protons and neutrons melt when you get to a million in a millionth of a second after the big bang the higgs boson melts so these temperatures the higgs boson stops giving matter i think the author meant "mass" to everyone else and all the other particles that are floating around suddenly become really related d light and fresh and they fly around, that's the thing we're sure it's about we just know, and I'd like to explain why it's because all the things I've listed here, to one degree or another, that we can recreate here on Earth, we can develop theories that will work perfectly for these situations, and then we take these theories and just import them into the big bang, that is, the behavior "today" on the scales of 10^{-44}m is identical to that immediately after the big-bang... what role of "structural significance" >time< plays here, I don't know, but it certainly plays some... where we see that all the observations just fit perfectly in there and we know exactly what the universe was doing one minute after the very beginning of the big bang, that first minute is a bit of a credit, could the big bang theory be wrong, Sean, you'd like to start right, to answer that first we need to say what we mean by the big bang theory because the phrase is meant in two very different contexts, we all know the universe is expanding so if you run the clock backwards the clock is a mechanism for "interval chopping" " on the time dimension (i.e. on all time dimensions) but physical real-time runs even without a watch, that... on the scales of the macrocosm, the time dimension expands and therefore time runs with one arrow..., in the microcosm on the Planck scales, time (does not) expand , there is a chaos of alternating "forward and backward" arrows , therefore the interactions of elementary particles are symmetric, the equations are linear.. if you run the movie uh last 14 billion years ago, it was in a hot dense state and we ha Something called **model** of the big bang cosmology, which is simply the statement that 14 billion years ago the universe was in a hot dense state, expanding and cooling and went from a very smooth to a relatively lumpy shape, well, isn't it a coincidence the other way around? In the microcosm, space-time is "lumpy" http://www.hypothesis-of-universe.com/docs/c/c_461.jpg ; and in the macro world it's continuous, smooth, it's gravity = geomentricky a parabola which is right now with all these stars and galaxies and so on, that's the big bang model, it's true that there's no point in doubting the big bang model, ok, we're not going to leave people on stage here if they doubt that part of the big bang model, but if you take general relativity seriously and say well what happened at the very beginning, what happens if so, we know exactly what the universe was doing one minute after the very beginning of the big bang, well from one minute to 14 billion years later, I'm not a mathematician, yet such a good mathematician could appear and show a way how a non-linear equation turns into a linear one. I can do it "lapidly": if I remove the

"G-constant, i.e. its dimensions" in the OTR equation, I get a nonlinear equation from a linear equation. http://www.hypothesis-of-universe.com/docs/c/c_463.jpg Who will show me the fundamental error??? as we understand that the first minute is a little ready to grab, so uh classical general relativity, the theory that einstein gave us for space and time, would according to **Roger Penrose** and **Stephen Hawking** said that at that moment **t** equals zero at the very beginning there was a singularity, but there is also this thing called quantum mechanics that gets in the way that is not part of general relativity, so if you want to say an event the big bang, the moment of the big bang the beginning of everything we don't know if it's right or wrong, we have room as theoretical physicists and cosmologists to come up with new scenarios and debate what's right, what's wrong, and so that's where our disagree, I'm pretty agnostic to be honest whether the moment is or isn't because it's a moment in time the big bang is not a place in space it's not an explosion in a pre-existing space,I repeat it for the hundredth time in the last year and for the thousandth time in the last 20 years: Time is a quantity, it has three dimensions as the quantity Length, and before the Big Bang time did not run, it was a stationary state in 3+3D space-time. The Big Bang was just an "INSTANT" change of state from non-curved dimensions to warped dimensions. And it is only at this >moment< that the flow = passage of time..., which is a shift along the time dimension, begins. What's moving? Well, in essence, it doesn't matter "who" cuts the intervals on the time dimensions. Whoever does not understand this has no right to understand reality. it is the beginning of everything, the beginning of the unfolding, the beginning of the passage of time it is the moment, O.K. before which there were no other moments, well, there were, but they "didn't run ".. and that is the model O.K. your model. Mine is HDV and the question is, is the model right, is it right, so I have two favorite theories and neither of them is Roger's favorite theory, which gives us something to talk about, um, the theory that I think is at least on the table is plausible, yeah, that's the beginning of the Universe and it's because that time and space are not essential in themselves, jesus, just the opposite !! Time and Duration are fundamental, the rest comes >after<… that when you get deep into quantum mechanics, you realize that all those things around us, the tables, the space of the chairs, the time itself, are themselves **emerging** approximate phenomena, arising from the transformation of the curvature of the dimensions of two quantities 3+3D… as if they are talking about air as a fluid with temperature and pressure, rather than talking about molecules, maybe even time is just a good approximation ?? What and started 14 billion years ago, that's one an option that I think is very likely, secon, if time is really of the essence, if time is real and there and inseparable from the underlying equations, then si I think it is very likely that the big bang was not the beginning in that case, BB was the beginning of the start of the flow-flow of time, because the unfolding of dimensions began but I also think that like Roger

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03) has emphasized better than anyone there's something very profound about the nature of time in our observable universe namely that it has a direction right that the past is different from the future and if we can get into this i hope the reason why the past is different from the future in your everyday life the reason why you remember yesterday and not tomorrow is ultimately because of what conditions were like at the big bang that's what set up the arrow of time and that's the fundamental mystery of cosmology why was it like that so my favorite view of that is that there is a much larger universe that we don't see that our little universe is a tiny little part of the whole picture and the whole picture is actually symmetric that there are people in our past who think that we are in their past the time runs in the opposite direction for them as it does for us this is not by any means set in stone we don't know it for sure but these are the kinds of scenarios that we're talking about as professional cosmologists to understand why the universe that we do live in looks the way it does we eventually run into a

face of the universe where all the matter was plasma anything before that is just speculation we have very good evidence that the universe is expanding i think there's pretty much no one in the scientific community who would doubt that and it follows from this that if we try to run the evolution of the universe back in time the universe must have been smaller it must have been denser and with that we eventually run into a face of the universe where all the matter was just one hot plasma with fluctuations in it and i think up to this point uh we're we're on pretty safe ground um yes we did have to introduce some new things like dark matter and dark energy to actually make this time evolution pitch fit with the observations uh but having said that it works just fine now if we try to go further beyond that it gets much more complicated because there's um if we go back in time we go to higher and higher energy scales and at some point they get higher than the energy scales that we have been able to test so far um the highest energies that we have tested were probed at the large hadron collider and anything before that is just speculation so you can continue to push the theories to higher and higher energies uh but really we we don't know if that's actually what's going on and now there are lots of um theoretical physicists who nevertheless have come up with theories for that um so all this matter is supposed to be um created by some other field uh the infertion field there is supposed to be a phase of exponential expansion that's called inflation um which is also supposed to be caused by that field and ultimately the universe supposedly came out of some quantum fluctuation and so on and so these are all ideas which are hugely speculative uh and i personally think the evidence is not very good for that um there is some evidence that one can discuss and then beyond this there is this question like uh where did it all come from the core i think it rests on a lot of faith that there actually are universal mathematical laws that hold true far beyond what's possible to test my philosophical work is on the limits of scientific knowledge and so for me why i got interested in cosmology is because i think this is the science where the lines between metaphysics and physics or faith and knowledge are the most obviously blurred and this calls for some some questioning um and the big bang theory is really based on a lot more interpretations and metaphysical assumptions than is commonly supposed and at the core i think it rests on a lot of faith that they actually are universal mathematical laws that hold true far beyond what's possible to test and so just to put this very briefly in perspective we know already with reasonable confidence from observation and testing that general relativity works for about 0.1 of the universe according to big bang theory so the big bang model is essentially an extension of einstein's general relativity into the remaining 99.9 percent of the theoretical universe and although there are ways that which we can measure using measuring methods to get far beyond this and to probe beyond the or 1.0.1 percent the further out we go the more model dependent we also become and it becomes more and more difficult to calculate things with precision and this is why you see so many different discrepancies pop up in in the last years when it comes to measurements so [Music]

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(03) He pointed out better than anyone else that there is something very profound about our observable Universe, about the nature of time, namely that it has a right direction, that the past is different from the future, O.K. the pasts are already realized configurations of curvatures of all dimensions (irreversibly) and if we can get into that, I hope that the reason the past is different from the future in your everyday life, the reason you remember yesterday and not tomorrow, is ultimately because of , what were the conditions in the big bang, nonsense.. conditions are not the reason why I remember the past.. that is what set the arrow of time the arrow of time occurs at the moment when linearity starts to change to non-linearity (I am not a mathematician, and I can't say it better) and that's the fundamental mystery of cosmology, why it was, so my favorite take on this is that there's a much bigger universe, O.K. After big-bang, "two quadrants" (in the macro world) come into play: a) our universe with the "right

arrow" and b) "our anti-universe" with the left arrow of time http://www.hypothesis-of-universe.com/docs /c/c_486.jpg which we do not see that our small universe is a small small part of the whole picture and the whole picture is actually symmetrical that in our past there are people who think that we are in their past running in the opposite direction for them, O.K., i take… as for us, it's not set in stone by any means, we don't know for sure, but these are the kinds of scenarios we talk about as professional cosmologists to understand why the universe we live in looks the way it does we do, eventually we'll hit the face of the universe where everything was plasma, whatever before that is just speculation, we have very good evidence that the universe is expanding, I mean there's hardly anyone in the scientific community who doubts that, me...because the expansion is the unwrapping of the dimensions of two quantities... and it follows that if we try to run the evolution of the universe back in time, the universe must have been smaller, it must have been denser, and thus we end up hitting the face of the universe where all the matter was just one hot plasma. Yes, after the big bang, space-time was extremely curved (perhaps compressed) and only then does time, flow - the passage of time, and expansion - the unfolding of space begin. And in the plasma, elementary particles will be born by "packing - packing dimensions", and a physical field. The genesis of the development of matter elements and complex matter will occur. I went into more detail on my website http://www.hypothesis-of-universe.com/ with the fluctuations in it and I think we are on pretty safe ground up to this point, yes we had to introduce some new things like is dark matter and dark energy here I'm a skeptic that this time the evolutionary playing field will adjust to the observation uh but having said that it works fine now when we try to go further it's much more complicated because when we go back it's um over time we'll go to higher and higher energy scales and at some point they'll get higher than the energy scales we've been able to test so far, the highest energies we've tested have been probed at the large hadron collider and anything before that is just speculation so you can keep scrolling theories to higher and higher energies, but we don't really know if that's the point, and now there's a lot of um theoretical physicists who have come up with theories anyway that um all this matter is supposed to um be created by some other field uh, the inference field is supposed to be phase of exponential expansion, which is called um inflation, which is also supposed to be caused by this field, and eventually the universe allegedly it came out of some quantum fluctuation and so on, so it's all thoughts that are highly speculative, O.K. and I personally think the **evidence for it isn't very good**, O.K. there is some evidence that can be debated. Then behind that is this question of like uh, where did it all come from at the core, I think it rests on a great belief that in **reality** there are universal **mathematical laws** that apply far beyond of what can be tested, my philosophical work is at the limit of possibilities. Scientific knowledge, and that's why I was interested in cosmology, because I think that in this science the lines between metaphysics and physics or faith and knowledge are most clearly blurred, which **requires some doubt and the big bang theory**. I have such HDV. It is actually based on a lot more interpretations and metaphysical assumptions than is commonly assumed, and at its core I think it rests on a great belief that there are in fact universal mathematical laws that apply far beyond the limits of what can be tested, so just to put this very briefly in perspective, we already know with reasonable certainty from observation and testing that general relativity works for about 0.1 universe according to the big ba ?? Model theory, so big bang model is basically an extension of general relativity ?? I haven't read that anywhere… Einstein on the remaining 99.9 percent of the theoretical universe, and although there are ways we can measure with measurement methods to go far beyond this and explore beyond or 1.0. The further one percent goes, the more dependent we become on the model and it becomes more and more difficult to calculate things with precision, which is why you see so many different discrepancies appearing in recent years, Numerical precision is not important in the model as far as about measurement so [Music]

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04) all of this to say is i think that there are lots of problems with the model that are not generally acknowledged and that makes it worth asking the question the question for the big bang itself is from my point of view obviously beyond what we can say anything about imperative any alternative to the big bang has a very high evidentiary bar to clear if we frame the big bang as the fact that the universe started in a hot dense state roughly 14 billion years ago i think the evidence is very very strong for that premise and everything i'm about to say does not depend on the nature of dark energy or dark matter those absolutely affect the expansion history but they don't affect what i'm going to say as evidence for the big bang itself and i agree i'm an observer so i think cosmology should be empirical driven by observations and the basic observation is red ship which is one of the few pure observables in cosmology so we have the recession velocity of galaxies proportional to distance known for a century and most obviously interpreted as a 3d uniform expansion with no center so copernican principle holds in the context of general relativity the hubble law represents expanding space time this is an exercise we give our advanced undergraduates the dynamical evolution of the is part of the theory it's predicted and once you trace the expansion backwards you infer that there should be relic radiation left over from the dense hot state it was predicted and a rough temperature assigned in the 1940s and less than 20 years later accidentally observed by radio astronomers it's almost perfectly smooth or isotropic and almost perfectly thermal with a temperature just under three degrees kelvin a big check mark on the whole idea and this radiation fits the idea of the universe becoming transparent as stable atoms form when it was about a thousand times hotter and a thousand times smaller than it is now i'll also point to a large pile of evidence that's that's kind of messy but it's a lot of astrophysics about cosmic evolution the fact that the evolution of galaxies and active galaxies and the radiation of the universe and the regions between the galaxies there's many observations that point to evolution consistent and concordant with a early hot dense state that's that's a lot of astrophysics in there and then the light element abundances are a primary piece of evidence for the big bang stars in the universe over cosmic history could not have created a quarter of the universe by mass and helium the big bang theory accounts for that and then in a completely different observational realm the isotope of hydrogen deuterium which is essentially primordial intergalactic gas one part and ten to the five in abundance also matches perfectly with the big bang model with no free parameters basically because the only free parameter originally was the baryon to photon ratio which has been measured by microwave observations so i guess to finish i would say that any alternative to the big bang as i framed it has a very high evidentiary bar to clear and it's not true that other theories haven't been looked at tired light has been looked at and ruled out and so and there are cycling models obviously that can finesse a big bang but in the terms of the basic idea again independent of dark matter and dark energy in their nature i think it hangs together very well there's consistency checks on the age from the age of individual stars so independent of expansion history the age cross checks so i think it's a strong theory it is not wrong and by big bang i in cosmic inflation it is not wrong it's incomplete cosmic inflation gives us this beautiful picture where the large-scale structure in the universe and the cosmic microwave background basically everything we observe around us is seeded from those primordial quantum fluctuations and how the whole universe started small and stretched all its non-uniformities as as cosmic inflation made that universe to accelerate and grow big very quickly so we have a set of observations our precision cosmologist is a very advanced field by now so all our observations agree perfectly well with this picture of cosmic inflation it does not mean they prove cosmic inflation it's conceivable that someone else might come along with a different picture that also agrees with this set of observations however we are happy because here is a theory that tells us everything

from the first fraction of a second to present day and we know our universe started small and it's growing but that picture does not tell us what gave that first energy and what was there before and what lies beyond our universe is uh about 10 to the power 27 centimeters the visible universe and it's only 13.8 billion years old these are big numbers but but they are not inconceivably big so we all of us have tried to ask what was there 13.9 billion years
……

(04)- vše, co k tomu říkám, je, že si myslím, že s modelem existuje spousta problémů, které nejsou obecně uznávány, a proto >stojí za to položit otázku, otázka samotného velkého třesku< je z mého pohledu zjevně nad rámec toho, co můžeme říci cokoli o imperativu jakákoli alternativa k velkému třesku má velmi vysokou evidentní čáru, kterou lze vyčistit, pokud rámujeme velký třesk jako skutečnost, že vesmír začal v horkém hustém stavu zhruba před 14 miliardami let, myslím, že důkazy jsou pro tuto premisu velmi silné a všechno, co se chystám říct, nezávisí na povaze temné energie nebo temné hmoty, ty absolutně ovlivňují historii expanze, ale =nemají vliv na to, co řeknu jako důkaz pro samotný velký třesk= a souhlasím, že Jsem pozorovatel, takže si myslím, že kosmologie by měla být empiricky řízena pozorováním a základním pozorováním je červená loď, která je jednou z mála čistých pozorovatelných v kosmologii, takže máme rychlost recese galaxií úměrnou známé vzdálenosti po celé století a nejzřetelněji interpretováno jako 3d uniformní expanze bez středu, takže Kopernikův princip platí v kontextu obecné relativity, >Hubbleův zákon představuje rozšiřování časoprostoru<, **a ten je závadný. Globální časoprostor se rozbaluje, a matematicky by se to mělo vyjádřit jako pootáčení soustav (neumím to sám udělat tu matematiku). Tady mám nějakou rozbalující se křivku** http://www.hypothesis-of-universe.com/docs/c/c_239.jpg **která nemusí být totožná s pravdou, chytří lidé už mi podají návrh na „rozbalující se evolventu“** toto je cvičení, které dáváme našim pokročilým vysokoškolským studentům dynamický vývoj je součástí Teorie je to předpovězeno a jakmile vystopujete expanzi dozadu, usoudíte, že by zde mělo zůstat reliktní záření z hustého horkého stavu, který byl předpovídán, a drsná teplota přiřazená ve 40. letech a o méně než 20 let později náhodně pozorovaná radioastronomy je téměř dokonalá, hladký nebo izotropní a téměř dokonale tepelný s teplotou těsně pod třemi stupni kelvinu, velká značka na celé myšlence a toto záření odpovídá představě o tom, že se vesmír stane transparentním, protože stabilní atomy se tvoří, když byl asi tisíckrát žhavější a tisíckrát menší, než je nyní, ukážu také na velkou hromadu důkazů, které jsou trochu špinavé, ale jsou hodně astrofyziky o kosmické evoluci skutečnost, že vývoj galaxií a aktivních galaxií a záření vesmíru a oblastí mezi galaxiemi existuje mnoho pozorování, které ukazují na vývoj konzistentní a shodný s počátkem **„našeho vesmíru“ tj. v podobě tvaru a stavu po Velkém třesku, protože Megavesmír tu už byl před BB**, horkého hustého stavu, což je spousta astrofyzika tam a potom jsou početné prvky světla primárním důkazem toho, že hvězdy velkého třesku ve vesmíru během kosmických dějin nemohly vytvořit čtvrtinu vesmíru hmotou a héliem, za což odpovídá teorie velkého třesku a poté v zcela odlišná pozorovací oblast izotop vodíku deuteria, což je v podstatě prvotní intergalaktický plyn, jedna část a deset až pět v hojnosti, také dokonale odpovídá modelu velkého třesku bez volných parametrů v podstatě proto, že jediným volným parametrem byl původně poměr baryon k fotonu, který bylo měřeno mikrovlnnými pozorováními, takže myslím, že až do konce, řekl bych, že každá alternativa k velkému třesku, jak jsem to zarámoval, má velmi vysoký důkazní pruh, který je třeba vyčistit, a není pravda, že jiné teorie nebyly pohlíženy na unavené světlo, **O.K** bylo pohlíženo a vyloučeno, a tak a samozřejmě existují cyklistické modely, které dokážou velký třesk, ale pokud jde o základní myšlenku, opět nezávislou na temné hmotě a temné energii v jejich povaze, myslím, že to velmi dobře drží pohromadě, je tu kontrola konzistence věku od věku jednotlivých hvězd tak nezávislá na historii expanze věková křížová kontrola.Tak myslím, že

je to silná teorie, **O.K. proti této popsané genezi vývoje elementárních částic, potažmo hvězd, nemám námitek…** není to špatné a velkým třeskem v kosmické inflaci se nemýlíme, je to neúplná kosmická inflace, která nám dává tento krásný obraz, kde rozsáhlá struktura ve vesmíru a kosmické mikrovlnné pozadí v podstatě vše, co pozorujeme kolem nás >je očkováno z těchto prvotních kvantových fluktuací< a z toho, jak celý vesmír začal malý a natáhl všechny jeho nerovnoměrnosti, protože >kosmická inflace< **na tuto inflaci nevěřím. A pokud byla, tak si myslím provokačně, že „proti ||délkové || inflaci“ musela přijít i ||„časová || inflace“, kdy se několik řádů času „sbalilo“ a „schovalo“ do hmoty… ; dnešní fůze ve slunci, to je „vypouštění, rozpouštění, rozbalování“ nakondenzované časové dimenze“ ((vím, že to zní hodně nevědecky a podivně… přesto o tom přemýšlejte)) a…a proto se v CERNu nedaří ta fúze,…; tady by měli fyzikové zapřemýšlet !!!
,způsobila, že vesmír zrychlil rychle rostou, takže máme řadu pozorování, náš přesný kosmolog je nyní velmi pokročilé pole, takže všechna naše pozorování dokonale souhlasí s tímto obrázkem >kosmické inflace<, to neznamená, že dokazují, že kosmická inflace je myslitelná, že by mohl přijít někdo jiný spolu s jiným obrázkem, který také souhlasí s touto sadou pozorování, >jsme však šťastní, protože zde je teorie, která nám říká všechno od první zlomku sekundy po současnost< **ta teorie, kterou tu opěvovujete, ano, říká „všechno“ o stavbě elementárních částic, ale neříká důkazy té inflace (inflace délková je tu zbytná pro výrobu hmoty)** a víme, že náš vesmír začal malý a roste, ale tento obrázek ano neříká nám, >co dalo tu první energii< **ha-ha… základním postulátem „tohoto vesmíru“ je to, že *„**křivení dimenzí je hmototvorné**“*, tedy i výroba energie…, každé křivé prostředí, tj. lokalita časoprostoru, která je „stavem křivých dimenzí“ nese energii, je stavem energie…plazma (po BB) je multi-křivý časoprostor, a vřící vakum (dnes) je také vřící časoprostor ..,** a co tam bylo předtím >a co leží za naším vesmírem<, **za hranou pozorovatelnosti je časorotor s vyšší křivostí než 90^0, anebo je tam velmi, velmi křivý časoprostor ve formě plazmy…** je uh asi 10 na sílu 27 centimetrů **(10^{26} m)** http://www.hypothesis-of-universe.com/docs/c/c_017.jpg ; viditelného vesmíru a je to jen 13,8 miliardy let staré, to jsou velká čísla, ale nejsou nepředstavitelně velká, http://www.hypothesis-of-universe.com/docs/c/c_262.jpg takže všichni jsme se pokusili zeptat, co tam bylo před 13,9 miliardami let **byl tak dvouveličinový plochý časoprostor, nekonečný, inertní, bez plynutí času, bez rozpínání, bez hmoty (!) a polí a bez posloupnosti zákonů (možná už existovaly dva-tři zákony. Jeden mohl být „Princip o střídání symetrií s asymetriemi“).**
…….

05) ago or what was that what's beyond 10 to the power 27 centimeters the big bang was not the beginning there was an eon prior to us one before that one before that etc there was supposed to be something within the first 10 to the minus 32 seconds now what does that mean you think of a number one fraction the bottom the denominator is a number which has 32 digits and that fraction ridiculously small fraction of a second the universe was supposed to have expanded far more rapidly than anything that we're aware of now it's called an exponential expansion which is supposed to have taken place and that's called inflation and it is very much part of conventional cosmology now to me that's the weak point of conventional cosmology because you you have to introduce ideas which there's no other reason for apart from making it do this but apart from that if you go one blip after that i completely agree with what sean's saying so the argument has to be from before that and i'm claiming that although there was this idea of a steady state model which i grew up with i may say when i was in cambridge as a graduate student this was all going on and dennis sharma was a good friend of mine and bondi and gold and people i used to know fred hoyle and they were all dead keen on this idea that the universe went on expanding expanding and it didn't change much because

new matter was created all the time okay i like that theory because philosophically it meant there was no beginning and you could talk about the universe in that kind of way now i'm picking up on that in a different way though i'm not disagreeing with the big bang there was a big bang i am rather disagreeing that quantum mechanics was important there and that's a big point of difference really the reason that you're allowed to continue before the big bang which is what i'm trying to claim is because in a certain sense i'm agreeing with sean that you don't have time how do we measure time we have extraordinarily accurate clocks today because a particle of mass is really a clock and this based on the two basic most famous formulae of 20th century physics namely einstein's E equals m c squared which tells you energy and mass equivalent and max planck's e equals h nu or f whatever you call it it tells you the energy and frequency equivalent put the two together that tells you that mass and frequency are equivalent that tells you that if you have a massive particle it is a clock of extraordinary precision now the point is when you don't have massive particles and this would apply to the remote future when basically the universe is dominated by photons running around either from stars or from black holes you see stephen hawking his most famous discovery if you like or a theoretical discovery was that black holes are not completely black or they're not completely cold that they have a temperature that temperature is so low that it's much lower than anything you could build in the lab certainly with the big biggest black holes uh sun uh galaxy has a black hole in its center which is about four million times the mass of the sun that's so cold that it puts everything else in the shade one minute now the thing is that according to Hawking these things eventually will evaporate away because the universe gets colder than the black holes they evaporate away and disappear so when those have disappeared there's nothing left but things which don't have any mass there's the photons basically that's true and that they're the only way of you don't have clocks anymore because you don't have mass and so the remote future you have no way of keeping time and the idea is that this remote future where you have this expansion of the universe which is becoming exponential expansion which is what we currently observe continues forever now i found that a really depressing picture it seems to me you know the universe is pretty exciting now but then you know what you've got eternity of boredom but then i thought who's going to be bored not well not us because we won't be around the main things that will be out there were photons and it's very hard to bore a photon i'll tell you because photons the main reason is probably they don't experience anything but that's not the point the main point is that they don't measure time photons right up to infinity and they're still there and they say what what we've got to do with the universe they're still there the idea is that the universe continues with what i call another eon our eons started with the big bang and ends with this ex exponential expansion that then roger becomes the big bang of another eon and there was an e on before i could go and talk endlessly with this if you allow me but the question is the big bang was not the beginning there was an eon prior to us one before that one before that etc for more debates talks and interviews subscribe today to the institute of art and ideas at iai [Music] tv [Music] you

……..

(05) nebo co to bylo za to, co je nad 10 na sílu 27 centimetrů, **čili co bylo před velkým třeskem. Ano, bylo tam**

http://www.hypothesis-of-universe.com/docs/eng/eng_098.pdf
http://www.hypothesis-of-universe.com/docs/eng/eng_085.pdf
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http://www.hypothesis-of-universe.com/docs/eng/eng_102.pdf
http://www.hypothesis-of-universe.com/docs/eng/eng_101.pdf
velký třesk nebyl začátek, před námi byl >eon<, **aha, Penrose vynález** jeden před tím před tím atd., mělo tam být něco během prvních 10 až minus 32 sekund co to znamená, že si myslíte o zlomku číslo jedna, dolní jmenovatel je číslo, které má 32 číslic **ano, interval „t“ od 0 do 10^{-32} sekund….v něm se nekonečná ||***křivost dimenzí 3+3*||** „roztekla“ na přijatelnou míru (pro neše pochopení přijatelnou) a tady pak nastává v té plazmě 3+3D geneze stavby elementárních částic (standardní model). Inflace to nebyla…** a ten zlomek směšně malého zlomku sekundy měl vesmír expandovat mnohem rychleji než cokoli, o čem si nyní víme nazývá se to >exponenciální expanze<, **?? Nerozumím proč by se měla konat „po expanzi“ n+m dimenzí z bodu 0 do 10^{-32} sekundy expanze délkových dimenzí, tj. prostoru ??** ke které >>>mělo dojít<<<, a to se nazývá >>>>inflace<<<< a je to pro mě velmi důležitá součást konvenční kosmologie, což je pro mě slabá stránka konvenční kosmologie, protože ||***musíte zavést myšlenky***||, pro které kromě jiného neexistuje žádný jiný důvod když to udělám, ale kromě toho, když po tom přejdete o jeden výkyv, zcela souhlasím s tím, co říká Sean, takže >argument musí být před tím< a já tvrdím, že >**ačkoli**< >>>byla tu myšlenka modelu ustáleného stavu<<<, se kterou jsem vyrostl, mohu říci, že když jsem byl v Cambridge jako postgraduální student, všechno se to dělo a Dennis Sharma byl můj dobrý přítel a Bondi a zlato a lidé, které jsem znal ***Fred Hoyle*** a ||***všichni byli hluboce nadšení z této myšlenky, že vesmír se rozšiřoval*||*,** rozšiřoval **všichni se radovali, že se rozpíná = rozvaluje POUZE prostor, tedy 3 délkové dimenze x,y,z …a co čas? Tam bádat nemusíte? A nechcete? Tady má věda díru v poznání. Čas má 3 dimenze a měl by také vykazovat „někde + někdy“ inflaci. Buď v období t = 0 až t = 10^{-32}sec., nebo v období t= 1minuta až t= 2 minuty po Třesku… ; Opět se zmíním o mém podezření, že ve Slunci (a ve všech hvězdách) je „zabalený“ čas, časová dimenze, která se při fůzi rozbaluje a to chybí vědcům do rovnice interakcí…já osobně nic netvrdím, matemastiku neumím, ale mám „čuch na problémy“…** a moc se nezměnilo, protože nová hmota byla vytvářena pořád dobře, mám rád tu teorii, protože >filozoficky to znamenalo, že nebyl začátek a mohli byste mluvit o vesmíru takovým způsobem, nyní to sleduji jiným způsobem, i když nesouhlasím s velkým třeskem, došlo k velkému třesku, spíše nesouhlasím s tím, že tam byla důležitá kvantová mechanika, a to je velký bod rozdíl je opravdu důvod, proč máte dovoleno pokračovat před velkým třeskem<, **to není až tak dobrá a správná logika. Já ve své HDV popisuji big-bang jako „skok“, jako „okamžitou náhlou změnu“ křivostí!! dimenzí. Takže před velkým třeskem je-existuje nekonečný 3+3D časoprostor, bez toku plynutí času (čili bez začátku časového) bez rozpínání (nekonečno se nemůže rozpínat), bez hmoty, bez polí, bez zákonů → tomu já říkám **logika, která má logiku**. Hmota se rodí po BB „křivením dimenzí“ a to se koná až po BB**, >>>což se snažím tvrdit<<<, protože v určitém smyslu souhlasím se ***Seanem***, že nemáte čas, jak měříme čas mají mimořádně přesné hodiny dnes, **vůbec nezáleží na přesnosti, na nějaké ***superpřesnosti toku-plynutí času*** tj. na ukrajování intervalů časových někde uprostřed vesmíru, na nějaké Zemi, v lokalitě, kde je tempo plynutí času „vesmírem zvolené“, nezdůvodnitelné, a kde okolní tempa (v jiných galaxiích) plynutí jsou nepochopitelná, nebo nepoznatelná, nebo…nebo…** protože částice hmoty jsou opravdu hodiny, a to na základě dvou základních nejznámějších vzorců fyziky 20. století, a to Einsteinova E se rovná m na druhou, která vám řekne energetický a hmotnostní ekvivalent a maximální planckovo e se

rovná h nu nebo f, jak to říkáte řekne vám energetický a frekvenční ekvivalent, dejte dohromady dva, které vám řeknou, že >hmotnost a frekvence jsou ekvivalentní<, které vám řeknou, že pokud máte masivní částice, jsou to hodiny mimořádné přesnosti, **k čemu je mimořádná přesnost nutná, potřebná…někde uprostřed vesmíru v době 13,8 miliardy let po BB…?** Nyní jde o to, když nemáte masivní částice **hvězdu** a to by platilo pro vzdálenou budoucnost, kdy v podstatě vesmíru dominují fotony běhající buď z hvězd, nebo z černých děr, vidíte Stephena, jak hrabá svůj nejslavnější objev, pokud chcete, nebo teoretický objev byl, že černé díry nejsou úplně černé nebo oni Nejsou úplně chladné, že mají teplotu, která je tak nízká, že je mnohem nižší než cokoli, co byste mohli postavit v laboratoři, určitě s největší největší černé díry, uh slunce, galaxie má ve svém středu černou díru, která je asi čtyři milionykrát větší než hmotnost Slunce, >která je tak studená, že za minutu staví všechno ostatní do stínu<, podle Hawkinga se tyto věci nakonec odpaří pryč, protože vesmír je chladnější než černé díry, které se odpařují a mizí, takže když zmizely, nezbylo nic jiného než věci, které nemají žádnou hmotu, **hmotnost** fotony jsou v zásadě pravdivé a že jsou jediným způsobem, jak to =*udělat*=. **Co udělat??...** Už nemáte hodiny, **a kam jste ten budík dali ?? Nemáte hodinky anebo čas? Kam se poděl čas?** protože nemáte hmotu, **aha, aha…, když zmizí hmota, zmizí i tok – plynutí času, sám čas ovšem nezmizí, je to „veličina Jsoucna-existenčna“** a tak vzdálená budoucnost nemá žádný způsob, jak si udržet čas a myšlenka je, že tato vzdálená budoucnost má tu expanzi vesmíru, která se stává exponenciální expanzí, což nyní pozorujeme, pokračuje navždy, nyní jsem zjistil, že opravdu depresivní obraz, zdá se mi, víte, že vesmír je teď docela vzrušující, ale pak víte, co máte věčnost nudy, ale pak jsem si myslel, kdo je že se nebudeme nudit, ne dobře, protože my nebudeme kolem hlavních věcí, které tam budou, byly fotony a je velmi těžké nést foton, řeknu vám to, protože fotony hlavním důvodem je pravděpodobně to, že nezažijí cokoli, ale to není to, o co jde, hlavním bodem je to, že neměří časové fotony až do nekonečna a jsou stále tam a říkají, co máme co dělat s vesmírem, stále tam je myšlenka že vesmír pokračuje **není mi zcela jasné „co“ autor vykládá a o co mu jde, (?)** v tom, čemu říkám další věk, >naše věky začaly velkým třeskem a ***končí*** **?** touto ex exponenciální expanzí<, ze které se pak Roger stane velkým třeskem ***dalšího věku***, **asi tu jde o cyklický vesmír jak jsem uvedl ve svém výkladu jinde. BB tu je pro kokovou změnu stavu plochého časoprostoru na neplochý, extrémě zakřivený. Tady půjde i o to, zda by ta vize měla být tak, že „nový stav“ vesmíru, respektive n+m časoprostoru bude „lokalitou“ plavající „v předchozím stavu“ anebo se celý předešlý nekonečný časoprostor plochý promění na nový „konečný“ stav časoprostoru byť se zahájením rozbalování dimenzí až do totální plochosti v nekonečnu…(?) A…a pak chyklicky nový BB č.3, pak BB č.4 atd…** a předtím, než jsem mohl jít a nekonečně s tím mluvit, dovolte mi, ale otázka zní, že velký třesk nebyl začátek, před námi byl věk, před tím před tím atd. pro další debaty rozhovory a rozhovory se dnes přihlaste k institutu umění a nápadů v iai [Hudba] tv [Hudba] vy

**19.06.2021 + 19.03.2024
To jsem já a můj (brýlatý) přítel, jehož dcera se vdává.et**