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The Huge Flaw in Quantum Mechanics Few Physicists Take Seriously

Obrovská chyba v kvantové mechanice Jen málo fyziků to bere vážně

Curt Jaimungal

420 tis. odběratelů

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← Obrovská chyba v kvantové mechanice Jen málo fyziků to bere vážně Curt Jaimungal 420 tis. odběratelů 26 934 zhlédnutí 10. 1. 2025 ✪ Pro členy už 9. ledna 2025 #science #physics #theoreticalphysics Hlavní epizoda s Rogerem Penrosem na IAI: • Potřebujeme „gravitovat" kvantovou mechaniku... a primární web Institutu pro umění a nápady je zde https://iai.tv/ Rozhovor s Rogerem v Oxfordu: • Největší žijící vědec 20. století... Připojte se k mému novému Substack (osobní příspěvky): https://curtjaimungal.substack.com Poslouchejte na Spotify: https://tinyurl.com/SpotifyTOE Staňte se členem YouTube (videa s předběžným přístupem)

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(01)- Quantum mechanics has a huge flaw, and the flaw is the collapse of the wave function. Most physicists say, "well, it's a function of things getting big and complicated." My view is the opposite of that. Trouble is that these procedures fundamentally cheat. You have to gravitize quantum mechanics. Sir Roger Penrose, welcome. It's good to have been spending almost the entire day with you since you've been here. My pleasure. What are you most proud of in your career? I think twistor theory would be the thing which probably I'm most proud of, in the sense that there's more in it. I mean, it was an idea that I had basically in 1963, I guess. And now, just now, there is a workshop in Cambridge which is devoted to

twistor theory. All sorts of people, and there are different aspects of the subject which is spread out into pure mathematics and into some areas of particle physics and things like that. So it's spread out. Not necessarily the form of the theory which I initiated, but nevertheless, the same sort of idea. Now, to explain what twistor theory is would be a little technical. It's an area of mathematics, I might even just say that, which was developed specifically to treat certain fundamental issues in quantum theory in relation to relativity theory too. So it's all tied up with that. But let's not go into that because it's a bit too technical. But on the other hand, I would say that there are two things. One is what people call the D.O.C. Penrose model. It's a different model exactly, but it's the same time scale. You see, there's a thing called the collapse of the wave function, which tries to make sense of quantum mechanics. Quantum mechanics doesn't make sense when you talk about macroscopic objects. What I mean by that is, it's a theory of small things, of particles and so on. And people sort of say, well, big things are made up of small things, so a theory of small things must be more fundamental than a theory of big things. Well, the best theory of big things that we have is general relativity, which deals with black holes and stars and galaxies and the way the universe as a whole behaves and things like that. And since people think that small things are more fundamental than big things in a sense, there's a big project which is to quantize gravity. That means use the rules of quantum mechanics and apply them to gravitational theory. And since quantum theory is the more fundamental, so the argument goes, that's the way you've got to do it. Now, my view is almost the opposite of that. You have to gravitize quantum mechanics because quantum mechanics has a huge flaw. And the flaw is basically the collapse of the wave function. What do I mean by that? Well, you see, there's a thing called the wave function, which evolves according to a very famous equation, the Schrodinger equation. The wave function describes the quantum system, the quantum state, if you like. So the state of the world, according to quantum mechanics, can be described by this kind of wave function. Now, the Schrodinger equation tells you how this evolves in time. So if you knew what the wave function was now, it would tell you what it was in 10 minutes, what it was in 20 minutes in the next day, and so on. If it was completely isolated. Of course, it's not. It tends to get perturbed by the outside world, and people seem to regard that as the important thing, why you can't really use the Schrodinger equation. But that's not my view. See, what you do is you develop the system according to the Schrodinger equation, and then you cheat. You do what's called you collapse of the wave function, which means you make a measurement on your system, and this measurement has a certain view as to what the alternatives can be, and the state may not be in one of those alternatives. And so you have a rule for how you proceed. And this involves the system evolving not according to the unitary evolution, as it's called, or the Schrodinger equation, or whatever you want to call it, but another phenomenon which is called the collapse of the wave function. Now, most physicists seem to say, well, it's a function of things getting big and complicated, and you can't really apply the Schrodinger equation because the system's got too complicated. So you develop systems, mathematical formalisms, to try and deal with that complication and sweep it under the carpet. The only trouble is that these procedures slightly cheat, or really fundamentally cheat, I should say. They change the view as how you regard reality. Is it described by the wave function, or is it something else? And you introduce this something else, which is called a density matrix, and that density matrix is supposed to be a better description of the world because it includes all the random things. And then you go back and say it describes a probability mixture of
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(01)- Quantum mechanics has a huge flaw, and the flaw is the collapse of the wave function. Most physicists say, "Well, it's a function of how things get bigger and more complicated." My opinion is the opposite. The problem is that these procedures fundamentally cheat. ?? You have to gravitate quantum mechanics. No, Mr. Roger. You have to do something else. On the contrary. You have to take the gravitational constant out of the OTR, that is, **take the dimensions out of the gravitational constant**. Then you find that the equivalence principle finally holds and that both equations are linear. QM, when using additional extra dimensions, becomes an equation for interactions for elementary particles, which are built from the dimensions of two space-time quantities. https://www.hypothesis-of-universe.com/index.php?nav=e ; https://www.hypothesis-of-universe.com/docs/aa/aa_415.pdf ; Just yesterday (10.01.2025) I wrote a plea to the professional community on my website, in which I describe **Penrose's problem and my problem**, which are ONE problem in the opposite direction. https://www.hypothesis-of-universe.com/docs/aa/aa_428.pdf . Penrose wants to gravitate QM to be nonlinear and I, on the other hand, want to "cancel the nonlinearity of OTR to be linear" by removing the dimensions that were fraudulently added to the gravitational constant...so we both want the same thing with opposite approaches. Sir Roger Penrose, welcome. It's been great to spend almost the whole day with you since you've been here. My pleasure. What are you most proud of in your career? I think twistor theory would be the thing I'm probably most proud of, in the sense that there's more to it. More of what? I think it was an idea I had in 1963, I think. And now, right now, there's a workshop in Cambridge that's on twistor theory. All sorts of people and there's different aspects of the subject that's spread out into pure mathematics and into some areas of particle physics and things like that. So it's spread out. Not necessarily the form of the theory that I initiated, but still the same kind of idea. Now to explain what twistor theory is would be a bit technical. It's a field of mathematics, I would even say, that was developed specifically to solve certain fundamental **problems in quantum theory in relation to the theory of relativity**. That is, to try to combine nonlinear theory with linear theory. Roger wants to make both nonlinear and I want to make both linear. https://www.hypothesis-of-universe.com/docs/aa/aa_415.pdf ; So it's all connected to that. But let's not get into that, because it's a little too technical. But on the other hand, I would say there are two things. One of them is what people call the D.O.C. Penrose model. ??? It's a different model exactly, but it's the same time scale. You know, there's this thing called wave function collapse that tries to make sense of quantum mechanics. Quantum mechanics doesn't make sense when you're talking about macroscopic objects. O.K. I mean it's a theory of small things, particles, and so on. Yes, QM is a theory for the interactions of "small particles." For example, here's a sample: (())(()) And people kind of say, well, big things are made up of small things, so the theory of small things must be more fundamental than the theory of big things. The best theory of big things we have is general relativity, O.K. which deals with black holes, stars, and galaxies, and how the universe as a whole behaves, and things like that. O.K. But OTR cheats in the sense of "assigning dimensions to the gravitational constant," making it a linear equation with dimensional balance. Roger Penrose wants to gravitate QM (change the linearity of quantum mechanics to nonlinearity, I don't know how), and I, on the other hand, want to gravitate OTR (change the linearity of OTR (1 = G.M/c2.x) to nonlinearity by removing dimensions from the gravitational constant). And because people think that small things are in some sense more fundamental than big things, there is a big project called quantizing gravity. Quantizing gravity is like taking a geometric parabola and cutting it into infinitesimal segments and then putting those segments back together, you get the line (that you want). That's the scam...that I pointed out 20 years ago. Quantizing gravity is the same thing in pale pink. It's a scam. Linearizing a parabola is a scam. That means taking ||the rules of ||quantum mechanics and applying them to gravitational theory. No, that won't solve it. And since quantum theory is more fundamental, the argument goes, you have to do it. Now my opinion is almost the opposite. ??

You have to gravitate quantum mechanics, No, that won't solve the problem… because quantum mechanics has a huge flaw. And the flaw is basically the collapse of the wave function. What do I mean by that? Well, you see, there's this thing called the wave function that evolves according to a very famous equation, the Schrödinger equation. The wave function describes a quantum system, a quantum state, if you will. Which are, in a sense, the interactions of elementary particles. I discussed the connection between quantum mechanics and OTR here: https://www.hypothesis-of-universe.com/docs/h/h_068.pdf r. 2018. (Nobody read, nobody helped, nobody had objections, counterarguments). (to this day). So the state of the world can be described by this kind of wave function according to quantum mechanics. Now the Schrödinger equation tells you how it evolves over time. So if you knew what the wave function was now, it would tell you what it would be in 10 minutes, what it would be in 20 minutes the next day, and so on. If it were completely isolated. Of course it isn't. It tends to be perturbed by the outside world, and people seem to think that's an important thing, why you can't actually use the Schrödinger equation. But that's not my view. You see, what you do is you evolve a system according to the Schrodinger equation and then you cheat. ?? You do what's called wave function collapse, which means you take a measurement on your system and that measurement has some insight into what the alternatives might be, and the state might not be in one of those alternatives. And so you have a rule of thumb for how you're going to proceed. And that involves a system that doesn't evolve according to unitary evolution, as they call it, or according to the Schrodinger equation, or whatever you want to call it, but according to another phenomenon called wave function collapse. Most physicists seem to say, well, it's a function of how things get bigger and more complicated, the system gets more complex as I call it → … https://www.hypothesis-of-universe.com/docs/eb/eb_002.pdf and the Schrödinger equation can't really be used because the system is too complicated. So you develop systems, mathematical formalisms, here is an example of the interaction of my "packages" of two-dimensional quantities https://www.hypothesis-of-universe.com/docs/eb/eb_006.pdf ; to try to deal with this complication and sweep it under the rug. The only problem is that these procedures cheat slightly, I'm not cheating... or really cheat fundamentally, I would say. They change the way you perceive reality. Is it described by a wave function, or is it something else? And you introduce something else called a density matrix, and that density matrix is supposed to be a better description of the world because it includes all the random things. And then you come back and say that it describes a combination of probabilities

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(02)- different states, different quantum states. In there is a little glitch of logic, which people like to sweep under the carpet. And what you have actually collapsed the wave function without saying it out loud. And the collapse of the wave function does not follow the Schrodinger equation. And I think most people in physics, certainly in the old days of physicists, I'm not sure what they think now, would think that the collapse of the wave function is not a real phenomena. It's something to do either with the environment getting

mixed up with it, or more plausibly some people would argue, by a conscious being coming and looking at the system, or doing an experiment on the system, measuring the system. In fact, the word measurement is used in quantum mechanics. You measure the system and that involves secretly the collapse of the wave function, but you shovel that under the carpet. So none of these arguments really do explain why quantum mechanics works. And when I say gravitizing quantum mechanics, the solution to this problem, in my view, has to involve gravity. Because the collapse of the wave function, in my view, is a real physical process. It's nothing to do with a conscious observer looking at the system or anything like that. It's a real physical process, which takes place when the system gets too big, in the sense of gravitation. And I can describe it as being, well, the sort of stage when people argue that things go classical beyond quantum, is the Planck mass. And the Planck mass is the mass of a flea's eye, roughly speaking. So it's pretty small, but not ridiculously small. In fact, it's not really very small, because if you had something of the mass of a flea's eye and you moved it into a superposition here and here at the same time, you can do that with protons and electrons and things, it can be here and here at the same time, and that's a perfectly good quantum state. Why don't you see a stone, why don't you see a pebble here and here at the same time? Well, people say, well, it's all to do with measurements and all that stuff. Well, I would say, no, there is a phenomenon, which is the collapse of the wave function, which actually happens at a certain level, and you can work out how fast it happens using this formula. And this formula was independently and earlier than me, done by Lajos Djosi, and he had a different argument. I don't even remember his argument. He was about two years earlier than me. I didn't know about his argument. I produced my argument later on as rather surprised to find that he's already done it. He hadn't done it in the sense of the argument that I presented. I don't think his argument was necessarily a gravitational field argument. So what was the same about it? It's the same lifetime. You see, it says that the decay time, you put a grain of sand into a superposition of here and here, how long will it take before it becomes one or the other? And the formula that he came up with is basically the same as the formula I came up with. And I'm arguing this from this tension between the gravitational theory, Einstein's gravitational theory, which it has to be Einstein's theory, and this superposition principle. See, Einstein's theory was based fundamentally, which really a principle goes back to Galileo. Galileo stated it very clearly, that if you fall freely in a gravitational field, the gravitational field disappears, in effect, locally. And I almost like the example he gave of fireworks. The fireworks go up, bang, and then the sphere of sparks, the sparks accelerates downwards as it falls, but it remains a sphere. So it remains the same shape as though there were no gravity. And he talked about big rocks and little rocks falling, and he knew that if you drop a feather it won't fall so fast because of air resistance. He really knew all these things. He was extremely insightful on these issues. But the main point he was making was the principle of equivalence. That is to say, if you fall freely in a gravitational field, you've got rid of it. We now know, we see the astronauts going around and they float around. They don't even worry about the Earth sitting like, well, there's that Earth, why don't I fall down to it or something? Field of drag of the Earth's field, I mean, no, it's the principle of equivalence says when you fall freely under gravity, it eliminates the field altogether, locally. And Einstein played on that thing and made, you see, you can get rid of it in Pisa, if you like, by just falling freely, but that doesn't get rid of it in New York. You've got to have a theory which allows this freefall aspect of the theory to be global. And that led Einstein into this non-Euclidean geometry picture. Great tremendous insight that he was able to see that you
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(02)- different states, different quantum states. All of this can be described in terms of packages of dimensions of quantities… There's a bit of a logical fallacy in that that people like to sweep under the rug. And what you've actually done is collapse the wave function without saying it out loud. And the collapse of the wave function doesn't follow the Schrodinger equation. And I think most people in physics, certainly in the old days of physicists, I'm not sure what they think now, would think that the collapse of the wave function is not a real phenomenon. So Roger, you still have some deficiency, a problem even if you "gravitate" QM… It's something to do with either the environment that gets mixed in with it, or more likely some people would argue that a conscious being comes in and looks at the system, or does an experiment on the system, measures the system. Actually, the word measurement is used in quantum mechanics. You measure the system and that secretly means the collapse of the wave function, but you sweep it under the rug. So none of these arguments really explain why quantum mechanics works. And when I say gravitating quantum mechanics, the solution to this problem, in my opinion, has to involve gravity. Because the collapse of the wave function is, in my opinion, a real physical process. It has nothing to do with a conscious observer looking at the system or anything like that. It's a real physical process that happens when a system gets too big, in the sense of gravity. And I can describe it as the stage where people say that things go beyond quantum classically, is the Planck ~~matterie~~. mass. And the Planck mass is the mass of a flea's eye, roughly speaking. So it's quite small, but not ridiculously small. It's actually not very small, because if you had some of the mass of a flea's eye and you moved it into a superposition back and forth at the same time, you could do that with protons and electrons and other things, it could be here and here at the same time, and that's a perfectly good quantum state. Why don't you see the rock, why don't you see the pebble here and here at the same time? Well, people say, well, it all has to do with measurements and all that stuff. Well, I would say no, there is a phenomenon, which is the collapse of the wave function, which actually happens at a certain level, and you can use this formula to figure out how fast it happens. And this formula was independently done before me by **Lajos Djosi**, and he had a different argument. I don't even remember his argument. He was about two years older than me. I didn't know about his argument. I later made my argument as if I was a bit surprised to find out that he had already done it. He didn't do it in the sense of the argument that I made. I don't think his argument was necessarily the gravitational field argument. So what was the same? It's the same lifetime. You see, they say the decay time, you put a grain of sand in a superposition here and here, how long does it take for it to become one or the other? And the formula that he came up with is basically the same as the formula that I came up with. And I argue this based on this tension between the theory of gravity, Einstein's theory of gravity, which has to be Einstein's theory, and this principle of superposition. You see, Einstein's theory was based on principles, which really goes back to Galileo. Galileo said it very clearly, that if you fall freely in a gravitational field, the gravitational field essentially disappears locally. And I almost like his example of fireworks. The fireworks go up, they pop, and then the ball of sparks, the sparks accelerate downward as they fall, but it remains a ball. So it stays the same shape as if there was no gravity. And he talked about big rocks falling and little rocks falling, and he knew that if you drop a feather, it doesn't fall as fast because of air resistance. He really knew all these things. He was extraordinarily bright about these things. But the main point he made was the "equivalence principle." That is, if you fall freely in a gravitational field, you've got rid of it. Now we know, we see astronauts walking around and floating around. They don't even care that the Earth is sitting there like, well, there's the Earth, why don't I fall on it or something? The repulsion field of the Earth's field, I mean, no, it's the equivalence principle, it says that when you're free-falling under gravity, the field completely cancels it out locally. And Einstein played with that thing and did, you see, you can get rid of it in Pisa if you want, by free-falling, but you can't get rid of it in New York. You have to have a theory that allows this aspect of the theory of free fall to be global. And that led Einstein to this picture of non-Euclidean geometry. Great amazing insight that he could see you

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(03)- had to discuss non-Euclidean geometry to describe the theory. And I don't really understand where he got that insight from. I mean, he's right. Absolutely right. I mean, a lot of the motivations he had weren't right. You had this rotating disk or something, and that argument isn't right. Various arguments he had, when you look at it, you know, they're not really quite right. But the general idea, the need, you had to go to a non-flat theory was absolutely correct. And theory is now determined to a precision comparable with quantum mechanics. They sort of, I don't know what the details are now, but they're about as well tested as each other in the sense of precision. Were you ever led to a conclusion or a result or a theorem that is correct, but when you look back, your reasoning was also similarly muddled? The full video is from the Institute for Arts and Ideas. The link is on screen and in the description. It was an honor to speak with Sir Roger Penrose for hours, both off air and on air. There's also a longer, separate interview at the Math Institute at Oxford on this channel, if you're interested. I also hosted some of the panels at this year's festival at the Institute for Arts and Ideas, one on consciousness slash the present moment, and the other about the end of evolution. Those videos may already be available in full if you search the Institute for Arts and Ideas

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(03)- musel diskutovat o neeuklidovské geometrii, aby popsal teorii. A opravdu nechápu, kde se k tomu vhledu vzal. Chci říct, má pravdu. Naprosto správně. Chci říct, že spousta motivací, které měl, nebyla správná. Měli jste takový rotující disk nebo co, a tento argument není správný. Měl různé argumenty, když se na to podíváte, nejsou tak úplně správné. Ale obecná myšlenka, potřeba, musíte jít na neplochou teorii, byla naprosto správná. A teorie je nyní určena s přesností srovnatelnou s kvantovou mechanikou. Jsou tak trochu, nevím, jaké jsou teď detaily, ale jsou asi tak dobře otestované jako jeden druhý, pokud jde o přesnost. Byli jste někdy vedeni k závěru, výsledku nebo větě, která je správná, ale když se podíváte zpět, vaše úvahy byly také podobně zmatené? Celé video pochází z Institutu pro umění a nápady. Odkaz je na obrazovce a v popisu. Bylo mi ctí hovořit se sirem Rogerem Penrosem celé hodiny, a to jak ve vysílání, tak ve vysílání. Pokud vás to zajímá, na tomto kanálu je také delší samostatný rozhovor na Math Institute v Oxfordu. Hostoval jsem také některé panely na letošním festivalu v Institutu pro umění a myšlenky, jeden o vědomí omezování přítomného okamžiku a druhý o konci evoluce. Tato videa již mohou být k dispozici v plném znění, pokud vyhledáte v Institutu pro umění a nápady

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