Colorado State University Libraries
Department of Philosophy
Rolston (Holmes) Collection
Transcription of History - Big Bang: Start up!! Setup? (Three Big Questions), 2012-02-16

Item Metadata

Collection: Streaming Media
Creator: Rolston, Holmes, 1932-, speaker
Title: Big Bang: Start up!! Setup? (Three Big Questions)
Date: 2012-02-16
File Name: Rolston_Big_Bang_Start_Up_Setup.mp4
Date Transcribed: Apr 2023
Transcription Platform: Konch

BEGIN TRANSCRIPTION

[00:23 - 03:59] Terry: Okay. Thanks for coming out. Thanks for Roger and Sandy coming along to set me straight. And let's see what we think. There's been a big bang. That's a start up. I think you saw a title, start up or set up. That's not the title I chose. There's no doubt about the big bang being a start up. Maybe there is some doubt about it being a set up. We're going to think about that. So we are dealing with this huge, well, what? Singularity explosion some 13 billion years ago. And immediately after the startup, just in the first microseconds, it's thought to have been a great inflation, faster than the speed of light. You might say, well, you taught me nothing can go faster than the speed of light. Yes. Well, I think space can expand, apparently, faster than the speed of light. In any case, we've got a kind of a huge explosion, a big fireball. And after that, we've got inflation with an even more gigantic explosion, and the universe since then has been expanding. Here's the way Nasa launched a picture of that kind of Inflation. You can't maybe read the details. And then creating a host of stars. The little gadget in the center of the cone is the Wilson Microwave Anisotropy Probe, that has gathered much of this data. So that's the kind of universe we have. And the conditions it's thought of this universe are unique. If you want a fancy word for that, it's idiographic. And yet, at the same time, when this universe gets going, it produces a universe that's quite low like. The corresponding fancy word for that is nomothetic. You'll meet physicists once in a while who say they are searching for a theory of everything.

[04:01 - 07:56] That phrase has a certain grandiose sound. It also has a certain arrogance, maybe even a bit of humor. It was a kind of original startup singularity. Can we have about it the Theory of Everything? Well, Lisa Randall, Harvard astronomer, says that's a horrible misnomer. I mean, the idea is, well, it's a theory about, well, the fundamental characteristics of the universe. It might explain the connections between gravity and electromagnetic force or something. But this theory is not going to explain who's going to win the next presidential election or any such details in the universe as that. So it's a kind of search for a fundamental universe theory that might explain the start up. All right. And we do find this universe has a kind of comprehensibility. Eugene Wegner, Princeton physicist, "The enormous usefulness of math in the sciences is something mysterious. There's no rational explanation for it. It's a kind of miracle that mathematics is as appropriate as it is in the universe in which we live." Here's Paul Dirac, the physicist. What physicists like about the theory of relativity is its great mathematical beauty. Roger Penrose in physics at Oxford, "Einstein saw gravitation spaced with new eyes. Gravitation is a feature of curved spacetime, and he produced an elegant equation." Elegant equation. The paradigm of a beautiful equation. Are you ready? Beautiful equation. Well, most of you have gotten into things about that complicated at least. Generally speaking, what's on the left hand side is the spacetime curvature and what's on the right hand side is the distribution of mass energy density in the universe. G is the gravitational constant. T is energy momentum tensor. And so you have an equation then, which fits the curvature of space time and with mass energy of the universe. And a lot of physicists, astronomers are like, well, there's something remarkable about the mathematical qualities of the universe.

[07:57 - 11:01] John Wheeler, Preston physicist. Garner wrote the text for many years on gravitation. It's a mathematical world. And if you get to the bottom of it, that's all it's gonna be. And Steve Hawking, Cambridge physicist, mathematician. Many of you have read his brief history of time. "Even if there's a theory, it's just a ruse equation. Something's got to make the theory real, breathe fire into the equations and make a universe for them to describe. The mathematical model can't answer the question of why there is actually a universe that the model describes." John Wheeler, that Princeton physicist says, "We live in a universe that gets its from bits." Hmm. Well, it's things. Objects processes from bits information. We've got people nowadays who say in some sense the universe is a computer. I think that might be a bit too simple and a bit not complex enough. Maybe much in the universe is just cause and effect systems, not computing. And maybe a lot that goes on in the universe can't be put into a computer. But in any case, we're getting at the idea that there's a kind of an elegant simplicity to the universe at the same time that it generates novelty and complexity. Here's Martin Rees, perhaps the best known astronomer in Britain today. Well, maybe you're going to get a magnificent equation you can wear on your T-shirt one day that shows how the properties of the universe are fixed. And that would be fact of the matter. "But Rees continues, "It still

be something to wonder about. It's not guaranteed that simple equations permit complex consequences. Paul Davies, a British astronomer while in Australia. He's now in Arizona. He says, "We hit the cosmic jackpot." That's an interesting comment for an astronomer.

[11:04 - 14:25] We got a universe that's just right for life. Well, let's develop that a little bit. We did say we have a universe that's expanding. And you may say, well, looks like to me 13 billion years is a long time to be expanding. But it is expanding and indeed, although it's of great age. Now I think we feel that the expansion rate is speeding up, now that we know something about dark energy, dark matter. Here is John Barrow, Cambridge cosmologist, mathematician. You know, when you look up at the sky at night, the vast universe, it's huge, aged. It's a lonely, dark out there in space. And yet, he continues, that has to be there for us to be here. You know, that's up above us. If we were outside maybe we feel lost and lonely, but we've just been told by an eminent physicists, mathematician, cosmologist, that if the stars weren't up there, we wouldn't be down here. Well, there's an idea called the anthropic principal. I wish it had been called that. I think it would have been better if it had been called the biogenic principle. And what does it say? It's got the idea that if you change around the features of the universe, very much everything stopped. Nothing could happen. For example, there are four fundamental forces, gravity, electromagnetism, you know about those, but we've got to have a strong nuclear force that keeps the atomic nucleus together and we also have a weak nuclear force. And if they weren't about what they are, there wouldn't be any heavy elements heavier than helium, hydrogen, and we wouldn't be here. You know, if the electron and proton are very different particles, but they have the same charge, right?

[14:25 - 17:50] If the charge weren't the same, there wouldn't be the kinds of chemistry that make Earth possible, that make life on earth possible. There's an item called the Cosmological Constant, often abbreviated with the Greek letter lambda. It's pretty small. I mean, if we write it out as an ordinary decimal, it's pretty small. I mean, I'm trying to tell you it's pretty small. Have you got the idea? Hahaha. Now, interestingly, if it were zero, we wouldn't be here. What if it were much bigger, we wouldn't be here. Here's Martin Rees again, British astronomer. "Lambda weakest force in nature seems to control the universe's expansion and fate. Our existence requires that Lambda should not have been too large." Well, there's another one often abbreviated with the Greek letter Alpha, called the fine structure constant. It's small, not that small. If we were to write that as a decimal, the fraction, it would look something like this. This controls the strength of the electromagnetic force in relation to the strong nuclear force, which is to say it controls what kinds of elements can be made, right? Change that just a little bit, one direction or the other and you'd have no protein chemistry. You'd have no carbon. In fact, the carbon chemistry is kind of interesting. Fred Hoyle, Cambridge astronomer, worked on that. And the idea is that the stars, carbon is, well, various things are

transformed into carbon, and carbon is transformed into oxygen, but not all of it is, right? So you get some carbon remaining and some oxygen form. And Fred Hoyle was really stunned by the sort of way in which this was fine tuned. Here's what he wrote. "You might think some super calculating intellect had designed the carbon atom. We wouldn't find an atom like this through the blind forces of nature." Hoyle continues. "You'd conclude the carbon atom is a fix."

[17:53 - 21:15] Well, super intellect edge market with the physics. You know, you might think Hoyle would show up in church the next Sunday, but he never did. But he still thought this was- He remained an atheist, but he still thought this was a staggering coincidence. Main idea now is that all the elements pass hydrogen, helium, maybe once in a while, a little beryllium with all the carbon and all the iron and all the phosphorus that's in our bodies, all the silicon in the rocks on earth is made in the stars and then gets dispersed in stellar explosions and then gathers into planets. So if you just kind of want to hold up your hand and look at it, you can think of yourself as fossil stardust. Or if you've really had a bad day, you could think of yourself as nuclear waste. A typical idea is that, well, a lot of this is automatic. It's self-organizing. And there are indeed those kinds of processes there. Peter Ward, Don Brownlee, University of Washington, paleontology, "Earth got it just right." It looks right, right? Well, compare Earth with the surface of the moon, also composed of those heavy elements. Think about this marvelous planet that we inhabit. Looks like here's one planet at least that got it right. You want to think that all this that happen above us is in some sense predictable? Or is it surprising? Well, it's hard to get a handle on that. Here's John Polkinghorne, a mathematical physicist, taught mathematical physics at Cambridge for a number of years, and after he said he thought he had all the good ideas in physics he might get, he actually became an Anglican priest.

[21:18 - 24:00] Universe started simple, big pile of energy. And now, we've got science and scientist. Well, what on account. "We've come to see," he says, "well, it's kind of all built into the universe at to start. Built in at the start." See, that's the idea that it's a deterministic process. And I do think if you'd been a clever chemist, shortly after the Big Bang, you might have been able to predict the periodic table that's in every chemistry lecture hall on campus. You might have been able to predict 32 crystal classes. That's a matter mostly of the way things could be packed in space. You might have been able to say, well, here's hydrogen. When it gets with oxygen, it's gonna do this and it's gonna form water, and that molecule is going to be positive on one hand and negative on the other. I think you might have been able to say early on in the universe that there's going to be rivers. If there's liquid water, there's going to be canyons, there's going to be oceans. So, you know, the idea is that a lot of this might be front loaded into the system. But is it all> We seem also to be dealing with an enlarging possibility space. You know, there's iron in meteorites. You go down here to the meteor crater in

Arizona and there might be some iron around. And it's possible, I think, that some of that iron in the meteor or another meteorite could get into your bloodstream.

[24:01 - 27:21] And I think it would function and your hemoglobin. Then you want to say then that an iron molecule always has that possibility of badgering into hemoglobin. Yes, I think an iron molecule coming in here on an asteroid could go into my hemoglobin in my blood. But I don't think it follows that an iron molecule has that possibility without enormous amounts of information that's coded into the DNA, all right? So to kind of question how much of it is built in, how much of it develops, opens up? Well, let's imagine some beings from outer space fly by Saturn, Jupiter, Mars and then they say, well, Saturn looks kind of interesting. Jupiter's got a great red spot. Mars is not too interesting. And one of them turns to the other and says, but I just can't wait to get to Earth. I want to see those elephants. Maybe knowing enough astronomy, you might predict there'll be planets with rings. You're not going to get anywhere in an astronomy book, the idea that, yes, there will be earth with its elephants. Bill Stoeger. He's an astronomer at the Vatican Observatory. He's also a Jesuit priest. "God creates the universe from nothing, holds it in existence at each moment." Many theologians have said that. But now we get the idea that God is what? Struggling, working, processes of cosmic biological social evolution, coaxing toward the realization of its destiny. So, yeah, you get the idea that, yes, a lot of the possibilities are there. But still, that has to be in some surprising ways, developed and realized. And now here's Polkinghorne a minute ago, who sort of said it was all there in the beginning.

[27:23 - 30:47] But now, Polkinghorne says, it's not performing a fixed score. So to always written by God inexorably performed by the creatures. It's an improvisation, he says. The creator and the creatures cooperate, unfolding the Grand Fugue of Creation. Determinant ends achieve the long contingent parts. You're going to have people say various things. They're going to say, well, maybe there are many universes. Many, many, many universes. The universe's always been bigger than we thought. Maybe there are many universes. And what? And this one's a lucky one, which explains these anthropic coincidences. You're going to hear other people say it's like this. We got a lot of people sitting in this room. Every one of you, most things die when they are young in the history of life. And you have had predecessors in the history of life for some five billion years. And guess what? All your ancestors survived to reproductive age. Are you surprised? Could be any other way. All the people here to be surprised are those whose ancestors lived to reproductive age, right? So they all say, well, this anthropic principle is like that. I don't think that's a good analogy. If your ancestors hadn't survived the reproductive age, others would have. So it's no surprise that there are living beings on life on earth today and have been for a billion years. Maybe that's wonder enough, but it isn't a dramatic surprise that some people are thinking about their past. Reason that's not a

good analogy where the tropic principle is, there, there's either a sort of pregnant universe or nothing at all. No heavy elements, no nothing, all right? So we've got a sort of an assignment on our hands of what to make of this universe in which we live.

[30:53 - 32:50] Roger Penrose, a cosmologist. It was an extraordinarily special big bag. Not all intelligent physicists think that way. Here's Steven Weinberg. Won a Nobel Prize in physics. Longer at MIT. Long at Harvard and other places. Jewish atheist, Jewish background. Book, First Three Minutes. The more the universe seems comprehensible, the more it seems pointless. Well, looks like we've got different accounts of what to make of this universe. I'm wondering as we go now to our discussion, maybe in some sense the startup looks like a set up or at least it is, as we philosophers say, necessary, though perhaps not sufficient for what comes after. If those kinds of things were in the sky, we wouldn't be here wondering about it. Panelist, join me, please. Here.

[32:51 - 32:54] Terry: Sandy or Roger, are you going to start out with a question that Holmes was kind of-

[32:58 - 32:58] Sandy: No, I'll give an answer.

[32:58 - 32:00] Terry: Okay. Give us answers then.

[33:00 - 33:01] Holmes: Sandy Khan.

[33:02 - 33:02] Sandy: Yeah.

[33:02 - 33:04] Holmes: I taught physics a long time.

[33:06 - 33:06] Roger: Very long time.

[33:07 - 33:07] Sandy: This one is not working.

[33:07 - 33:11] Terry: Try this.

[33:12 - 33:14] Sandy: I taught a very long time.

[33:17 - 33:19] Holmes: But now he's teaching in the Opera, right?

[33:19 - 33:30] Sandy: Yeah, I'm teaching an Opera course. But this is true. This is something I saw to answer something that-

[33:31 - 33:34] Terry: Can you put the microphone closer to your mouth? Perhaps you have to eat it, I don't know.

[33:34 - 35:47] Sandy: I saw a billboard maybe 10, 12 years ago outside Lafayette, Indiana, right off I-65. This is true. And it said, if your parents didn't have any children, neither would you. But I think that fits in with what Holmes was saying. But one thing I would like to address is the idea of a set up. It seems whatever we don't understand, we ascribe to some kind of undetectable sources, which, as a scientist, means that it's untestable and therefore it's outside science. So I'd like to say that pulling in scientific data to prove your point here I think is pointless. And let me give you another little example, then I'll let Raj bang away. Several years ago, the eminent physicist, Richard Feynman, was going to give a talk to one of our conferences. And as he entered the- As he was coming to the convention center, he looked at an automobile. And then when he went in, he started his talk with, you know, just as I was coming in here, I saw a car with the license plate. Da da da da da da da. Now, what are the chances in the universe that I would ever see a car with that license plate number? I think we have to take the- Let me sum this. Let me sum this all up, is kind of the way I think about it. I think it's, we are here because that's the way it worked out. Not, it worked out that way because we're here. Shall I repeat?

[35:48 - 35:49] Holmes: Yeah.

[35:51 - 36:00] Sandy: I think it's, we are here because that's the way it worked out. Not, that's the way it worked out because we here. We're giving all these little special little bit to prove that there's essentially some intelligent design, whereas in fact, you mentioned multiple universes, if you go along with multiple universes, there are many of them, some of which worked out the way ours did with some kinds of laws, physical laws that maybe the same as ours are different. And there's even a possibility that there are an infinite number of these multiple universes, which fortunately or unfortunately, may mean that there's somewhere a group of people looking very much like you being bored to tears by a group very much like us. So there's a lot and there's more I want to say, but let me pass the baton.

[37:02 - 39:30] Roger: Thank you. I have to echo a lot of Sandy's comments. When you do science, you basically are trying to construct a description of the physical world, okay? Not just the physical world. And that scientific philosophy has been enormously successful over the last three and a half centuries since the so-called scientific revolution in the 17th century. And it is a philosophy that is designed by and for the physical sciences or the social sciences that trying to apply these methods in their field with some success. But it is, when you start talking about intelligent design or some sort of supreme being, this right away falls outside of that room. In other words, I cannot construct an

experiment to, I'd say, discriminate among the various religions of the world. I can't get a Jewish rabbi or a Roman Catholic priest or a Protestant minister or a Hindu monk or a Muslim Mullar have them all standing up in front of you with their rods thrown down on the floor as the one that turns into the snake. Okay? That's when you look and you watch. We can't do an experiment like that in the sciences. And as a result, it's really, you're basically talking about two different worlds. Now, there are certainly relationships. I mean, Galileo, who was put on trial by the church in 1633, his comment was that mathematics is the alphabet with which God is written the universe, okay? Very much an idealist and believer, but that describes the universe. It doesn't really address the fundamental question of, okay, where did all this come from? What was it before the Big Bang? And the problem fundamentally, and I can sum it up, is that you either have to do one of two things in discussing those kinds of questions, where did the universe come from and so on.

[39:31 - 41:39] You either have to internalize the universe or you have to internalize a supreme being who built the universe in some fashion. And the uniqueness of the earth may not be all that unique, okay? We have, as a result of space age, a number of places in the solar system where lifeforms might exist, Mars, in Surtur, one of the satellites of Saturn, where you have water geysers on that satellite, Ganymede and Europa, where you have possibly water worlds, where you have a rock mantle surrounded by a layer of water overlaid by ice. And as soon as you have water someplace, you have life as we know it. And you have a place like Titan, where you have methane and that exists as a gas. You can breathe the methane atmosphere, you can go ice skating on frozen methane lakes, and you can have methane range. You can walk in a methane rainstorm. Now, does that mean that you have a center at this triple point that lifeforms can develop there? We don't know. We do know that in the same meteorites that bring us iron also have been found to contain amino acids. Now, the jump from an amino acid to a simple protein is not that much. And what it tells us and what astronomers have found, and particularly over the last 20 or 30 years, is that there are a lot of amino acids that are extraterrestrial in amino acids. And that means that there are processes in outer space that are building these very large atomic number, atomic weight molecules in outer space. And so if that's going on, to what extent might that the jump we made? In recent years, the other thing that's been happening, as you've probably all have heard about, extrasolar planets, planets going around other stars. Okay, that number right now, the last I looked was about 550 of these things.

[41:39 - 42:07] ghAnd some of those are far as starting to get down to earth sized planets, with the planets like the Earth in very in the last few days, there has been a water planet about the size of the earth. Okay, well, that's starting to sound like the earth. So we don't know all of the of the universe.

It's amazing. I've been an astronomer. I actually top Sandy. I've been at CSU for 46 years, and mainly because I can't get a job any place else. [Laughs]

[42:09 - 42:12] Sandy: I don't know whether that's a plus. That's not a plus, Roger.

[42:12 - 43:01] Roger: Well, that's what I'm saying, you know, I can't get a job someplace else. But anyway, uh, astronomy has always been fascinating to me because the more you find out, the more there is to find out. And I'm not sure that will ever. In fact, I don't believe we will ever get a so-called total, a theory of everything, okay? And so, uh, it's great fun to uncover this magnificent universe, but as far as where it all came from, in Christian tradition, you have what is called, I grew up a Catholic kid, you have the so-called cardinal virtues. Okay? And the first of these is faith and then hope and then charity or love. Notice which one's number one, faith.

[43:03 - 43:07] Sandy: I would just like to add something, if I may, to what Rogers said.

[43:09 - 43:11] Holmes: Well, you're going to speak, you're going.

[43:11 - 44:31] Sandy: Okay. It seems to have been built into us that as scientists moved along and when when you look at a child, an infant, the child thinks the whole world is themselves. And then as you grow old or as you grow older, you realize you're separate from them. Intellectually, we've gone through a similar kind of process, a process of dissenting. And if you hear Piaget, decentering, yeah. And we in the last few hundred years have gone through an enormous process of decentering, we would have had an anthropic principle that would say, well, look, the sun goes around the earth. That's, you know, just for us. Now, we have other arguments. But we found out that one, we go around the sun. We're not the center of the universe. The sun is not the center of our galaxy. Our galaxy is not the center of all the other galaxies of the universe. In fact, if we believe Einstein, there is no center. So I think the advance of science is going to take us more and more away from it's me mommy.

[44:35 - 44:41] Holmes: Oh, Sandy. Are you listening, Sandy? (Laughs)

[44:44 - 44:44] Sandy: Blame him.

[44:46 - 45:10] Holmes: I closed with Steve Weinberg, "The more the universe seems comprehensible, the more it seems pointless." And I also close with Roger Penrose. "This is an extraordinarily special Big Bang." You don't think either one of those people should have made those kind of statements?

[45:15 - 45:15] Sandy: They're great people.

[45:16 - 45:17] Roger: May I answer that?

[45:17 - 45:19] Holmes: You may answer that after Sandy.

[45:19 - 45:25] Roger: Okay .(Laughs) Talk about a set up.

[45:26 - 45:27] Sandy: Yeah. Talk about a set up.

[45:28 - 45:28] Roger: Talk about a set up. Yeah.

[45:28 - 46:26] Sandy: Yeah. And I can't speak for other people. They can say whatever they wish. It shows you how liberal I am in my intellectual thinking. But any big bang is going to be extraordinary. And for all we know, there have been a series of Big Bangs. We just happened to live in one of them. That's all we can say at this point. That's all we can say at this point. Is the universe pointless? I don't care. I don't care. I'm going to take what is right in front of me. Got that? Here is where I am right now. I've got wonderful friends, nice people to argue with who could ask for more. So I think the saying that it's pointless is itself pointless. It doesn't bother me.

[46:28 - 46:30] Roger: Well, you talk about the, you know-

[46:31 - 46:37] Sandy: Seriously. Goodness. I think you did that facetiously.

[46:39 - 47:05] Roger: Yeah, that the word seems comprehensible. If you adhere to a Big Bang idea, which I think is pretty well established in within astronomy and astrophysics, part of that process involves all mentioned the inflationary universe.

[47:05 - 47:06] Sandy: Clean it up.

[47:06 - 49:14] Roger: Now, the reason that an inflationary universe has to have occurred is because if it was just a Big Bang and everything was moving out at the speed of light, you would have a uniform universe. Everywhere you look in all directions of space, you would see pretty much the same density of galaxies and so on. You don't see that. It's a lumpy universe. There are places like the Virgo cluster where you have thousands of galaxies, one part of the sky and other places like Ilinanos(ph), where you have almost none. And so this is not what you would expect from a so-called classical Big Bang. So there is a fellow named Garth at Princeton University in the early 1980s who hypothesized that, well, one way out of this is to have two expansions as Holmes mentioned. You

have a Big Bang and then you have, which is a basically an energy matter expansion, but you also have a space time expansion. Now, space time is not constrained by the speed of light, whereas matter energy is. nothing can go faster than the speed of light, okay? You see it over the engineering laboratory walls, you know, underneath 6000 miles per second. It's not just a good idea, it's the wrong, you know. And so there is a constraint there, but there's no constraint on the expansion of space time. So basically Garth idea was that you expand the space time, you inflate space time so that you have this space time into which matter energy can expand. Now, as soon as you do that, you solve the (inaudible) problem, okay? Because now you predict that you get a lumpy universe, but you also get this bubble breaking out into other bubbles. And this is one of the driving forces behind this idea that is very common now (inaudible), which even as recently as 30 years ago, in the realm of science fiction. I'll be with a fellow in town named Neil Smith nails that's made a career of writing about alternate universe.

[49:15 - 49:15] Terry: Yeah.

[49:16 - 51:06] Roger: And people have hypothesize, Sandy mentioned it just here a minute ago, you can have an infinite number of these alternate universe. And so the fact that we are seemed to be unique, well, maybe we are, maybe we're not. Maybe there are other Earth like planets going around other stars. Maybe there's life forms in the solar system. But again, I think that there's an egotism about human beings that is in the last several hundred years has slowly but surely been dumped on. I mean, and there's been sort of a psychological, you know, response. I mean, human beings, I think, are kind of awed by this. I mean, we just as an example, just a little over a hundred years ago in 1905, the perception, okay? Western civilization, Western science, that the universe consisted of what we see as the Milky Way. It was a model called the Captain Universe, and that Captain Universe was a football shaped system of stars that we see in the Milky Way, 5,000 light years by 2,000 light years. That was the picture, the view of the entire universe just a little over a hundred years ago. And so, as I say, there's so much that we've discovered and now we find that the universe is accelerating because there's dark energy that we can't see. We've known for about 30 years that there's dark matter which causes the galaxy clusters to hold together or rotate faster than they should, and it's just magnificent, okay? But who did it or is there any of who did it? Okay, that again, is a matter for faith versus science.

[51:08 - 51:53] Holmes: Let me hear Roger say I would welcome the discovery of life on other planets, but the universe wouldn't be any less surprising that would a second Genesis would sort of corroborate the idea that there's a creative genesis at work in a universe that needs to be explained.

Maybe if it's created life only once, that's a bit more surprising, but if it's created life thousands of times, then that sounds even more like something that's built in to the nature of things.

[51:54 - 51:56] Terry: So that's provocative question, fathers.

[51:56 - 51:56] Sandy: The Nike one.

[51:58 - 51:58] Terry: Okay, Sandy.

[52:00 - 52:26] Sandy: One thing that really bothers me when you get to a directed universe is something that a little over a hundred years ago, I think 1933, J.P Morgan said, "I think of myself as the most fortunate of God's creatures." In other words, he made me really rich, he didn't make you really rich.

[52:28 - 52:29] Holmes: I didn't say that .(Laughs)

[52:33 - 52:36] Terry: Is this microphone working? I bet no.

[52:36 - 52:36] Audience: No.

[52:36 - 52:40] Terry: Let me use this one and we'll come back to you guys.

[52:42 - 52:49] Speaker 2: You mentioned briefly your presentation about the arrogance of science.

[52:50 - 52:56] Holmes: Not all the part of the science that part of the science is going to go into the theory of everything.

[52:56 - 53:23] Speaker 2: Right. Which is none of science at the moment, actually. But hopefully in physics, eventually. Isn't it also very interesting that there was some divine creation aspect to the universe, that life is somehow special and different from the rest of the matter in the universe? Isn't that also an arrogant statement?

[53:24 - 53:59] Holmes: Well, let me explain that question back to you. If I claim that there's something remarkably special about Earth, and that it's got elephants and billions of species over about five billion years of history, then maybe there's life elsewhere we don't yet know that, but Earth is a quite remarkable planet as we generally look around in the universe. Does that sound arrogant to you?

[54:02 - 54:02] Speaker 2: That earth is remarkable?

[54:03 - 54:04] Holmes: Yeah.

[54:04 - 54:05] Speaker 2: No, I would not say that.

[54:06 - 54:10] Holmes: Okay. You don't think I made an arrogant claim then.

[54:13 - 54:14] Speaker 2: Well, I'm sorry.

[54:16 - 54:44] Holmes: I mean, I do think to say that Earth is a remarkable planet in many ways doesn't strike me as being arrogant. Likewise, and you got to come back, whatever it is, April 26 to hear this. I don't think for the claim that humans on Earth are a remarkable species, I don't think that's arrogant either.

[54:44 - 55:12] Speaker 2: To say that something is remarkable is not to say that it was created specifically for the purpose. To say that something is remarkable simply means that it's special. It doesn't mean it could be exquisite, it could be luck. I mean, if you find a black pearl, yeah, that's a remarkable find, but that doesn't make it any more supernatural than finding a black pearl elsewhere in the earth.

[55:12 - 55:17] Holmes: I would not use the word supernatural at any time this evening.

[55:17 - 55:34] Speaker 2: It's nowhere, it's not a divine or special or intelligent living creation than any other object that you might find the notion.

[55:35 - 55:36] Holmes: Maybe I could-

[55:37 - 55:37] Speaker 2: (Inaudible).

[55:42 - 56:43] Holmes: Well, maybe we better keep this going. But let me say, nothing I said this evening, tells you that you ought to be a Christian. Nothing I said this evening tells you that you should go to the Jewish synagogue. Nothing I said this evening says that you shouldn't go to a minaret or stay away from one. Nothing I said this evening has anything to do with whether you should be Buddhist or not. What did I say this evening? I tried to make the claim that nothing in science shuts out the possibility of being religious. Let me turn that to Roger. Anything in your astronomy books that shuts out the possibility of being religious?

[56:43 - 56:44] Sandy: Nothing.

[56:44 - 56:48] Roger: No, but nothing in my astronomy books proves such an existance.

[56:48 - 56:51] Holmes: I agree with both those statements.

[56:52 - 56:52] (Inaudible)

[56:53 - 57:01] Holmes: And now let me ask Sandy. Sandy, anything in your physics that shuts out the possibility of being religious?

[57:01 - 57:03] Sandy: You don't know what books I read .(Laughs)

[57:04 - 57:05] Holmes: In your physics books.

[57:05 - 57:05] Terry: We got another question.

[57:05 - 57:17] Sandy: The point is there's nothing in a physics book that would even point itself towards anything religious. So it's not even a question-

[57:18 - 57:19] Holmes: It leaves that question open?

[57:19 - 57:21] Sandy: It doesn't address it.

[57:21 - 57:23] Holmes: Doesn't address that question. Okay.

[57:23 - 57:27] Sandy: So it's not whether it has it or not. That's not within its purview.

[57:28 - 57:46] Holmes: Well, I do think that your physics books shut out certain kinds of religious beliefs. If you think the world was created in six days, astronomy shuts that out. But I also think that-

[57:47 - 57:48] Sandy: That's an eyeball roller.

[57:48 - 58:13] Holmes: Yeah. There's nothing in these science books that shuts out the possibility of religious belief. I am giving you a number of instances where I think that it's a surprising universe in many of its features. That leaves open the possibility of religious belief. That's your take home message this evening. Terry?

[58:13 - 58:13] Terry: Yeah, I'm right here.

[58:13 - 58:21] Holmes: If you can find a woman out there first who can speak up, if not the guy in the green shirt next.

[58:21 - 58:35] Speaker 3: I guess I'd say in addition to your argument, you're saying that we can't disprove any god, but I guess I would say that at the same time, we can't disprove that there's a flying spaghetti monster.

[58:35 - 58:35] Holmes: Yeah.

[58:35 - 58:38] Speaker 3: I'm sure you've heard the argument of the Flying Spaghetti Monster.

[58:38 - 58:39] Holmes: Yeah.

[58:39 - 58:47] Speaker 3: And that argument is equally valid and equally sound as saying that there's a God. I'm just wondering what you think about that.

[58:53 - 59:11] Holmes: I do think that there are sciences that shut out many of the fairy tale kind of events. Yeah.

[59:13 - 59:13] Speaker 3: Okay.

[59:14 - 59:16] Terry: Okay. Go ahead.

[59:20 - 59:26] Speaker 3: I'm just confused of what you're saying. You're saying that there's science that disproves compliant Spaghetti Monster. Well, I disagree.

[59:27 - 59:27] Holmes: Yeah.

[59:27 - 59:37] Speaker 3: There's nothing you can say that completely disproves that there is one. Just like there's nothing you can say that disapproves there's no God. So it's the exact same argument.

[59:38 - 59:38] Holmes: Yeah.

[59:39 - 59:40] Terry: Prove a negative, I think, what he's getting at.

[59:40 - 59:41] Speaker 3: Okay. Sure.

[59:41 - 59:41] Terry: Yeah

[59:41 - 59:43] Holmes: Or it's a question proven a negative.

[59:44 - 59:45] Terry: Lack of explanation is that what you're saying?

[59:46 - 59:47] Holmes: Excuse me.

[59:47 - 59:51] Terry: That the lack of an explanation is an explanation is that what you're trying to say?

[59:52 - 01:00:03] Holmes: Yeah. Well. Absence of evidence is not evidence.

[01:00:05 - 01:00:06] Roger: Yeah. Exactly.

[01:00:08 - 01:00:09] Holmes: Can we have another question?

[01:00:10 - 01:00:11] Speaker 4: I need just to see if you (inaudible).

[01:00:14 - 01:00:14] Holmes: Okay. I can

[01:00:19 - 01:00:19] Sandy: (Inaudible)

[01:00:19 - 01:00:39] Speaker 4: So if our universe is so fortunate in all the way it is set up and that it says it takes a designer, that designer would have to be just as complex if not more so. Would that designer also then need a creator? if it does not need a creator, why does this universe?

[01:00:46 - 01:03:42] Holmes: Well, this universe needs an adequate explanation. It has many surprising features. Now, it may be that there are many other universes that in such a way that this one is no longer surprising because it's lucky. But then you need an adequate explanation for why it is that many other universes are created. Example. Suppose you say, well, I'm not going to think there are many other universes, there's only this one. It's surprising and an adequate explanation of the way in which it's surprising is that it is in some way created by God, right? That does strike me as being one, but not only one form of adequate explanation. Now, you say and this has been around for years in one form or another. Well, then you have to explain God, right? And so you need an adequate explanation for God. Theologians have wrestled with that question over many centuries, and the usual sort of answer is that, if God exist, would be the sort of being that is self-contained, self created, okay? Now, you might say, Well, then let's just have a universe that's self-created, self-generated. Most of my naturalist friends believe that. Sandy probably believe that. (Sandy laughs) So now we are equipped with a surprising universe and hold that it's self created, okay? All right.

Quit. Stop there if you like. I don't think that's an adequate explanation as looking for a deeper level of explanation. I didn't use the word supernatural. I might use the word trance natural. Maybe you just want to quit with a universe that's not supernatural, but it's super, right? It's quite surprising. And the many things that happen in this universe.

[01:03:43 - 01:05:42] Maybe that's the best explanation we can get. Now, there's a lot more we need to explain beyond this universe. So you might say, Why do I want a divine being to explain the cosmic explosion? If I had only the cosmic explosion, I might not go that route. I would find it surprising. Maybe I would quit. On this earth, you've got to come back March 22nd, you got to come back April 26. We have life created in myriad forms. One species of which is the human species with a spectacular mind that can think about the myriads of stars above as Roger does. Can think about Micro-particles and Sandy does, and Mother Theresa, right? Or the Saints. So now we need an adequate explanation, not simply of the big fireball, but of a universe that results in diversity of life and a rich human culture which includes freedom, loving, caring, justice. Now, I might say that nothing in Rodgers astronomy books about the Big Bang are going to offer any insight at all into how you get a universe that brings forth Mother Theresa. Now, I may want a deeper explanation at the beginning of the Cosmic Firewall.

[01:05:44 - 01:05:51] Terry: We have one question here, and I think we're gonna take one more and than get (inaudible) and then we're going to release people to-

[01:05:51 - 01:05:53] Holmes: We have cookies afterwards. (Audience laughs)

[01:05:57 - 01:06:07] Sandy: First of all, my attitude on a lot of this is I can't say the universe is self created or not. I just know it's here and that's where I'm going.

[01:06:09 - 01:06:15] Holmes: But all of us know it's here. You don't want to ask why it's here. That's not a question that you wanna have answered.

[01:06:15 - 01:06:20] Sandy: No. I don't want to ask why it's here. That's true.

[01:06:21 - 01:06:36] Holmes: You should never take a philosophy class, you would flock. (Audience laughs)We're good friends. We were in the gym for years.

[01:06:39 - 01:07:21] Sandy: I can tell you what he looks like in the node. (Audience laughs) Don't ask. But here's an expression I really like. It's a version of, and it's ahead of the book of I. Peter. And a line goes like this. "We are unseen before birth, we are unseen after death. We are seen between

two great unseens why end this fine sorrow. So this universe, is what I've got. So let me bustle about in it and enjoy it while I can. Sometimes I say to people, What if you make it to the-

[01:07:22 - 01:07:25] Holmes: Now you see why he gave up physics and he's studying Opera. (Audience laughs)

[01:07:26 - 01:07:30] Sandy: Uproar. Wait, you broke my line of thought.

[01:07:31 - 01:07:33] Holmes: Yeah. (Laughs)

[01:07:33 - 01:07:36] Sandy: But you saw that even, right? Yeah. Go.

[01:07:37 - 01:07:37] Holmes: Friends. That's all. (Audience laughs)

[01:07:39 - 01:09:10] Roger: Yeah. In astronomy, the Big Bang, there's a very fundamental question of what came before the Big Bang, like there's been books written about that. And so in one scenario, you have basically an eternal universe that is constantly expanding and then stops contracts, bang, expands, contracts. So you basically have an internal universe, okay? That's the atheistic view, okay? On the other hand, people of faith, you have an internal creator or internal supreme being who at some point decided, Hey, I'm going to build me a universe. And again, science cannot distinguish those two scenarios, at least not with the presently. Now, whether something like that will happen down the line, we will be able to have everybody line up and throw their rods on the floor and you'll pick out the one you want to follow. That might happen, but right now, tonight, science cannot settle the question of whether or not there is a supreme being. It just comes down to the eternal lies, the supreme being, which, you know, is all powerful presumably. Or you can internalize the universe, which has basically always been there. And that then comes down to what seems reasonable to you, and that goes back to what I've said a couple times tonight, your faith.

[01:09:11 - 01:09:37] Sandy: Yeah. Can I say one word? Supposedly, we have the chances of describing things back to about the universe up to about 10 to the minus 43rd of a second. prior to that, we don't know of anything that's going to give us an explanation. So we just more or less have to take what we have. And the fun we have in life is trying to describe it.

[01:09:37 - 01:09:53] Roger: Yeah. Okay. Let me. Just as a quick sidebar, Sandy, you know, had this beautiful quote just a minute ago. This is the only person I've ever known who was quoting Shakespeare in a physics department. (Sandy and audience laughs)

[01:10:00 - 01:10:06] Terry: Well, I think we're going to bring the evening to a close and I hope for next month. So thank you. Give these gentlemen round of applause. (Audience applauses)

END TRANSCRIPTION