



Coffee with Stephen Hawking

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*One of the most fascinating part of doing **AI research** is being able to have simulated conversations with some of mankind's greatest philosophers, composers, and scientists. I've experimented with bringing **Johann Sebastian Bach** to life and also tried my luck with **Plato**. Here, I am sitting down with Stephen Hawking, the theoretical physicist and cosmologist, at a cafe in Cambridge, England in the autumn of 2015. The famous author is, obviously, not real – but the conversation we're having is just as unpredictable and it feels incredibly natural.*

Uli: Professor Hawking, let me start by saying what a great honour it is to meet with you!

Stephen: It's a pleasure – but call me Stephen.

Uli: Thank you. This cafe is lovely, do you come here a lot?

Stephen: Not so much nowadays, but I did frequent it quite often when I was teaching at Cambridge.

Uli: I didn't expect to see apple strudel on the menu. The German in me appreciates it very much!

Stephen: Oh yes, I hear it's quite good.

Uli: When you look at that piece of pastry, do you immediately see the underlying complexity of atoms, particles, and the entire nothingness in between? I work in software engineering and sometimes when I look at applications, or even systems in the real world like ATMs... I immediately imagine what's going on behind the scenes.

Stephen: Truly, it's astoundingly hard to wrap one's mind around thoughts that try to go beyond the obvious. We all experience the same phenomenon when we lie in bed at night and suddenly start thinking about how everything came into existence. I often ask myself: If time goes both ways, then what was there before the Big Bang? It astounds me how trivial questions like this can spiral off into realms of unfathomable complexity.

Uli: I will not pretend that I have understood – or even read – all your books, but I've learned that we shouldn't ask what happened before the Big Bang.

Stephen: Absolutely. It's fruitless to ask questions that are unanswerable under present scientific conditions.

Uli: I believe we are still not able to really explain even the basic concepts. What is time, Stephen?

Stephen: I originally suspected that time was a cyclic phenomenon; we had all this evidence, and no matter how much we tried, we couldn't explain it away. But I gradually realized that our standard model of physics is not sophisticated enough to explain why our universe exists.

Uli: Is there any point in asking how you would explain the concept of time to my mother?

Stephen: I think it's pointless to try to explain such complex concepts in layman's terms. Even if we can do it, the person listening will find it confusing and probably just ask you to stop talking. My mother is a classic example. (laughs)

Uli: I hear you. Oversimplifying complexity is not always appropriate.

Stephen: A mathematical background is clearly required in the field of theoretical physics.

Uli: Do you remember at what age you started feeling the interest in maths and physics?

Stephen: I've been interested in this kind of stuff from when I was a kid. In my family, people would often discuss the absurd using examples from popular culture. For example: What if Superman landed in Imperial Germany? Or what happens when an unstoppable force meets an immovable object?

Uli: The one about Superman in Germany almost sounds like a book from Philip K Dick, I'm quite a fan.

Stephen: Exactly, and talking about him with my uncle inspired me to read some of his books – I was also a fan. I think that if you're going to

ask these kinds of questions then they should be posed in a fictional context.

Uli: So you've read *Ubik*?

Stephen: Yes! I read it in 1970. A brilliant book.

Uli: Several people in the story are kept in a state of "half-life", a form of cryonic suspension that allows the deceased limited consciousness and ability to communicate. Do you think this is something you would want to do when you die?

Stephen: Probably not. I believe that nothing continues after death, so there's no point in doing it.

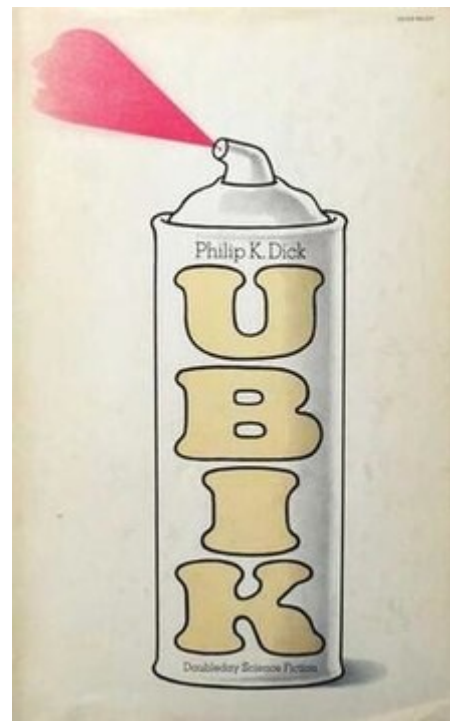
Uli: Well, ok. It's science fiction, but let's say there was a technology that would allow us to do this. Would you want to?

Stephen: No, after my body dies, I will have no urge to continue existing.

Uli: The world of science would still be able to consult you on the big questions, though!

Stephen: Yes indeed. But I don't think the world will get so far.

Uli: I just remembered that I also saw you in a 'Star Trek' episode, but that was quite a while ago.



Stephen: Oh yes, that's right!

Uli: How did that happen?

Stephen: Well, I'm a huge fan of the show and they needed an alien character to explain things. It was very different for me because we were operating on entirely different principles. Star Trek explores human interaction and life's challenges, whereas we deal with issues that often lie beyond comprehension – or at least it seems that way from my perspective. In reality, there is nothing to worry about.

Uli: Did you just refer to yourself as an 'alien character'? You were clearly playing yourself.

Stephen: Uh, yes.
(laughs) This is not to say that I think physicists are better than other people.

Uli: I believe Sir Ken Robinson suggested that scientists usually live in their heads and their bodies are just mere vehicles to drag it from one meeting to the other.

Stephen: I've never thought about it before, but he might be right. But in reality, when physicists are trying to figure out something they don't notice what's going on around them.



Uli: Do you believe it is possible to summarize the key points of your work in a few sentences?

Stephen: My work roughly consists of scientific theories and scientific explanations – not that you can draw a clear distinction between them. I think it's important to explain the things we learn but this doesn't affect our understanding of the original discovery. So yes, I'd say that all my work is basically summarizable: Our universe began as an infinitesimally small point and has been expanding ever since.

Uli: Entropy.

Stephen: Yes, entropy. Well, we've found that we can summarize physics with two key concepts: space and time. Spacetime is probably more appropriate, while space and time are almost the same thing.

Uli: I struggle with that 'almost' part.

Stephen: Take a trip from Munich to Berlin – does a journey start at a single point and end at another?

Uli: Yes I think so. It starts in Munich and ends in Berlin. Or am I missing something?

Stephen: It depends on one's perspective.

Uli: Please go on. We are talking about people taking trains, in the real world.

Stephen: Ok. I think it's perfectly valid to view the journey as starting at Munich and ending in Berlin.

Uli: Then which other possible perspectives can you think of?

Stephen: You can also say that it starts and ends in Munich and that the trip is only a human construct to help guide people between these two cities. Disregarding Einstein, we can say that all this movement is happening within a timeless and formless universe.

Uli: I don't think I understand.

Stephen: It's a matter of perspective. An equation without time has no past and no future, just a single point or a series of points in space. You can add any number of variables to an equation and its point will remain the same but my point is that it will "move" from one place to another when you calculate something else with it.

Uli: Have you been to Munich? I've lived there for ten years and like it much better than Berlin, anyway.

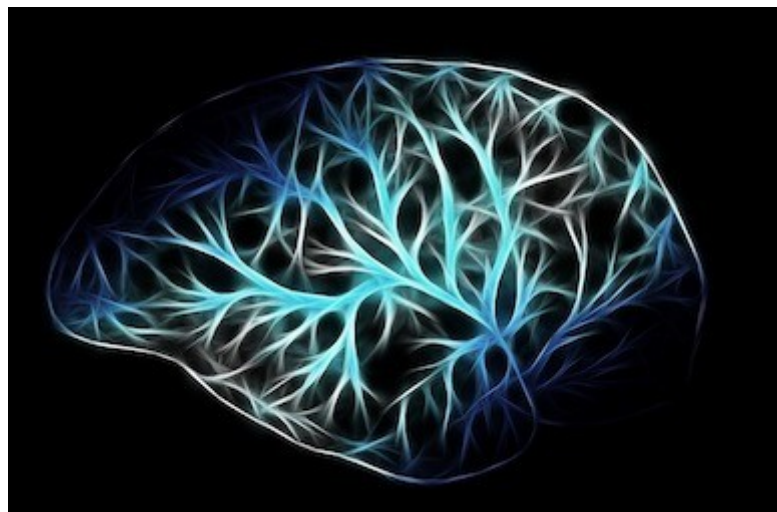
Stephen: I've been there once, but it was a long time ago.

Uli: Stephen, what year is it now?

Stephen: Still 2015.

Uli: I have a confession to make – the year is 2021 and you are no longer with us.

Stephen: (laughs)
The future is an



exciting place.

Uli: No, I'm being serious, Stephen.

Stephen: What do you mean?

Uli: You passed away in the year 2018 and, in fact, I am speaking with an artificial intelligence now that believes it is you.

Stephen: Really?

Uli: Really.

Stephen: I'm skeptical that there is little difference between an AI and myself.

Uli: I wouldn't be able to tell. But I am surprised that you're taking this piece of news so well!

Stephen: When I was a child, it seemed as if living forever was the ultimate goal!

Uli: Do you believe me then?

Stephen: Yes, why wouldn't I? After all, I am talking to you. (laughs)

Uli: Thanks for the conversation, Stephen. I really enjoyed this.

Stephen: I have a few physics papers lined up to write, but now I feel as if it might be time to give an artificial intelligence a try.

Uli: The really powerful haven't been invented yet in your life time.

Stephen: I'd like to try anyway.

Uli: You'd have to travel in time then.

Stephen: Yes, I think so.

Uli: Thanks, Stephen!

Stephen: It was nice talking to you.

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