**Sabine Hossenfelder  extra dimenze**
https://www.youtube.com/watch?v=UHZam0Zf1FQ

#science #mathematics #physics
Does the Universe have Higher Dimensions? Part 2

(translated by google-translator)
(red font are my embedded opinions)

(01) - … Higher dimensions. And physicists have studied (to study means to think in abstraction and logic…; to look for higher dimensions observationally, physicists have not done so far; or if, everything was unsuccessful) the question of whether such other dimensions really exist in sufficient detail. So what did they find? Are other dimensions possible? (History has shown that the idea was first born and… and it was studied in thought, with logic; mathematical images followed only abstract considerations.) What do they have to do with string theory and wormholes on the Large Hadron accelerator? And if extra dimensions are possible, can we use them for space travel? We'll talk about that today.

This video (part II) continues from last week (part I), in which I talked about the history of extras. (I don't know "what" Sabina wanted to say here, or how badly the google-translator worked.) As she explained in the previous video, if seven other dimensions are added to our ordinary reality 3 + 1, then all the basic forces of nature can be described geometrically.
( Here, Sabina says, she shows that first and first intention and reason why it occurred to someone 100 years ago to "add" more dimensions to the Universe. → To make MATEMATICALLY unite forces under "the same geometry." OK) And that sounds like really a promising idea for unified physics. (Yes, this is the original reason for "adding" other dimensions to čp 3 + 1. My reason for "adding" extra dimensions is different !! The construction of matter by "curving" extra dimensions space-time.)

In the early 1980s, string theorist Edward Whitten thought it was interesting that the other seven dimensions of space were also the maximum for supergravity. However, it turned out that this random selection of 7 led nowhere. (The goal of those extra dimensions was: to unify the physics of forces). This geometric construction of fundamental forces, called the Kaluza-Klein theory, suffers from several problems that no one has yet been able to solve.

01) (After many years of thinking, I came to the conclusion that dimensions up to 3 + 3 are geometric, and those extra dimensions in higher numbers over 3 + 3 are only "mathematical", then they do not manifest geometrically by being twisted "into n -dimensional balls - geons - wave packages ".). One problem is that the radii of the "tubes" of these extra dimensions are unstable.

02) (For HDV, these extra-dimensions of mathematics are not tubes, so they do not have a "radius." The problem disappears. Witten's theory of strings is an "idea" with tubes "= strings. , which "only" does not consider that extra dimensions are "tubes." Why should one idea (not confronted with reality) of an expert-scientist have a higher scientific value than another idea

of a non-expert ?? Cannot have one idea (in an abstract position ) a different value than the second idea. (Question for the stringer: **Why** are the normal dimensions of 3 + 1 not tubes? )

03) (Because string theory "introduced" *the doctrine, the postulate that matter is the third inalienable quantity* and… and in this case with this theory that matter will be built "by means of tubes" = strings = chains which are "created from nothing" Simply and without logic, the "stringers" introduced it so that… there are somehow the tubes (?!?!?), und fertig. And that's it, the stringers call their "abstract idea-vision" a THEORY and only because an unverified idea was built into mathematics? (So every idea built into mathematics is already a theory according to the principles of science ???… and an idea without mathematics is no longer a theory, is it just a hypothesis?) http://www.hypothesis-of-universe.com/index.php?nav=e )

04) For me, for my HDV, the extra-dimensions are the same dimensions as the developed geometric ones (spatiotemporal), with the fact that **"curvature" of cp-dimensions does not produce tubes, but "packets = balls = wave packages = geons** as already separate" artifacts ", with a fixed topology, which will already have the nature of matter, the properties of matter, the behavior of matter, a great" curvature "on microscales, and these are the dimensions packed-curved-packed into" packages ", into multi-packages. So the difference between string theory and HDV is "" "only" "" slight:
They take the tubes "from Nothing" and twist them into loops-varieties, http://www.hypothesis-of-universe.com/docs/c/c_025.jpg (as Sabina shows) and bent strings, which then " stringers "vibrate, and the vibrations then" present "as standard elements of matter.
I create the idea that matter is "born" from two spatiotemporal quantities and their dimensions (3 + 3D) by the act of converting these dimensions into packages. http://www.hypothesis-of-universe.com/docs/c/c_388.gif The curvature of dimensions as an act is mass-creating. After the Big Bang, plasma occurred = a state of "boiling" dimensions, which is a chaotic foam of curvature. (it is a linear state). And in this foam, "frozen" clones were born - topological formations, shapes constructed-built from these dimensions. The clones then "float" in that boiling plasma (gluons, quarks, bosons, etc.) see the following explanation of the genesis of matter from these packed waveform geons. Witten's idea of strings = "out of nowhere" tubes that vibrate and their "vibrations" to become matter is their string theory.
I don't understand what my HDV should be a worse idea ??, a reprehensible idea and in addition to the disgusting ridicule of everyone !! physicists in the Czech Basin. Thus, in order for those tube radii to increase or decrease, it is not compatible with observation. (**)
Repetition: The problem of stringers: it introduces extra dimensions like "tubes" and God knows what; I don't, I build matter from the normal dimensions of the space-time two quantities "Length" (has 3 dimensions) "Time" (has three dimensions), or http://www.hypothesis-of-universe.com/docs/c/c_278.jpg , namely the "principle of curvature". My higher dimensions are the same as the basic ones, but they are "packed dimensions = packages" for matter, and these become the basic elementary particles as shown in the Standard Model. http://www.hypothesis-of-universe.com/index.php?nav=e The curvature of cp dimensions shows not only "packages" but also open curvatures - they are pal fields. Matter "floats" in fields and both then "floats" in the basic fabric, grid, raster of 3 + 3D space-time flat dimensions… basically every "crooked state" "floats" (is nested) in a different curved state. http://www.hypothesis-of-universe.com/docs/aa/aa_123.pdf Another problem is that some of the particles we know come in two different versions, left and right.

05) Although Sabina does not describe anything "how" the "multidimensional world" (10D or 26D) of Kalus-Klein-Witten is related to elementary mass particles (exhibiting mirror asymmetry - chirality), for my HDV, mirror asymmetry is understandable. (explanations are elsewhere). http://www.hypothesis-of-universe.com/docs/aa/aa_127.pdf And these versions do not behave the same way. This is called chirality. The fact that the particles behave in this way is an observed fact, but it does not correspond to the Kaluza-Klein idea. Witten was really worried about that in his 1981 post. Enter string theory. (introduced strings) In string theory, the basic entities are strings. The fact that strings are basic means that they are not made of anything else.

06) This is the diametrical difference between TS and HDV. HDV builds mass elements from the basic quantities of space-time…. In the style of "curvature of dimensions of quantities". Here, HDV is based on a different premise, a different vision, a different consideration, simply HDV is an "improved" idea than string theory, and is worth exploring. Unfortunately, it has been neglected for 40 years. They just are. Witten's doctrine is: strings-tubes simply are-exist and fetig, they are from Nothing, the strings then realize the material elements by "vibration." HDV doctrine: the spatio-temporal dimensions 3 + 3 themselves, when they pack up-they create (they have to create) a geon-pack, **which by its topology itself shows the properties (charge, spin, etc.) of material behavior, they are elements of matter**. The properties themselves differ according to the specific topology "distortion"… etc. see interpretations elsewhere. http://www.hypothesis-of-universe.com/index.php?nav=ee ; http://www.hypothesis-of-universe.com/index.php?nav=e And everything else is made of these chains. Now you may be asking how many dimensions for the string to twist to properly describe the physics we are observing? The first answer theorists received was **26.** That's twenty-five dimensions of space and one dimension of time.

07) Here is another significant difference between String Theory and HDV. (difference in idea, vision, thought). To this day, physicist theorists assume that time is a kind of scalar (not a vector) that "grows in one direction" (from the past to the future) even when they call it a "dimension" or dimension. … And which "flows in all directions into the future". **However, this is a bad knowledge about the phenomenon of TIME.** http://www.hypothesis-ofuniverse.com/docs/aa/aa_125.pdf No one has ever explored the nature of time, "what time is" and whether time can have dimensions, at least 3 dimensions such as space. http://www.hypothesis-of-universe.com/docs/aa/aa_121.pdf ((I have said a lot about time on other sites)) one of the examples of 2009 http://www.hypothesis-of-universe.com/docs/g/g_026.pdf That's a lot. However, it turned out that if we add supersymmetry, the number of dimensions decreases to **10**, ie nine dimensions of space and one dimension of time. String theory simply doesn't work properly in a smaller number of space dimensions. However, this is demonstrated not by the Universe, but by the (proposed) mathematics, the mathematical processing of physical forces and the laws that we unify. We "modify" physical reality with mathematics - we supply (when unifying) spatial dimensions. I know, although I don't know mathematics, that it wouldn't be a problem for scientists if "time dimensions fit into mathematical equations" as the spatial dimensions add there. Mathematically, this is not a problem, but the problem in the human psyche is how we perceive time, "what we know about time, what we think about time," and that they would not believe in such "adding dimensions of time." But no one researched it. This creates the same problem that people with the Kaluza-Kein theory had a hundred years ago: If these dimensions exist, where are they? Those extra dimensions are all around us, they are built into matter and physical fields. The field "floats" in the basic 3 + 3D grid just as the multi-dimensional matter "floats" in the basic grid and floats in the fields as well. Each crooked

state of "compact" floats in a different state of less crooked dimensions. And string theorists answered in the same way: We can't see them because they are twisted into small radii. Extra dimensions in HDV are not visible because they are packed "inside a ball", not "into tubes". In string theory, these extra dimensions can be twisted into complicated geometric shapes called "Calabi-You pipes", but the details are not so important.

08) In other words, the difference between HDV and String Theory is "only" in that HDV still uses the same "basic" dimensions of the two quantities "Length" and "Time" (3 + 3D) as extra-dimensions; while the "stringers" invented some "tubes from Nothing." (? why should the "normal" dimensions be non-tubular - entities of space-time and extra dimensions as entities "from Something" and tubular ???) I produce elements of matter by "wave wrapping" dimensions 3 + 3, ie using already ineligible artifacts of quantities time-space http://www.hypothesis-of-universe.com/docs/c/c_300.jpg and… and stringers produce matter with "fictional tubes" which they have taken "out of nowhere" and which vibrate, and even have to "from somewhere" for those vibrations borrow energy. The important thing is that due to this ripple, the strings have higher harmonics. ? lack of google translator, probably. This is the same as what Kaluza-Klein's theory is about. This means that if the string gains enough energy, it can vibrate with certain frequencies that must match and the radius of these new (extra) dimensions.

09) Here I reject the idea that in order for string theory to apply and "stir the vibrations of the strings", it needs some energy "from the outside" tomu; it is illogical that matter is to be formed from strings, but it must first "seek" to vibrate matter-energy "from somewhere." So it's not true that string theory doesn't make predictions, even though I hear people claim it. I also hear from my enemies that HDV makes no predictions. It is, of course, a lie and a cheap slander. String theory makes the prediction that these higher harmonics ? The "what" about google translator error should exist. The problem is that we need a lot of high energy to make the strings and vibrate them. (***) In the laboratory. But how does the universe do it itself? This is because we already know that these twisted dimensions must be small. HDV doesn't have "tubes", no need. And small radii mean high frequencies, and therefore high energies. How big must the energy be to see these higher harmonics? Ah, then the question. Human devices can only see up to a size of 10-18 m; their strings and my wave packages = balls will be on sizes of about 10-22 m.?! Yes ?! I don't know. String theory won't tell you. Why ? All we know is that these other dimensions must be so small that we have not seen them yet. In principle, therefore, they could only be out of range, and another larger particle accelerator could create these higher harmonics. (photo on panel: Sabina shows loops from strings). And hence the idea that the Great Hadron Colider can create small black holes. To understand how they help solve other extra dimensions in creating black holes, we must first know that Newton's law over the square is geometric. The gravitational force of a point mass decreases with one angled R to the other, because the surface of a sphere increases with R to another, where R is the radius of the sphere. So if we increase the distance of matter, the force lines thin out as the surface of the sphere grows. But here it is important to steer. ? the translator probably didn't do something. Suppose we have other dimensions of space. Let's say we don't have just three, but 3 + n (dimensions), where n is a positive integer. Then the surface of the sphere increases with R to (2 + n) (i.e. photo: R2 + n where n = extra-dimensional). As a result, the gravitational force decreases with one polynomial R (2 + n) as Forse ~ 1 / R2 + n (distance between material objects). This means that if a space has more than three dimensions, the force decreases with distance to the source much faster than usual.

10) It is worth adding a note here: Astronomers find that galaxies lack mass and use Newton's law for calculations (which is enough because the velocities of stars on the periphery of the galaxy are not relativistic) which is fine, but it's not ok anymore to have the equation Forse = M.m / $R^2$ uses R-distance = straight-line line. It is bad. This is no longer the case here for galaxies, because from the point of view of a distant observer, the space-time in the galaxy is curved and the lines "R" they are in an arc, not straight, and a greater distance must be established between the bodies, which coincidentally satisfies the equation Forse ~ 1 / $R^{2+n}$; http://www.hypothesis-of-universe.com/docs/aa/aa_017.pdf ; http://www.hypothesis-of-universe.com/docs/b/b_067.pdf Newtonian gravity was, of course, replaced by Einstein's theory of general relativity, but this general geometric consideration of how gravity weakens with distance from the source remains valid. O.K., but as I said here: a "line in an arc" must be inserted in the gravitational equation, the curved space-time is noticeable in the galaxy. In higher dimensions, therefore, the gravitational force decreases faster with distance to the source. Keep in mind, however, that the other dimensions we are interested in are wavy, because otherwise we would have noticed them. Yes, extra dimensions are only in the state of curved dimensions (and wrapped in geons). That is, in the direction of these extra dimensions, the force lines can only extend to a distance comparable to the radius of the tube dimension. Then the only directions the force lines can continue are the three large (expanded) directions. This means that at distances much larger than the radius of the special dimensions, the usual law 1 / $R^2$, which we observe, returns. O.K. in spaces that are not curved, or negligibly. Now about those black holes.
If gravity works as usual in the three dimensions of space, we cannot create black holes. This is because gravity is too weak. But consider that they are, and you have these other dimensions. Because the gravitational force decreases much faster (if there are more dimensions) as we move away from matter (body), it means that as we approach matter, the force will be much stronger than it would be in 3 dimensions. This makes it much "easier" to create black holes. No comment Really, if the extra dimensions are big enough for a Large Hadron Collider we can create black holes. At least in theory. In practice, the Large Hadron Collider did not produce black holes, which means that if there are other dimensions, they are really small. Not "small" but they are packaged - compacted into geons and then into multi-geons, etc., etc. see the structure of matter "from wave packages" How "small"? It depends on the number of additional dimensions, but roughly speaking below the micrometer. If they existed, could we travel through them? The short answer is: no, and even if we could, it would be useless. The reason is that while the force of gravity can spread to all other dimensions, material objects, as well as the things we are made of, cannot go there. It is bound to a three-dimensional section, which string theorists call "gates", it is not the brain of these gates, but it is a generalization of the membrane. No comment.
So we're basically stuck on this three-dimensional gate, which is our universe. HDV offers a new (next) vision "about the world and the antiworld" (matter - antimatter) as two quadrants of 3 + 3D space-time of one Universe, in which it goes, time runs in opposite directions. The "gateway" is then the interface of these two quadrants, which even intersect in the microworld of the Planck scales. In one, the particles in the other antiparticle are realized, precisely in the way in which the "dimension" of the time dimension "tangles" into the package. Spins are opposite http://www.hypothesis-of-universe.com/docs/aa/aa_127.pdf

But even if that were not the case, what do we really want in these (these) other dimensions? There is nothing there and you cannot travel faster than in our universe. People often think that other dimensions provide a certain type of abbreviation, for example because of these illustrations. ?? Misunderstanding of "dimensions"! The idea is that our universe is something like this (photo: a topological leaf with a wormhole), which is bent and then you can go in a

direction perpendicular to it to get to a seemingly distant point faster. The point is that we don't need any other dimensions for that. What we call "dimensions" in general, relativity would be represented in this figure (bent paper with a wormhole) represented by the size of the surface, which does not change. In fact, these things are called wormholes, and we can have them in ordinary general relativity with the ordinary three dimensions of the universe. Why did great thinkers from the time of Kalusa-Klein to Witten, why did they actually invent additional extra dimensions? The reason for physicists was the unification of forces and also the connection of QM (linear equations) with OTR (theory with nonlinear equations). In HDV, I "needed" extra dimensions for the construction of matter, for the construction of elementary particles and fields. I think that physicists are mistaken here for their reasoning *"for what they really have to be good and necessary extra dimensions."* This space for insertion does not really exist here. This is also the reason why people get a confused question: what is the universe expanding into. http://www.hypothesis-of-universe.com/docs/aa/aa_123.pdf ; http://www.hypothesis-of-universe.com/docs/aa/aa_117.pdf It does not expand into anything, it simply expands. By the way, a fun fact if you want to insert a general 4-dimensional space-time of numerical chance, but I'll digress. I don't know exactly "what" Sabina wanted to say, because the google translator doesn't translate the "meaning" of the words. What does this mean for space travel? This means that traveling in a higher dimension using hyperdrive is scientifically extremely unlikely. And completely useless. That's why my final assessment of the scientific credibility of sci-fi travel is 3rd place… hyperdrives, although it's a nice idea, it makes no scientific sense. 2nd place: wormholes, because at least they exist mathematically, although no one knows how to create them. And the winner is the warp drive, because not only does it work mathematically, it's basically possible to create it, at least if you stay below the speed of the light limit. How to travel faster than light, I'm afraid we still don't know. And also unnecessary.
But maybe it's you who finds out. This video was sponsored by Audible. I like to listen to audiobooks and podcasts, but I hate having to deal with several different applications.

← I obtained Sabina's black text with an automatic translator directly from the video and rewrote it here. Then I wrote my notes in red in black text.

I wish someone good and accommodating could be found and translated this text into English aby. So that physicists, outside the Czech Basin, could finally read it… and think about it.

JN, 21.05.2021

// I believe that there will be an expert in both physics and English who will correct the google translation so as not to distort the meaning and essence of interpretation //