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What are the Strings in String Theory?

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•18. 10. 2018

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(black font google-translator, red font my opinions)

Thank you to 23andme for supporting PBS Digital Studios .You may have heard the usual pop sci description of string theory. There are these tiny vibrating strings and That's where all the forces particles including gravity in the entire universe come from This raises more questions than it answers Like why strings? What are they made of? (Here http://www.hypothesis-of-universe.com/docs/i/i_001.pdf the great scientist L. Motl made fun of this question I asked him in 2001.) And what's all this nonsense of extra dimensions? In physics we like to reduce our description of the mechanics of reality down to the simplest possible form We expect the most fundamental machinery to have the fewest possible moving parts or free parameters This is why the standard model of particle physics is considered incomplete. Its equations predict many things with stunning accuracy But they first require us to tune many mathematical knobs and dials we need to use physical measurement to fix 19 free parameters like the masses of particles and Then there's gravity which doesn't fit into the standard model at all so surely there exists a deeper set of cogs and wheels A theory that brings all observable phenomena into the same mechanical framework That would be a theory of everything and this is the great hope of string theory. In the following episodes We're going to explore the gory details of string theory, but today it's string theory 10+1 Where did this crazy idea come from? I mean why tiny vibrating strings? (and wavy lines, wavepacked, balls of dimensions) Versus literally any other little vibrant anything? What exactly are strings (and waveforms, balls of dimensions) string theory as primary? (When a titled scientist asks in this way, it is question legitimate. When a layman asks in this way, it is stupid pataphysical stupidity, and therefore in HDV, it is a phantasmagoria that destroys people's awareness of the right knowledge about the Universe Pane that Mr. Kulhánek?) Let's make a quick introduction to the beginnings of string theory. The idea started in the 60s with efforts to understand the behavior of hadrons collections of quarks bound by the gluons of the strong nuclear force That includes protons and neutrons as well as mesons, which are a combination of a quark and an antiquark Peculiarities in the interactions between pairs of mesons as well as an odd relationship between their angular momenta and masses Suggested that the quarks in mesons are connected by, you guessed it, strings In this case, the strings are stretched out tubes of strong nuclear force Vibrating elastic bands made of gluons. (It's still just an abstract vision, the same values as the abstract vision of my HDV that the quarks, gluons, etc. are made by "packing-geon" 3 + 3-dimensions spacetime.) A lot of work went into figuring out a quantum theory for the the strong interaction based on the physics of strings Many theoretical mathematical works...The theory had some success but kind of got stuck and was ultimately replaced by quantum chromodynamics. She is excellent. One of the reasons this strong force version of string theory got stuck is that it predicted the existence of unexpected and unwanted vibrational modes in the gluon field of these strings. ..matematika selhala ?? What is the vibration mode in a quantum field? It's a particle. This is a completely bold vision. If

string physicists told her for the first time in the Czech basin in front of Kulhánek, Brož and similar physicists, *she would be called phantasmagoric wishing theory from unrecognized geniuses who have an unlimited ability to generate nonsense ... , or these words: deterring unscientific opinions by which the author consciously or unconsciously distorts the views of fellow citizens.* http://www.hypothesis-of-universe.com/docs/x/x_031.pdf ;

http://www.hypothesis-of-universe.com/docs/y/y_004.pdf And one of these modes appears as a weightless (**weightless**) spin-2 particle.

But the only hypothetical massless spin-2 particle is the graviton, the conjectured quantum particle of the gravitational field. If the gravitational field is made of quantum particles. Which it might be we really don't know. **Mass is a "property" of an elementary particle** But if it is, then the quanta of gravity should have an uncanny resemblance to the type of particle produced by this little investigation into hadronic strings (**loop quantum**) except that there's no way anything like the graviton should appear in that sort of string. This realization came in the early 70s. A bold new proposal emerged: forget mesons. What if the math of this theory could be used in a theory of quantum gravity? In fact, what if all force-carrying particles result from oscillations in tiny strings? **Legitimate visions that do not deserve insult and ridicule... as it deserves in the Czech Basin HDV as a phantasmagoria of unrecognized geniuses that we have to deal with silence.** All we needed was to cut the strings. **What to reduce? Length ?, diameter tubes?** Like 20 orders of magnitude smaller. Shrinking from the size of a proton to the Planck scale. **That's it is unobservable and easily approaches the "boiling vacuum", which is "foam of 3 + 3 dimensions of phenomena "Time" and "Length".** → http://www.hypothesis-of-universe.com/docs/c/c_384.jpg Roughly the scale of the difference between the Milky Way galaxy and your living room. Oh, and we needed to add 22 dimensions to the familiar 4. **However, such a result "breeds" mathematical constructions that "require" "something".** No biggie. This was the so-called bosonic theory string. **In my HDV, I need 3 length dimensions and 11/3 time dimensions for quarks.** See http://www.hypothesis-of-universe.com/docs/ea/ea_006.pdf and for assemblies of all baryons I need **9 length dimensions and 10 time dimensions**, see page **9** at http://www.hypothesis-of-universe.com/docs/ea/ea_006.pdf . For all mesons, **5 length dimensions and 6** are required **time dimensions**, see http://www.hypothesis-of-universe.com/docs/ea/ea_013.pdf page **3**. If it worked, it would be a candidate for a great unified theory combining all known forces. But why stay with it? If the twisting strings. **Here at this point, string theory literally copies my vision of HDV, with the difference that the "stringers" twist, the strings "out of nothing, I twist the space-time dimensions into packets-geons.** Can explain the bosons carrying force, why not also fermions that contain matter? **In my HDV, leptons need 2 dimensions of length and 2 dimensions of time.** During the 1970s and 1980s several proposals introduced the idea of supersymmetry to bring the fermions and bosons into the same theoretical framework. **24 particles of the Standard model.**

The resulting superstring theory sought (**I also tried...**) to become an all-encompassing mechanism to explain the underlying workings of our entire reality. A theory of everything. As an added bonus this ambition also shaved off a bunch of dimensions. Only ten were needed once fermions were added. **Probably 9 + 1, nine length and one time. I need 9 length and 10 time dimensions for everything.** Then in 1995 Ed Witten brought the many forms of superstring theory together into the single framework of M theory. **I into the framework of HDV.** All for the low price of adding only one more spatial dimension for an eleven-dimensional theory. **that is, they 10 + 1, why ten?** Okay, enough for the history lesson. Let's talk strings. So **twisted strings** could explain the whole universe. (**I think the twisted dimensions of space-time quantities could explain the whole universe.** Here's the slight difference between HDV and TS. Only that the strings are out of nowhere and my wave packets are from the dimensions of space-time. **So why the 20-year madness against me? , against my HDV ??, why the**

hatred ??? I dare say that no hypothesis in the world has undergone such insane persecution as I did with HDV, and yet none of the renowned scientists has made any major counter-arguments at all to sink it and send it to the dump - only the insult, humiliation and the unbelievable suffering I suffer. He collected 40 years of hard work (Of course, not a job for a salary in some Fermilab or CERN as it is received by all physicists in the world who work in physics). That's a hell of a claim. To understand quantum strings, first we need to look at regular strings they're cooler than you think. The key is that strings can carry waves and If the string has ends or is tied in a **loop then a wave will end up overlapping with itself**. I have been interpreting this vision and idea for 20 years on the Internet that: dimensional wave packs twist "inside" into all sorts of topological loops, meaning that if the "outer arrow of time" is still into the future, the particles inside the pack can twist "In the opposite direction of the time arrow" for a small super-short time interval. This opposite twist of the time dimension is made by antiparticles, (?) That "time inside" runs in the opposite direction, ie time seems to run in them with the opposite arrow of time. → Still to think. In that case you get a standing wave Roughly speaking when these travelling waves overlap each other they can either stack up or cancel out constructive or destructive interference. See **virtual pairs of particles in a vacuum**. Constructive interference only happens if the wavelength of the wave fits a neat number of times along the length of the string Then the phases of the overlapping wave match in the right way and that wavelength / frequency of the wave is enhanced All other frequencies tend to die out The result is that for a given string only certain frequencies Corresponding to certain energies are possible. These resonant frequencies depend on the length of the string Also, it's tension which defines wave velocity and so relates frequency to wave length For example, this leads to the specific frequencies of vibration on a guitar string But this sort of behavior, where only specific discrete energy modes are allowed sounds very quantum like String theorists weren't the first to notice this Niels Bohr came up with the first quantum model for electron orbits by thinking of them as ring like standing waves around the hydrogen atom. But Quantum strings are much more ambitious than boring electron orbits. The hope is that tweaked just right, those discrete vibrational modes can **be made to match the properties of known particles**. All 24 particles of the Standard Model therefore **have "their" shape** of the package packing and this is related to the "properties" of the particles, ie the forces. Mass is a property, spin, charge, and all quantum numbers are **properties** of that topological-geometric design of particles. Particle **mass** just comes from the length of the string (See here that the vision of String Theory does not contradict HDV's view.) and it's tension tension is after all just energy per unit length string length **defines mass**. In my vision, **mass defines the "shape" of the twisting of dimensions...** and not only mass but also other **properties of matter**. But also defines which complex vibrational modes are possible and those modes in turn define particle **properties** like electric charge **And thus the agreement between String and HDV Theory is confirmed here** and spin So this is the great promise of string theory. So, Mr. Kulhanek et al. : from the very beginning for the creation of HDV, I follow the same logic of thinking about the "parameters-quantum numbers" of elementary particles, ie the same phantasmagoria as string theorists. I don't know math ... I don't know where the stringers are in trouble, but I know it wouldn't hurt to think about my vision that a "string" isn't out of "nothing" and then they manipulate that "fluid" but are space-time dimensions that are the real real fact for the solution. This is where the New Physics will go. By defining a single parameter the string tension Or equivalently string length scale all of the possible particles should be automatically defined.* **String theory only manipulates the length of the scale at the strings to make solved the mass, energy, and other properties of the element.particles...**, it is quite shallow; The wavy lines of dimensions are a breathtaking spectacle, don't you think? → <http://www.hypothesis-of-universe.com/index.php?nav=ea> Compare that one parameter to the 19 free parameters of the standard model. **Here I will quote**

WIKIPEDIA: *Although experimental evidence confirm the assumptions of the standard model, many physicists consider this model to be insufficient because it contains a number of indeterminate parameters, a number of fundamental particles, and other more theoretical considerations as a hierarchical problem. There are several speculative theories outside the standard model that attempt to address these shortcomings.* It sure sounds closer to a fundamental theory. Okay recap, we have these Planck scale One-dimensional structures that can be in loops (in packages like HDV) or extended they have vibrational modes that define particle properties (Literally as if the author were copying from my HDV.) By the way, those vibrations the standing waves. You're not some abstract internal wave the strings are real physical strands and the waves are wiggles (they are packaged) in actual space. the author describes HDV But physical strands of what? common answers include pure mass energy fundamental irreducible existence Topological irregularities in the fabric of reality (I'm amazed) or the most common answer. It's a meaningless question. They are fundamental so not made of anything ((what? .. I stare (!!)) or in other words a material known as shut-up-and-calculate-onium.* Astonishment, I hear this for the first time in 40 years that a string physicist physicist would abandon the "unwavering" vision that those strings are out of nowhere. I read this for the first time in 40 years. And also: what are they "onium"? I do not understand. Most string theorists are more interested in what strings do not what they're made of So, what do they do? (That amazes me. That I haven't read new visions of "what are strings of" if not from Nothing ...?!), , what do they do? Well vibrate obviously they can hold energy. (in order to vibrate must be supplied by him energy or vice versa: by vibrating does it produce energy? So who "vibrates" them?) They can stretch they can also merge and split apart. **Basic ball-wave packs can no longer be divided, only conglomerates.** These last properties are important because it gives a mechanism for the particles of string theory to interact and to decay into other particles. Does String Theory mean that strings break into other particles? that is, that the "general string" are "all" particles, which when we fragment, we get the "basic particles" Standard particle model ??? jóó... This picture of strings coming together joining and splitting apart is a huge strength of the theory. HDV has that "power of theory," too. It solves one of the main problems with quantizing gravity. At the moment, I would omit quantum gravity from the interpretation and comments. It is a non-linear problem. See → http://www.hypothesis-of-universe.com/docs/eng/eng_030.jpg Maybe you remember from our episode on quantum gravity if you try to describe gravitational interactions on the smaller scales, the energies required to interact on that scale produce black holes There's no way to even think about the shape of the gravitational field on the Planck scale. There is a "linear world of interactions" in the microworld. Gravity prevails in the macroworld and it is the "curvature of space-time dimensions" in a nonlinear form. This issue needs to be considered. → That doesn't produce a hopeless conflict string theory fixes this because the graviton is a loop not a point particle its interactions are Smeared around that string handily avoiding the explosion of mathematical infinities You get below the Planck length. All this stuff sounds great and by the way doesn't work for any other geometrical structure other than a 1d string.. It doesn't suit me here, there is a difference in vision. TS manufactures all element. particles only from a string that is one-dimensional. HDV is produced by elem. particles from 3 + 3D and also from extra-dimensions. So vibrating guitar strings, yes. Drum skins, no. Unfortunately, it's not going to be this easy. I suspect; the difficulty is in the mathematical construction of the idea of a "one-dimensional string" that it must be "immersed" (or multiplied ??) into 10 + 1 dimensions... Yeah, the strings themselves are 1d but to even start to produce the properties of known particles. They need to vibrate in more than just the three dimensions of space In fact, the theory only works in precisely nine spatial dimensions plus one for time Plus one for M theory, which we'll come back to in short without exactly this number of dimensions. You don't get gravitons or any other massless

particle. We'll look into why in future episodes But this is awkward to say the least. It's a theory that works in a universe. HDV encourages the vision that "higher states of dimensions", ie the more curved reality of space-time, "float" in less curved states of space-time. The basic raster, thread, grid of events is the 3 + 3 dimensional Euclidean space-time and in it other space-time "floats", ie other more crooked "states" of dimensions. That's the idea. It is even similar to the ether, which was from "Nothing". If the ether were "from the dimensions of space-time", curved, that would be another alternative..., and perhaps it would take over = the ether from the dimensions of space-time, but curved..., and it "floats" in the basic grid 3 + 3. That is clearly not our own with its measly three dimensions of space. But this sort of thing doesn't deter string theorists. 50-60 years. They are not at the finish line. Why ?? There's a way to add extra spatial dimensions .. Where do string physicists add the other extra dimensions, where? that's their problem. They destroy our basic space-time to some n-dimensional state. That's not good. It is much more elegant that the "more curved" states of dimensions "float" (are nested) into less curved space-time... that is still consistent with our **perceived** 3d universe. ..and the point is that the stringers destroy the basic essence of the universe = 3 + 3 space-time. 3 + 3D is geometric space-time and... and extra-dimensions are a "mathematical superstructure" of pseudodimensions that are built **into matter**. To get our heads around this Imagine we lived in a 2d flatland universe. We know that, we know it..., but take my variant IMAGINATION; why should i imagine the world in 2D when i can imagine! another world, a world of "crooked tangled dimensions" into balls - and you are then matter. Why can't you "imagine" it too? We only perceive the giant x and y directions. But what if flatland isn't truly flat? What if the z-direction? Has a tiny tiny width back where you started Very tiny objects like quantum strings could explore that extra dimension and importantly oscillate in it. Of course, flat ants consider the third dimension to be extra-dimensional. We 3 + 3D people imagine extra dimensions how? Me in HDV as I describe. And what about you ? But we giant lumbering Flatlanders would have no clue it existed Okay now scale this up three large dimensions of space and six tiny pac-man dimensions. Well, you see abstractions, you go too., That only strings experience. Voila string theory is saved Modern m-theory proposes (I also suggest, everyone here suggests ..) an additional large spatial dimension our universe of 3d space and 1d time is like flatland on this 5d object called a 5-brane M-theory unites different string theories because it demonstrates some philosophically fascinating dualities between different ways of thinking about the dimensions. I understand... but you do not understand HDV, mainly because you did not read it, you refused to read it because it was invented by a nerd, a masquerade, which all Czech physicists think only because at the beginning (approx. 2004-2006) it was a couple of villains who had their unwashed mouth (+ huge hatred) and started gossiping, insulting and chasing witch. Ultimately, it also leads to the ultimate duality. That is the holographic principle Patience, grasshoppers. We will get there. The exact behavior of strings depend on the shape of their compact dimensions. In other words, words from HDV: the behavior of material elements from dimensions into precise shapes-shapes-geons-wave packages, ie the design shows the reality of the properties of particles-matter and the mutual behavior of matter-interaction. In fact the single free parameter in string theory becomes the configuration of the extra dimensions. These are just multicolored verbal descriptions the same realities in HDV and string theory. Find the right location in this string landscape and you perfectly describe the universe the only issue is that there are an estimated 10 to the power of 500 possible choices and almost no way to figure out which one is ours. ? Right now string theory appears to be at an impasse. Why ? about mathematical notation. Option b) → HDV . It has produced no confirmed predictions Some would say it's made no testable predictions Tuning that string landscape to match our universe is daunting and perhaps impossible Yet despite this impasse its promise and its elegance has convinced many that it must be right or at least the right path.

I don't understand why the world neglects to read HDV when I send my visions from time to time to various physicists around the world of physics. That's many thousands of email letters in 20 years. (I have them in the archive). In coming episodes will look deeper into both the successes, the failures, .. 60 years of research... hundreds to thousands of scientists are working on it (in equipped laboratories and institutes with mutual consultations) and the result ... ?? .., "something to zero"... I also work on HDV 40 years... result zero (ie little) but I am alone against everyone, against extremely hateful gang in the Czech Basin..., and the profound weirdnesses of string theory then you can decide for yourself whether you accept the fundamental stringy nature of space-time. Thanks to 23andme for supporting PBS Digital Studios and space-time 23andme is a personal genetic company created to help (no one helped me though I begged) people understand what their DNA says about them the month of October is Family History Month, which is a great time to explore and learn more about your own family and ancestry a discovery that can lead to new connections with others You could learn more by going to 23andme.com/spacetime Last week we talked about the fundamental computational limits of our universe and Incidentally what it would take to compute a universe simulation on the event horizon of a black hole Let's see what you had to say Roman R asks Whether computation at an event horizon would experience massive time dilation relative to an outside observer So how do we see the results of the computation? Yeah, that's an issue Really? You can't read off the results of an event horizon computation until practically ever.

I will forgive more comments ..

I mentioned in the video that you'd read off the result in Hawking radiation Which would take until long after the last star in the universe has died to even give you a small fraction of that read out The slow read out by Hawking radiation is equivalent to the time dilation issue You know what these black hole computers suck. Let's not build one A few of you pointed out that a black hole computer couldn't store the information about other black holes and You're right this is one of the assumptions we made in the calculation Our supermassive black hole computer is only large enough to contain all information in radiation and matter But most of the information in the universe is in black holes or more accurately Most entropy or hidden information is in black holes So our black hole computer can't contain the information hidden in all black holes. It can't even contain the information from black holes larger than itself Yuval Nehemia went back to an old video that quotes me saying to Neil deGrasse Tyson To simulate the universe you need a computer the size of the universe. In direct contradiction with everything I've said recently about the bekenstein bound As hard as it is to believe that I have ever said anything wrong before I'm afraid Yuval has caught me out. You can build a universe simulator smaller than the universe That's it. The universe simulator that you'd build inside this universe has limits It couldn't simulate a universe so perfectly that the simulated universe could also contain an equally good universe simulator There's no infinite set of nested simulators Like I said our black hole computer is only simulating particles not black holes It's like the simple logical gate arrays that people build inside Minecraft Emulators are never as efficient as the original hardware Sam Gil tells us this was the most boringest video I've ever seen. I have to say I'm kind of flattered Have you been on YouTube? Even PBS Digital Studios has spectacular contenders What about that one where Johansson does nothing but lick a lollipop for over 17 minutes? Or Vanessa Hill's literal "The Most Boring Video Ever"? That one's actually quite interesting

JN, com. 24.08.2021