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Why The Theory of Relativity Doesn't Add Up (In Einstein's Own Words)

Proč teorie relativity nesedí (vlastními slovy Einsteina)

Dialect

54,6 tis. odběratelů

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Relativity is as successful a theory as it is mind-bending - yet Einstein himself did not believe it was complete, and in a 1914 paper he critiqued its internal consistency at some length. Indeed, at one time or another we have all found ourselves in a state of healthy skepticism about the tenets of relativity, seemingly confronted by a mysticism of warping space and time that is nigh impossible to wrap one's head around -- and so here we find ourselves compelled to ask the same question Einstein did over a century ago: is the theory of relativity truly consistent, and if not, what does this mean for its future?

Proč teorie relativity nesedí (vlastními slovy Einsteina) Teorie relativity je stejně úspěšná jako ohromující teorie – přesto Einstein sám nevěřil, že je úplná, a v článku z roku 1914 její vnitřní konzistenci do jisté míry kritizoval. Vskutku, někdy jsme se všichni ocitli ve stavu zdravé skepse ohledně principů relativity, zdánlivě konfrontováni s mystikou deformace prostoru a času, kterou je téměř nemožné zabalit – a tak zde jsme nuceni položit si stejnou otázku, jakou Einstein před více než stoletím: je teorie relativity skutečně konzistentní, a pokud ne, co to znamená pro její budoucnost?

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(01)- Special relativity has undoubtedly been one of the most successful theories to emerge out of recent history not only has the theory correctly predicted new phenomena but also in complementing more sophisticated theories like general relativity or Quantum field Theory it has helped enhance our understanding of both the very large and the very small but despite all this it can be an intuitively jarring Theory and Einstein himself was in fact never fully satisfied with it writing in 1914 that the theory suffered from what he termed an undeniable fundamental defect but what was this defect exactly and how did he propose to overcome it this is dialect and today we're examining why relativity doesn't add up Of Axioms & Absolutes every scientific theory is predicated upon certain unprovable statements known as axioms the axioms of classical mechanics essentially Newton's three laws more or less reflect intuitive beliefs about our everyday reality I.E that motion is related to causality and force to motion and action to reaction Etc but unlike those axioms the central Axiom of special relativity that light travels at the same speed in all inertial frames is something of a head scratcher it tells us that no matter what velocity observers are traveling at with respect to one another they will all measure the same speed for any given beam of light unlike Newton's Laws this Axiom hardly seems to follow as a consequence of any intuitive ideas yet by adopting it Einstein was able to achieve quite a lot unite electricity and magnetism under one framework show mass and energy were of the same form and dispense with the need for an unobservable ether but possibly the greatest Allure this Axiom held for Einstein was that it promised to overturn the absolute space and time of Newtonian physics Einstein was an avid devotee of Ernst mock the philosopher who had stressed that all laws in physics ought to

concern the relative motion of bodies and not their motion as referred to some theoretical absolutist construct indeed by asserting the constancy of the speed of light Einstein felt he was achieving Mock's vision of a relative space and time but there was one thing he knew his new Theory didn't yet relative eyes motion this was because it relied on an implicit definition of observers being inertial meaning unaccelerated in order for them to measure a constant speed of light this quality of being unaccelerated was not relative to individual observers but rather somehow an objective fact already agreed upon between all observers meaning it was absolute but Einstein recognized right away that this absoluteness meant the existence of an internal tension within his theory if motion was defined through space and time and space and time were relative then how could motion be anything but relative indeed Einstein's immediate intuition told him this meant the theory of special relativity was incomplete sure he had framed the laws of physics to be independent of any particular velocity but this had already been a feature of Newtonian mechanics into Conformity with Which special relativity merely brought the laws of electromagnetism to Einstein true relativity meant the relativity of all motion not just the relativity of velocities Einstein Calls Out His Own Theory for that reason in a 1914 paper entitled on the relativity problem he wrote that he felt special relativity suffered from the same undeniable fundamental defect that Newtonian physics did that is that it relied on a notion of absolute acceleration in order to complete its formalism so why do we care whether a formalism invokes absolute acceleration or not well as Einstein pointed out in his paper it's because absolute acceleration is undefinable one would try in vain to explain what it is that one should understand by the pure and simple acceleration of a body one would succeed only in defining the relative acceleration of bodies with respect to each other indeed to make a statement about any sort of motion meaningful be it velocity acceleration jerk Etc you have to specify what you're moving relative to for instance if you say you're accelerating in a car you're implying that you're accelerating relative to the ground but if that ground were say actually the deck of a boat accelerating equally and oppositely over a body of water then relative to someone on the shore you'd actually be at rest
Defining "Absolute" Acceleration no physicist in their right mind would of course admit that you could have acceleration which is not relative to anything and So formalistically speaking the answer to this problem is to define absolute acceleration as meaning acceleration relative to an inertial frame but of course inertial frames are defined via an absence of acceleration so this definition is horrifically circular indeed most physicists will esue giving that definition altogether in favor of the empirical one where an absolute acceleration is defined as
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(01)- **Special theory of relativity** was undoubtedly one of the most successful theories to emerge in recent history, not only did this theory correctly predict new phenomena, but also, thanks to the addition of more sophisticated theories such as general relativity or quantum field theory, it helped to improve our understanding of both the very large and the very small, but despite all this, it can be an intuitively disturbing theory and Einstein himself was never really fully satisfied with it, when in 1914 he wrote that the theory suffers from what he called an undeniable fundamental defect, This is not a defect in the construction of this special theory, it is correct, it is a defect in the understanding of the theory constructed. In fact, STR describes in the real universe **rotation of frames**, i.e. the fundamental frame in which the observer is located (the frame chosen x, y, z, t) and the object that is observed, which has "its own frame" (x´, y´, z´, t´). This is not about any transformation, but about rotation. Why?,

because the object curves space-time in its movement around itself and then itself flies in that curvature of space-time = moves along curved dimensions, and perceives it, senses it (into its projection plane). The observer perceives it as a rotation of the system of that object relative to the observer "standing" on it. On the object itself, no dilation or contraction takes place, the Observer just observes it. I don't want to understand why physicists don't read it and why they don't want to refute it (?) And even!! … ! He doesn't even observe "it", but only calculates the presented "relativistic" formulas on paper... he only finds out "v". Dear, will I be stoned for my opinion? I should be, because I am breaking down the truth that has been concreted for 110 years, but what exactly was the defect and how did he propose to overcome it, this is a dialect and today we are investigating, are you investigating? Shit, shit you research, you just insult other opinions, why relativity doesn't add up. Axioms and Absolute **every** scientific theory is based on certain unprovable statements known as axioms, the axioms of classical mechanics, essentially Newton's three laws, more or less reflect intuitive beliefs about our everyday reality, i.e. that motion is related to causality and force to motion and action to reaction etc., but unlike these axioms, the central axiom of special relativit is that light propagates at the same speed in all inertial frames, something. Light also copies the curvature of "its surrounding spacetime", but this curvature is zero, light has no mass, therefore it does not curve anything around itself, **c = 1/1** ….; **m . v = m_0 . c** ; The scratchpad tells us that no matter how fast observers are moving relative to each other, they will all measure the same speed for any given ray of light, unlike Newton's laws, which this axiom barely follows as a result of any intuitive ideas. Erm. Yet by adopting it, Einstein was able to achieve quite a bit of unification of electricity and magnetism into a single framework, showed that matter and energy had the same form, and got rid of the need for an unobservable ether, O.K. but I still wonder what the (excess) ether = space-time grid=weave=raster would do, what harm would it do?, but perhaps the greatest appeal this axiom held for Einstein was that it promised to overturn the absolute space and time of Newtonian physics. What did he turn him over? Einstein was an ardent devotee of **Ernst Mach**, who mocked the philosopher who insisted that all laws in physics should concern relative motion of bodies, relative means that at home, in the basic observatory at rest, the **Observer** observes values "rotated", but which on the observed object and in the home observatory are *the same*… however, they observe values "jinked" to each other due to the rotation of the systems or due to the curvature of dimensions and not their motion, as is referred to in some theoretical absolutist construct, asserting the constancy of the magnitude of the speed of light. Einstein felt that he was achieving Mach's vision of relative space and time, but there was one thing he knew that his new theory did not yet move relative eyes, because it relied on an implicit definition of the observer. Inertial meaning unaccelerated so that they could measure the constant speed of light, this quality of unaccelerated was not relative to individual observers, but rather some objective fact that all observers had already agreed upon, meaning it was absolute, (!) but Einstein immediately recognized that this absoluteness meant the existence of an internal tension in his theory, if motion was defined in space and time ..,, and space and time were relative, then how could motion be anything other than relative, Einstein's immediate **intuition** told him that this meant **that the theory of special relativity was incomplete**, surely he was sure he had created it? The laws of physics are independent of any particular speed, but that was already a feature of Newtonian mechanics in accordance with which
The special theory of relativity only gave Einstein the laws of electromagnetism. True relativity meant the relativity of all motion, not just the relativity of speeds. Einstein calls his

own theory for this reason, in a 1914 article entitled On the Problem of Relativity, he wrote, **that he believes that the special theory of relativity suffers from the same undeniable fundamental flaw as Newtonian physics**, namely that it relied on the notion of absolute acceleration to complete its formalism, so why do we care whether the formalism gives rise to absolute acceleration or not, as Einstein pointed out in his article, it is because absolute acceleration is undefinable, we would try in vain to explain what it is that we should understand by pure and simple acceleration of a body would succeed only in defining the relative acceleration of bodies with respect to each other, in order to express the meaningfulness of any kind of motion, be it speed, acceleration, jerk, etc., you have to specify what you are moving towards, for example if we say you are accelerating in a car, you are implying that you are accelerating with respect to the earth, but if that earth were in fact the deck of a ship accelerating equally and oppositely above the water surface, **then relative** to someone on the shore I would actually be at rest. O.K. Defining "absolute" acceleration no physicist in his right mind would of course admit that you could have an acceleration that is not relative to anything, so formally speaking the answer to this problem is to define absolute acceleration as acceleration relative to an inertial frame, but course inertial frames are defined by the absence of acceleration, so **this definition is frighteningly circular**, i.e. a tautology in fact most physicists will give this definition entirely in favor of the empirical definition, where absolute acceleration is defined as

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(02)- something that can be measured with an accelerometer unfortunately since any measuring instrument first has to be calibrated before it can give meaningful readings this answer is likewise problematic for instance given a spring accelerometer we'd have to make a choice of where and when to calibrate it before we could use it and should we choose to calibrate it on

7:00

a rocket ship that unbeknownst to us was blasting through outer space then as soon as the rocket engines shut off the spring would stretch leading us to wrongly conclude that we had begun experiencing a force attempts to utilize a better or more sophisticated accelerometer will not bypass this calibration requirement meaning acceleration as measured by an accelerometer is always only acceleration relative to the frame of calibration

What are We Accelerating Relative to? there is yet still one intuitive definition of absolute motion left to us which you can find given in videos such as this Ted Edwin on the twin paradox this is the idea that absolute acceleration I.E non-inertial motion can be defined as acceleration with respect to the rest of the universe to be in a national Observer one has to maintain a constant speed and direction

8:01

relative to the rest of the universe well on the surface this definition is highly appealing It suffers from a crucial defect it's non-local that is if acceleration is supposed to be a real effect then the information that something is accelerating must be transmitted to that something at the moment that the acceleration occurs but if information can only travel at the speed of light then this information can't come from a great distance away in other words you can only be causally affected by things in your immediate vicinity so the state of motion of the rest of the universe relative to you at the moment of your acceleration is both irrelevant and impossible to know whatever you're accelerating relative to it must be located within your immediate

vicinity and infinitesimally so should we take this notion of local action to its limit this means that if we want to treat
9:01
acceleration as absolutely and instantaneously real then we are left with only two options for what you are accelerating relative to 1. an absolute space or two some ether-like substance a special relativity of course rejects both these possibilities telling us that we can have neither absolutes nor ethers but Einstein developed special relativity in 1905 before he ventured into any considerations about how acceleration played into the picture so it's natural to see why he and others might have leapt to the conclusion that absolute space and or an ether could be dismissed altogether however by the time 1914 rolled around Einstein had well past realized that the notion of absolute acceleration didn't mesh with his relativistic Paradigm and Einstein's Mistake
10:01
so to correct this undeniable fundamental defect he concluded in his 1914 paper that the laws of physics ought to be packaged in a way so as to refer to only the motion between bodies indeed in 1914 Einstein felt extremely confident that his pending theory of general relativity would achieve exactly that this was because Einstein had begun working with tensors a type of mathematical object which seemed to provide a way to relate the laws of physics without reference to any particular coordinate system eager for a way to realize Mock's program of unfettered relativism Einstein mistakenly conflated this coronet-free aspect of tensors with the relativity of all motion and concluded he had finally done away with the Last Vestige of Newtonian absolutism
11:02
but Einstein received a serious blow in 1917 when the German physicist Eric crutchman pointed out to him that tensors were simply a convenient way of mathematically packaging a formalism and that pretty much any old Theory could be expressed through them sure enough only a few years later the French mathematician Elite managed to reformulate classical Newtonian physics in the language of cornet-free tensors developing what became known as Newton kirtan physics the implication of this was clear if the absolute space time and motion of Newtonian physics could be expressed in the language of tensors then the tensor formalism of general relativity indicated nothing whatsoever in regards to motion being absolute or relative Where Do We Go From Here? for the remainder of his life Einstein would struggle to interpret the meaning
12:01
of Relativity changing his mind frequently about its implications and completely reversing his stances on topics such as the existence of The Ether or Mock's principle but mainstream physics would ignore all this and merely retain the philosophy of Relativity as Einstein had established it in 1905 before he had given full weight to the meaning of acceleration which
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(02)- something that can unfortunately be measured with an accelerometer, since every measuring device must first be calibrated before it can provide meaningful data, this answer is also problematic, for example, given a spring accelerometer, we would have to choose where and when to calibrate it before we could use it, and should we choose to calibrate it at
7:00
a rocket ship that flew through space without our knowledge, once the rocket engines shut down, the spring would stretch, leading us to the erroneous conclusion that we were

beginning to experience force attempts to use a better or more sophisticated accelerometer will not get around this calibration requirement, meaning that the acceleration measured by an accelerometer is always just the acceleration relative to the calibration frame. What are we accelerating with? We are left with one intuitive definition of absolute motion, which you can find in videos like this one by **Ted Edwin** on the twin paradox, which is the idea that **absolute acceleration, i.e. non-inertial motion**, can be defined as acceleration relative to the rest of the universe, but acceleration is the reason = cause of the distortion of the dimensions of space-time in which the accelerated object moves, but there is also a thought proposal that you can relate "accelerated motion" to "ether = coordinate system 3+1D, or 3+3D. So there would be two systems in play for the Observer "at rest", to be in the national observer, we must maintain constant speed and direction
8:01
relative to the rest of the universe well on the surface this definition is very attractive. It suffers from a fundamental flaw, it is non-local, that is, if acceleration is to be a real effect, the information that something is accelerating must be transferred **to that something** into a warped twisted spacetime at the moment the acceleration occurs, but if information can only travel at the speed of light, then that information cannot come from a great distance from other affected things in your immediate vicinity. Why do you want information to come from a great distance? The motion of the rest of the universe relative to you at the moment of your acceleration is irrelevant yes, the universe is moving, i.e. it is expanding since the Big Bang, and in this expanding environment there are galaxies and star systems that are “unfolding” = have their galaxy-wide curvatures different from the global universe-wide curvature in a given stop-state. These accelerations add up, yes or no? and it is impossible to know, whatever you are accelerating relative to must be in your immediate vicinity and infinitely small, so if we were to take this notion of local action to its limit, it means that if we want to treat
9:01
acceleration as absolutely and immediately real, then we are left with only two possibilities, what you are accelerating relative to **1**. absolute space or **2**. some ethereal substance, special relativity of course rejects both of these possibilities Sure. Special relativity only "communicates" stop-states. It does not find out and comment on "acceleration" "where it came from". Therefore, anyone who claims to have understood STR is lying, because...because STR =can= only comment on the state of a rotated system of objects with **"v" (v_n)**, STR does not know that the body is in a trampoline of curved space-time, into which it was put by acceleration = force, e.g. gravitational. and tells us that we can have neither absolutes nor ethers, but Einstein developed special relativity in 1905 before he had even considered how others might have concluded that absolute space and/or the ether could be completely discarded, but by the time 1914 rolled around Einstein had long since realized that the notion of absolute acceleration did not fit into his relativistic paradigm, and Einstein's mistake
10:01
to correct this undeniable fundamental flaw, he concluded in his 1914 paper that the laws of physics should be repackaged to refer only to motion between bodies. Indeed, in 1914 Einstein was very confident that his proposed theory of general relativity would achieve exactly that, because Einstein had begun working with tensor, a type of mathematical coordinate system that >seems< to provide a relationship to some particular coordinate

system. Eager for a way to implement Mock's program of unfettered relativism, Einstein mistakenly connected this aspect of uncrowned tensors with the relativity of all motion and concluded that he had finally done away with the last vestige of Newtonian absolutism.
11:02
But Einstein suffered a serious blow in 1917 when the German physicist **Eric Crutchman** strange that I am hearing this name for the first time (probably physicists today do not know him, or do not quote him) pointed out to him that tensors are simply a convenient way to mathematically package a formalism and that almost any old theory can be expressed in terms of them with certainty, only a few years later the French mathematician Elita managed to reformulate classical Newtonian physics in the language of cornetless tensors and develop what became known as Newtonian kirtan physics, (as a mathematical layman I do not understand this) the consequence of this was clear, if the absolute space-time and motion of Newtonian physics could be expressed in the language of tensors, then the tensor formalism of general relativity implied nothing at all about motion being absolute or relative. Where do we go from here? For the rest of his life, Einstein tried to interpret the meaning of
12:01
Relativity, often changing his mind about its implications and completely reversing his positions on topics such as the existence of the Aether or Mock's principle, but mainstream physics would ignore all of this and would simply retain the philosophy of relativity as Einstein had established it in 1905, before he gave full weight to the significance of acceleration, which

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(03)- means Einstein never succeeded in removing his Theory's fundamental defect and that this defect Still Remains with the theory today indeed it's easy to see that this defect comes about because we want to treat acceleration as absolutely real and yet at the same time persist in saying that all the components which go into making up acceleration time space length velocity are all relative foreign 's instinct to solve this problem by relativizing acceleration was certainly correct but as we mentioned before if we want all observers to agree on their states of acceleration whilst also preserving the principle of local action this leaves only two options for what observers can be accelerating relative to an absolute space or an ether since the whole point of Relativity is to avoid problematical absolutes this means we must cross the first option off our list which leaves only the second option The Ether and thus at once we see why relativity is internally inconsistent in order to handle acceleration the formalism requires the existence of an ether but at the same time its philosophy conceived only for constant velocity motion forbids us to speak of any such ether of course it's hardly a coincidence that Einstein would eventually change his mind and declare that The Ether did exist nor is it a coincidence that it would be considerations of gravity and acceleration which would lead him to do so because for all the mystery surrounding what The Ether may or may not be what our current theories most strongly suggest is the idea that we detect its presence every time we accelerate of course you might object that if we can have a measurable acceleration with respect to the ether then we must also have a measurable velocity with respect to the ether which brings us back round to the central mystery of relativity if the ether exists why can't we detect our velocity with respect to it the lorenzian answer to this question was to modify Newtonian physics with an additional Axiom stating that clocks physically slow down and rulers physically shrink when in motion with respect to the ether this Axiom in and of itself feels pretty arbitrary and jarring but at the same time the Axiom Einstein replaced it with that

the speed of light is measurably equal in all inertial frames hardly feels any less arbitrary or jarring neither are intuitive and both leave one essentially scratching their head going why that but what if we could find another Axiom a deeper more intuitive principle from which these two seemingly conflicting axioms would actually emerge as being one in the same thing indeed some of you who have been following this channel for a while have been very patient with us as for some time now we've been dotting our eyes and crossing our T's in order to bring you an interpretation of Relativity which we feel will offer a more intuitive and concrete way of understanding the Theory's formalism our aim is to strip the theory of its mathematical abstraction and demonstrate that to every counter-intuitive and bizarre phenomenon a simple and physically meaningful picture can be coordinated Acknowledgments now of course none of this would have been possible without the encouragement insights and guidance from our viewers over the years additionally we want to express our gratitude for our patreon supporters without whose generosity this Channel's continuance would also not be possible and lastly we want to acknowledge Henry Lindner whose paper on the philosophical inadequacy of modern physics served as the inspiration for this video [Music] well until soon this has been dialect
16:45
thanks for watching
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(03)- means that Einstein never managed to eliminate the fundamental defect of his theory. What defect? **I don't see any in STR**. I only see that STR was not understood as a rotation of the system ; Lorentz transformation only demonstrated "stop-states" with the substitution of "unconfirmed "v" speeds", and **I also don't see any error in OTR, I only see an error in physicists, there yes**, that they want to merge OTR with QM, which is a mistake, not of physics, but of physicists. OTR belongs to the large-scale places of matter behavior, and QM to the microworld of interactions. Why merge them? Unnecessary and wrong. So what did Einstein remove? and that this defect still remains in the theory, today it is really easy to see that this defect occurs because we want to consider acceleration as absolutely real, and so what is it?, and yet we persist in the claim that **all components that make up acceleration**, → space-time length, velocity are all relative, foreign, if this problem was correctly mentioned by the instinct that we solved earlier. We want all observers to agree on their states of acceleration and at the same time preserve the principle of local action, this leaves only two possibilities, what can observers accelerate, what can they?? with respect to absolute space or ether, I don't understand the question 100%, anyway: "acceleration" is the same "thing" as the curvature of space-time and ... and since the BB space-time is still expanding, I guess it is also curved. So you want to know how to compare acceleration and the curved grid, network, 3+1 web in which the accelerating object moves, right? because the point of relativity is to avoid problematic absolutes, that means we have to cross off the first option from our list, which leaves only the second option: Ether, and so we suddenly see why the internal arrangement in relativity is consistent. Ether, but at the same time its philosophy conceived only for movement at constant speed (it was not allowed to move in the ether with non-constant motion before Einstein?) forbids us to talk about any such ether, of course
It is no coincidence that Einstein would eventually change his mind and declare that the Aether existed, nor is it a coincidence that it would be considerations of gravity and acceleration that would strongly lead him to do so, for it may be a mystery to everyone what

the Aether is or is not. Our current idea is that we detect its presence every time we accelerate, of course you could argue that if we can have a measurable acceleration relative to the ether, we must also have a measurable velocity relative to the ether, which brings us back to the central mystery of relativity, if the ether exists, why can't we detect our velocity relative to it? Lorentz's additional answer to this new and axiomatic physics question was to modify the deceleration of rulers physically shrink when they are in motion relative to the ether, this axiom in itself seems quite arbitrary and jarring, but at the same time Einstein's axiom that the speed of light is measurably the same in all inertial frames hardly feels any less arbitrary or jarring, neither of which is intuitive and both leave one essentially scratching their heads at the prospect of finding the other two axioms in deeper intuitive conflict. The axioms would actually appear as one in the same thing, some of you who have been following this channel for a while have been very patient with us, as we have been dotting our eyes and crossing T's for some time to bring you an interpretation of relativity that we believe will offer a more intuitive and concrete way of understanding the formalism of the theory, our goal is to strip away every abstract theory and its bizarre-mathematical phenomenon into a simple and mathematical phenomenon. A meaningful picture can be coordinated Acknowledgements Now of course none of this would have been possible without the encouraging insights and guidance from our viewers over the years, in addition we want to express our gratitude to our patron supporters without whose generosity the continuation of this channel would also not have been possible, and finally we want to acknowledge Henry Lindner whose article on the philosophy of this video served as an inspiration for modern physics in inadequa. was dialect
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thanks for watching

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JN, 08.02.2025