https://www.youtube.com/watch?v=PdL8CudJTcs&t=10s

Is Time Real?

Sabine Hossenfelder - je čas realita ?
382 176 zhlédnutí
•2. 1. 2021
(Můj názor a komentář je červeným písmem. Zde druhá verze z 09.07.2021)
(My opinion and comment is in red font. Here is the second version from 09.07.2021)

Time is money. It's also running out. Unless possibly it's on your side. Time flies. Time is up. We talk about time… all the time. But does anybody actually know what it is? Time is an artifact = phenomenon = quantity from which the Universe is built, ie space-time and matter and laws-rules It's 3:30. That's not what I mean. Then what do you mean? What does it mean? That's what we will talk about today. Is time real? Time must be understood from multiple perspectives. Time itself does not "run" (because it is an "artifact" presenting with dimensions), but what it does is "that it can be curved" its dimensions are curved, each different. The flow-flow of time is then the perception (perception "in the projection") of the "straightening" of the curvature of the temporal dimension (one or two or three). So the real time-quantity-artifact-phenomenon is. And the flow-passage of time will always be where the time dimension expands, and… and the rate of passage of time will be relative "for the Observer" who looks at it from his system. If the pace of the passage of time changes from the Bang, it is because the curvatures of the time dimensions change (either they straighten out, or in the microworld on the Planck scales, the curvatures still change, "foaming" there 3 + 3D What does this even mean? First things first, what is time? "Time is what keeps everything from happening at once," as Ray Cummings put it. Funny, but not very useful. If you ask Wikipedia, time is what clocks measure. Which brings up the question, what is a clock. According to Wikipedia, a clock is what measures time. The clock is a handy mechanism for producing regular intervals whose flow (intervals) can be "deployed" to the time dimension we are moving on = we move people with the whole "bundle of matter" (with the whole globe) around the Universe, ie through space-time. In its sense, it is the same as when we say that we-the globe move = we move "along the longitudinal dimension" of that space (when we rotate a system coordinate of three dimensions, we move into three longitudinal dimensions = axis. Dtto with time: also with we move to three time dimensions, ie to three axes if we rotate a system of those three axes, but you will argue that time runs at the same pace in all three directions to three spatial dimensions, so one dimension of time is enough for us. (*) Huh. That seems a little circular. Luckily, Albert Einstein gets us out of this conundrum. Yes, this guy again. According to Einstein, time is a dimension. And not only that ! This idea goes back originally to Minkowski, but it was Einstein who used it in his theories of special and general relativity to arrive at testable predictions that have since been confirmed countless times. Well, and …and how did Einstein come to the conclusion that time is a "dimension"? "How did he prove that it is a dimension?" So in theory he proved that it is a dimension? And testing has also shown that time must be a dimension? Yippee. Time as an artifact "has" dimensions, yes, three (timece) as a phenomenon "Length" - a quantity also has three dimensions (space). Time is a dimension, similar to the three dimensions of space, but with a very important difference that I'm sure you have noticed. We can stand still in space, but we cannot stand still in time. This is only the "effect" of perception. We can't even

stand still in space… because from Expansion space expands-expands. The people-material object is always called "along the length dimension" (dtto after three length dimensions according to the rotation of the system)…; in order to track our shift-movement, we must have a fixed point "somewhere", a fixed system, and NEVER ! we don't have…. So it's the same as with time: we are still moving "along the length dimension" and thus cutting intervals on it. So time is not the same as space. ?! It is necessary to determine what it is not in and what it is (for a person) But that time is a dimension means you can rotate into the time-direction, like you can rotate into a direction of space. In space, if you are moving in, say, the forward direction, you can turn forty-five degrees and then you'll instead move into a direction that's a mixture of forward and sideways. You can do the same with a time and a space direction. And it's not even all that difficult. The only thing you need to do is change your velocity. * Attention! That is the taste of deeper knowledge. If I am placed in the Universe at any place-point, will I move (will I? If I follow the scholar's postulate that bodies always remain in motion if no force acts on them)? I will "stand" in that global 3D space and the "movement" will be "only" in one direction, ie together with čp in the direction of expansion. ie x = non-zero, y = 0, z = 0 because I am carried away by this expansion (unpacking). Only when I rotate my own coordinate system can I observe the movement-displacement "by three components" - length dimensions .. (**), but dtto with time: At the same point of any location I will observe only the flow-flow of time in one direction (forward), but… but when I rotate my coordinate system of three time dimensions, I also find that my time "runs" the fastest in the direction of the aging of the universe and in the other two the time shift will be slight…, see the rocket that goes into space from Earth and will "for the Earth Observer" in the direction of the shift to dilate time, only in this direction to dilate a… and in the other two time dimensions the shift will be zero. (is that true?) Now (**) à even if I move in the space "against" the expansion, the sum of the interval "expanding and my negative" will still be positive. (***) → even reasoning can be moved to the vision of the "crooked dimension" in the stop-position of the global local curvature čp to the "otherwise crooked dimension" of my shift to the less crooked dimension… and vice versa. Dtto with time dimensions. These considerations need to be elaborated further. If you are standing still and then begin to walk, that does not only change your position in space, it also changes which direction you are going in space-time. The speed can only be changed by the action of "surrounding" forces and they are not here…; And if the devices are sensitive enough, it will be found that in one direction the dilation of time takes place and in the other not You are now moving into a direction that is a combination of both time and space. http://www.hypothesis-of-universe.com/docs/c/c_012.jpg In physics, we call such a change of velocity a "boost" and the larger the change of velocity, the larger the angle you turn from time to space. Yes, therefore STR must be only for the "velocities" in (1) to (n), which we get to by "acceleration" (action of an external force, eg gravity), ie the Lorentz transformation is only a "stop-state" for one value a… and for more values is a proof of "rotation of systems" OTR is also a proof of rotation of systems or curvature of dimensions time-space. Now, as you all know, the speed of light is an upper limit. O.K. c = 1/1, other velocities v <c are proof of the curvature of the dimensions This means you cannot turn from moving only through time and standing still in space to moving only in space and not in time. Slowing down the rate of passage of time means a change in the curvature of the time dimension, dtto with length: a change in the "slicing" of length dimensions during movement-shift means a change in the curvature of the dimension That does not work. O.K. Instead, there's a maximal angle you can turn in space-time by speeding up. O.K. We rotate our own system of the tested body (relative to the "standing" Observer) by accelerating, so we rotate up to 900 and thus we get to c = 1/1 → we straightened the curvature of the dimension That maximal angle is by convention usually set to 45 degrees. But that's really just convention. For the physics it matters only that it's

some angle smaller than ninety degrees. The consequence of time being a dimension, as Einstein understood, is that time passes more slowly if you move, I specify: time is a dimension in a network-grid 3 + 1 D time-space (perhaps in a network 3 + 3D čp), then it is necessary to really divide-separate the terms "time dimension" from "flow of time" and from "pace of time flow" . The dimension does not flow, time flows only when the "cursor" moves along the dimension, ie the material point… cuts intervals into the dimension and it is then "time = passage of time" and… and even the pace of time (dilation) changes. If the truth from prof. Kulhánka, statement-claim that the passage of time is the fastest in the place of the Observer and everywhere else (all over the universe) the flow of time is slower on the "moving" bodies of TEMPO, so longer time intervals are cut on its trajectory, then it means that a) , Bc) . That a) there is the fastest pace of time on Earth and no one has ever found out "how big" it is. That b) may not be true that throughout the existence of the Universe the rate of passage of time is prague as we observe it here on Earth (that is, the "curvature" of time dimensions not only by gravity but also by "expanding the universe itself = space-time from Bang. the passage of time (basically only dilation-deceleration) is observed by all observers of the whole universe when they observe the "motion" of their test bodies and this clearly leads to evidence of "curvature" of the time dimension which straightens with "change of speed"… better from another angle: flow time is by slicing different intervals on the time dimension, which "stands", which is part of the "čp-network-grid 3 + 3D. I repeat these my visions here for the 100th year in my 20 years of my descriptions of HDV, and only because I want to arouse physicists to think about HDV, I do not write HDV because it is only and only true, but so that the Kulhánks finally read it. relative to the case when you were not moving. Attention: dilation is observed only by the "basic Observer" who was chosen to the selected system and fitted to rest. Only the Observer senses in this system "dilation, or data about the TEMPU on the rocket. The rocket commander himself does not observe any dilation. (The observer on Earth captures information from the rocket, which by its movement = shift through all dimensions, rotated its own system - see STR and thus the time interval "on the rocket" I capture at a "rotated angle to another shorter interval", etc., etc. as I have said this countless times in discussions when opponents furiously searched "against" and did not seek "for". This is the “time dilatation”. (→ change the size of the time interval) How do we know this is correct? We measure "from the information" we receive. - a "rotated system" of dimensions 3 + 3 arrives from the rocket and we measure different lines into our projection screen than the "on the rocket"… dilated lines. We can measure it. How do you measure a time-dimension? We do not measure a dimension (it "stands" in the basic space-time grid, but we measure intervals !! not a dimension It turns out you can measure the time-dimension with – guess what – the things we normally call clocks. Of course, we do not measure dimension by hours, but intervals The relevant point here is that this definition is no longer circular. We defined time as a dimension in a specific theory. And keep paying attention: time-dimension is something other than time-interval…. which we assess the flow of time and the pace of time. Clocks are what we call devices that measure this. How do clocks work? It measures intervals, it does not measure dimension-time. A clock is anything that mechanism, eg cesium counts how often a system returns to the same, or at least very similar, configuration. For example, if the Earth orbits around the sun once,
and returns to almost the same place, we call that a year. (on Mars, a year is a different "long unit interval" than a terrestrial-unit) Or take a pendulum. If you count
how often the pendulum is, say, at one of the turning points, that gives you a measure of time. O.K., we calculate "selected intervals" and add them… The reason this works is that once you have a theory for space-time, you can calculate that the thing you called time is related to the recurrences of certain events in a regular way. Here is a cumbersome explanation of "what is the pace of the passage of time" Then you measure the recurrence of

these events to tell the passage of time. But then what do physicists mean if they say time is not real, as for example **Lee Smolin** has argued. As I have discussed in a series of earlier videos, we call something "real" in scientific terms if it is a necessary ingredient of a theory that correctly describes what we observe. Attention: the differences are: **a)** observe… **b)** "understand" the observed and ..**c)** evaluate the observed well (using the right theory, the law. For example, I do not like Hubble's law of expansion, it is linear, but I think that in reality it is not that the universe EXPANDS, not linearly expands) Quarks, for example, are real, not because we can see them – we cannot – but because they are necessary to correctly describe what particle physicists measure at the Large Hadron Collider. O.K. Time, for the same reason, is real, because it's a necessary ingredient for Einstein's theory of General Relativity to correctly describe observations. *time* is real even if Einstein's theory does not exist…
However, we know that General Relativity is not fundamentally the correct theory. By this I mean that this theory has shortcomings that have so-far not been resolved, notably singularities and the incompatibility with quantum theory. I'm not a mathematician (and I'm just an amateur physicist) so I won't drill into "singularities". I have an opinion in every text and I would just repeat myself. For this reason, most physicists, me included, think that General Relativity is only an approximation to a better theory, usually called "quantum gravity". No. I wouldn't agree. Why ? We don't yet have a theory of quantum gravity, quantizing a nonlinear equation doesn't suit me even though I'm not a mathematician. but there is no shortage of speculations about what its properties may be. And one of the properties that it may have is that it does not have time. And it's clear why it didn't suit me. Why shouldn't quantum gravity have time?
So, this is what physicists mean when they say time is not real. Crap. They mean that time may not be an ingredient of the to-be-found theory of quantum gravity or, if you are even more ambitious, a theory of everything. Time, on the other hand, will not only be part of the theory of Everything, but will even be the bearer of the reality of EVERYTHING Time then exists only on an approximate "emergent" level. Personally, ☺ I find it misleading to say that in this case, time is not real. (!) It's like claiming that because our theories for the constituents of matter don't contain chairs, chairs are not real. (!)That doesn't make any sense.(!) But leaving aside that it's bad terminology, is it right that time might fundamentally not exist? I have to admit it's not entirely implausible. That's because one of the major reasons why it's difficult to combine quantum theory with general relativity is that… time is a dimension in general relativity. On the contrary. Time is not only one dimension, but also has 3 dimensions such as Length (space) In Quantum Mechanics, on the other hand, time is not something you can measure. It is not "an observable," as the physicists say. And "space" is more observable / palpable than time ??? ho-ho… In fact, in quantum mechanics it is entirely unclear how to answer a seemingly simple question like "what is the probability for the arrival time of a laser signal". Time is treated very differently in these two theories. Probably .. if I'm not mistaken that for physicists one day it's an omnidirectional scalar and the other is the dimension of the space-time grid-network-web-environment in which "everything" takes place…
What might a theory look like in which time is not real? One possibility is that our space-time might be embedded into just space. What is "embedded" in space ?? Ho-ho. Time is as full-fledged a statutory space-forming phenomenon as the quantity Length But it has a boundary were time turns to space. Note how carefully I have avoided saying before it turns to space. Ho-ho what are these considerations? That something like a person turned into DNA? Before arguably is a meaningless word if you have no direction of time. Oh, dear Sabina, how wrong you were in understanding "time." We humans only perceive the "flow-flow of intervals" (you call the direction) on the time dimension and we call it "time", the flow and flow in one direction is only because the "young" space-time 3 + 3D expands… But

the "institute" → The universe has time as the TIME-building block of the existence of being, this length-quantity for space for the construction of the "third" quantity such as MASS. The direction of time is something other than the passage of time = shifting material objects along the time dimension, which shifts the intervals on that time dimension and „and" the pace of the passage of time is a third view that says how "big intervals" observed (eg rocket). Time with its three dimensions (time) is "retrograde" to Length with its three dimensions = space. It would be more accurate to say what we usually call "the early universe" where we expect a "big bang" may actually have been "outside of space time" No, no... the big bang is the "interface" of the previous and subsequent states, where the previous state is the 3+3D where "nothing along the time dimension is moving" and therefore Nothing measures the rate of time passing which is the stealing of intervals on the time dimension ... ; after the Bang, there is an extreme distortion of the space-time dimensions and the unwrapping is then perceived by the "standing" Observer as "the passage of time" ...(inaccuracies if the reader feels them, so they can be later fine-tuned, refined) and there might have been only space, no time. And that's why my HDV is a bit further along than contemporary physics and cosmology, because such a statement is obsolete. Another possibility that physicists have discussed is (unfortunately they haven't gotten to the HDV yet) that deep down the universe and everything in it is a network. And that's why my HDV is a bit further along than contemporary physics and cosmology, because such a statement is obsolete.
What we usually call space-time is merely an approximation to the network 3+3 dimensional warp in which other curved networks take place and "float" = states of curved dimensions in cases when the network is particularly regular. Smooth Euclidean flat 3+3D There are actually quite a few approaches that use this idea, the most recent one being Stephen Wolfram's Hypergraphs. Finally, I should mention Julian Barbour who has argued that we don't need time to begin with. One can see how today's physicists misunderstand the "standing time-dimension of the network" from the flow-flow of time which is the cutting of intervals on a dimension as an object moves along that time dimension // *time does not flow for me, but we-people flow for it* // We do need it in General Relativity, which is the currently accepted theory for the universe. But Barbour has developed a theory that he claims is at least as good as General Relativity, and does not need time. Nonsense. - I have developed HDV and it has not been evaluated in 40 years and I know that I have sent my visions about HDV to at least 10,000 persons-physicists all over the world since 2000 !!!! and I have this in the archives and I can prove it. Nobody has responded positively and helpfully !!! - - Too bad, I don't know why and where I am wrong Instead, it is a theory only about the relations between configurations of matter in space, which contain an order that we normally associate with the passage of time, but really the order in space by itself is already sufficient. ??Barbour's view is certainly unconventional and it may not lead anywhere, but then again, maybe he is onto something. Still, Barbour got more attention than my HDV. He has just published a new book about his ideas. This video was sponsored by Brilliant which is a website and app that offers interactive courses on a large variety of topics in science and mathematics. If you want to understand better
what space-time is, what boosts are, and how time-dilatation works, then Brilliant is a great place to start. To get more background on this video's content and to see how the math works, I recommend you look at their course on special relativity. It will teach you all you need to know about Einstein's ideas, Lorentz-transformations, and the odd consequences that follow from that. To support this channel and learn more about Brilliant, go to brilliant dot org slash Sabine and sign up for free. The first 200 subscribers using this link will get 20 percent off their annual premium subscription. Thanks for your time, see you next week.
I don't speak English and therefore it is possible that somewhere I have inserted a translation sentence in a different place than it belongs in the text ..so sorry.

02.06.2021 … JN, kom 09.07.2021