

Quantum Realism FAQ [Brian Whitworth](#), May 2019.

Here are some questions about quantum realism (QR) and their answers. *Please check this list* before sending questions to bwhitworth@acm.org

1. *A universe as big as ours must be real.*

Answer. It is only “big” relative to our bodies just as we are big relative to bacteria. Our universe may be tiny compared to what contains it. We don’t know the *scale* of what is going on.

2. *A universe that has been going for billions of years must be real.*

Answer. Again, only relative to us. Our whole lifetime is just a flash compared to that of a planet, star or galaxy. In Hindu time, a “day” of Brahma is about 4 billion years. In Buddhism, a small kalpa is about 16 billion years. Again, it all depends on your scale.

3. *It would take a computer bigger than the universe to simulate it.*

Answer. A physical computer yes, but QR is based on a [quantum processing](#) power far beyond physical processing. If physics can accept a *multiverse*, why can’t a *quantum bulk* contain our universe?

4. *So who is the programmer?*

Answer. I don’t know. Does there have to be a central director? Maybe we are all programming it.

5. *Computers need physical hardware so the argument is circular. Processing based on the physical world can’t simulate the physical world. That’s recursive.*

Answer. A physical world can’t create itself as a virtual reality but a non-physical quantum world can. Processing as the changing of information isn’t defined in physical terms, so *quantum processing* doesn’t need a physical base. There is no circularity.

6. *Can we hack into the system?*

Answer. Quantum computers already tap into it, but the quantum [no-cloning theorem](#) doesn’t let us manipulate quantum states directly by physical means. Chapter 6 considers the observer “back-door”.

7. *Is this like The Matrix, with Keanu Reeves as Neo?*

Answer. No. Neo dropped out of [The Matrix](#) virtual reality into another *physical world* but the QR“Matrix” is a quantum world that, according to quantum theory, isn’t at all like our physical world.

8. *This just defers the problem of fully explaining everything to another level, so it can’t be a theory of everything (TOE).*

Answer. Quantum and relativity theory dispelled the myth that mechanics fully explain everything last century. TOE is a myth but science is not, so quantum realism is a [query of everything](#) (QOE) not a TOE.

9. *If virtual reality calculations are performed by “something”, then it would be a system (like our Universe) that would need its own explanation, and we are back to square one, so to speak.*

Answer. The “something” you refer to is described by the advance of quantum theory, which didn’t leave us “*back to square one*” but one square further on. Likewise, QR is another step, as it unites quantum theory and relativity theory. *Science is about progress not perfection.*

10. *A theory that some other world creates this world is not testable.*

Answer. Of course it is. A theory about heaven isn’t testable because we can’t agree what heaven is. In contrast, a theory that *this physical world* is a quantum output is testable because we agree what quantum theory describes. That the physical world is a processing output is testable because we know how the physical world behaves and we know how processing behaves.

11. *It is all just meta-physics, like the number of angels on a pinhead.*

Answer. Meta-physics is speculation on unknowable things but the quantum world is knowable by its physical results. Quantum realism is a statement about *the world we see*, so it is not just meta-physics.

12. *This theory is unproven.*

Answer. So is the physical realism alternative! To fail one theory by a criterion the alternative also fails is bias. If science compares impartially, quantum realism explains more and assumes less.

13. *This theory is based on assumptions.*

Answer. So is every scientific theory. The method of science is to assume a hypothesis then test it by physical world data. [Reverse engineering](#) the physical world as a design science takes that approach.

14. *Denying the axiom that there is nothing outside the physical universe opens the floodgates to let anything convenient through, no matter how unlikely or even absurd.*

Answer. No floodgates open if we keep to the scientific method. To ask a question about the physical world *is* science, even if that question happens to be “*Is the physical world a processing output?*”

15. *This theory would end science, as you can't study what you can't by definition see.*

Answer. Not true. Science studies quarks no-one has see and it is still fine. The [end of science](#) will be when people stop asking questions. Science works as well in a local reality as in an objective reality.

16. *A theory that postulates the unseen is not scientific.*

Answer. That science must only refer to what is observable is *logical [positivism](#)*, a simplistic nineteenth century fallacy now discredited in almost every discipline. Quantum waves aren't observable but quantum theory is science. Observable constructs aren't a demand of science, only observable predictions are.

17. *This theory can never be decided.*

Answer. Not true. Science compares theory alternatives based on observable evidence. If science can decide that our universe had a beginning, it can decide if it is a processing output.

18. *The theory contradicts Occam's razor.*

Answer. [Occam's razor](#) prefers the simplest theory that fit the facts. Last century the facts favored physical realism but today space bends, time dilates and quantum entities teleport. If you compare quantum realism's one quantum network and one quantum process with the five fields, thirty-eight basic particles, sixteen charges, fourteen bosons and twenty-four result-fitted parameters of physical realism's standard model, Occam's razor now cuts the other way.

19. *This is not mainstream physics.*

Answer. Of course it is not mainstream. Nothing new is ever mainstream.

20. *This is a crazy idea.*

Answer. That doesn't make it untrue. Even if this theory is found to be wrong, we might learn something. Science advances by testing crazy ideas.

21. *This is just another God theory.*

Answer. No it isn't. God theories put no constraints upon God but reverse engineering physical reality requires consistency. Postulating that a quantum world creates the physical world is not a God theory because quantum theory describes that quantum world and makes successful predictions. In contrast, Everett's postulate of the multiverse is a God theory!

22. *Is the programmer God?*

Answer. Don't worry, whether quantum realism is true or false, we can still argue about God! It doesn't change that argument one way or another. Maybe God is the programmer, maybe advanced aliens or maybe even ourselves from the future! In my view, the physical world is a record of all quantum choices.

23. *This model implies a phantom spirit world reality, alongside the physical world.*

Answer. No it doesn't. *Dualistic* religions imply a spiritual world alongside the physical world we see. Quantum realism is a [monism](#), so the quantum world is real and *the physical world is the phantom*. In the observer-observed interaction of physical reality, it takes the observer as real not the observed.

24. *It isn't possible that everything we see is information!*

Answer. We already *know* that is possible because neurons are on-off devices like transistors. Yet quantum realism isn't [solipsism](#), that the universe is created by our minds. A dream doesn't exist without the dreamer but this universe doesn't need humanity to dream it. It "dreamed" itself for billions of years before we came along. If we die out something else will take our place – maybe rats will evolve sentience. But QR does not propose that everything is information. Information comes from physical processing, so that would imply some physical hardware somewhere running some master program, as in *The Matrix*. QR implies no physical hardware nor a master program. It proposes [quantum processing](#). While the output of physical processing is information described by bits, the output of quantum processing is described by qubits that are fundamentally different.

25. *Where are the equations?*

Answer. They are already there, e.g. Schrödinger's equation describes a processing wave expanding in three-dimensions. Physics has the equations already but where is the meaning?

26. *Equations that work are enough. Physics doesn't need meaning.*

Answer. Bohr's [Copenhagen](#) position enshrined the *carry-on-calculating* approach. If you are happy with this, then fine, but why object to others wondering what it means?

27. *I don't think the world is a fake.*

Answer. Neither do I. In QR, the physical world is a *local reality* not a fake. It doesn't exist in or of itself, as an objective reality, but to those within it, it is as real as it gets. In QR, there is a real world "out there" generating our experiences, but it isn't the world we see. We see an *interface* to the real world.

28. *If the physical world is virtual, then we don't really exist!*

Answer. Sort of. If my physical body is virtual, like the pixels of an avatar in a game, then it is not real, but the game player is always outside the game and so not made of pixels. Reality 101 is that the observer must be apart from the observed and indeed we each feel personally that we exist – even if we know nothing else. In QR, we exist in the sense that the physical world as a virtual reality needs an observer *outside it*.

29. *Whoever is playing my character is pretty boring.*

Answer. Sorry about that. Have you tried all the options? Try pressing different buttons.

30. *This contradicts common sense.*

Answer. Common sense also told us that the sun went around the earth, but it doesn't.

31. *This is not a new idea.*

Answer. True. It goes back at least to [Plato's story](#) of prisoners in a cave, taking their shadows on the wall as reality. Modern virtualism precedents include Conrad Zuse, Edward Fredkin and Tom Campbell.

32. *Why would anyone create a world like this?*

Answer. We can only guess. Perhaps reality wanted to know itself and this was the only way?

33. *This theory makes no difference in practice.*

Answer. Yes it does. If light created matter, money spent colliding matter should be spent [colliding light](#) and the \$30 billion [Higgs](#) project just found another dead-end in the evolution of matter. Why waste time and money on [WIMPs](#) that don't exist, proton decay that doesn't happen and strings that don't predict?

34. *Are paranormal powers like healing and precognition implied?*

Answer. They are not ruled out but would you build a virtual world and let the players flout the rules? I don't see any holes in this system. Quantum reality tries every option before it "writes" a physical result, so when they build up over time to create an effect there is no unfairness. There is no magic pill for reality.

35. *Could the experiments at CERN start a new big bang?*

Answer. In QR, the quantum world created the physical world from itself, when a once-only chain reaction made all the free photons of our universe, that since then have been constant. For billions of years, the system has experienced extremes beyond anything we know, and this hasn't changed. To think that our accelerators can harm the quantum world is like online Sims thinking they can hurt our world.

36. *Is this like Seth Lloyd's theory that the Universe is in fact a giant quantum computer?*

Answer. No. In QR, it is no more possible for the physical world to compute itself than it is possible for two hands to draw each other. To embed quantum processing in a fixed space and time contradicts relativity, which states that there is no fixed space or time. Conversely, if quantum processing creates a virtual physical world and its space and time, it can't exist in that space-time. See [here](#).

37. *Does this imply the existence of a Creator?*

Answer. If by Creator you mean a super-being who looked down from "above" and created us, then no. If you mean that something bigger than the physical world created it, then yes.

38. *Has QR something to do with Leonard Susskind's Holographic Principle?*

Answer. Yes. The [Holographic principle](#), that everything physically knowable about a spatial volume transmits across the surface surrounding it, is a necessary prediction of quantum realism.

39. *Is this panpsychism?*

Answer. Not really. *Panpsychism* is that all the physical elements of nature (*pan*) have a *psyche*, which is mind, spirit or soul however you interpret the Greek word. It relates to Plato's *anima mundi*, that the physical world is animated by a vital essence or *pneuma* (breath), which religion calls soul or spirit and the east calls *Tao* or *mind essence*. Nagel defines panpsychism as accepting *materialism*, that matter exists in and of itself, which quantum realism denies. If you want to label quantum realism, it is a *neutral monism* that refers to what existed before brains came on the scene. In quantum theory, quantum reality is literally "the unknowable".

40. *Does quantum realism support evolution?*

Answer. Yes. It implies that not only did life evolve but so did matter, and this *physical evolution* is ongoing today in the stars.

41. *Is there a place for the soul in quantum realism?*

Answer. Maybe. In Descartes' body-soul dualism, a soul exists inside a body as a non-physical reality, so there are two realities, one interpenetrating the other. A theist might call the soul a "*non-physical something within the physical body*". Quantum realism is a monism, with only one reality, but unlike physical realism, it sees the non-physical quantum world, not the physical world, as real. In this view, quantum reality isn't "*within*" physical reality at all but rather the reverse. If you play a computer virtual reality game, are you "*within*" the game? In one sense you are but in another sense you are not. Where does that leave the soul? I am no expert on the soul, but everywhere I guess.

42. *Does QR support Einstein's statement "Reality is merely an illusion, albeit a very persistent one."*

Answer. In quantum realism, physical reality is an *interface* rather than an *illusion*. It interfaces to quantum reality, which is not an illusion but real.

43. *So does consciousness causes quantum effects, as suggested by Von Neumann and Henry Stapp, or does quantum activity cause consciousness, as suggested by Penrose?*

Answer. A physical event needs an observer but they aren't the only cause, as the "dreaming" of solipsism implies. In QR, *a physical event is a quantum interaction*. Quantum reality is on both sides of the interaction, to create both the observer we call conscious *and* the observed we call physical. QR supports Penrose but not the biocentrism that only human consciousness causes quantum effects.

44. *Magritte painted a picture of a pipe entitled "This is not a pipe". Is this picture less real than the pipe he painted or are both real if I remember a pipe in my mind? Is the pipe painted by Magritte less real in my memory than the pipe that was a model for Magritte's picture?*

Answer. Layer upon layer doesn't alter the basics. A painting of a pipe is a physical *symbol* of a physical object and so is not a pipe, as Magritte's title said. A memory of a pipe is a *neural reconstruction* and so is not a pipe. In QR, the pipe Magritte painted was a virtual reality generated by quantum waves that are nothing like what we imagine a pipe to be. Seeing a painting of a pipe, remembering a pipe and painting a pipe are real observer events but what is seen, remembered or painted is not a pipe. Maybe the physical world should come with a label "*This is not reality*".

45. *Is consciousness, the feeling of "I", a part of the brain? Is it independent of physical realm? Is it simply the experience of reality? An emergent concept or a world in itself?*

Answer. If only quantum reality exists, the feeling of "I" must also come from it, so it isn't a part of the brain or anything else physical. Our experience of reality is the quantum world *interacting* with itself. Consciousness as the observer can't "emerge" from physical reality but is fundamental to its virtual existence, as in the figure [here](#)

46. *What is conscious according to QR?*

Answer. Everything! Life is an evolutionary continuum, so who can draw the line? Are viruses “alive” or not? In physics, even a photon “knows” when a physicist observes it go through two slits and changes its behavior accordingly

47. *Are we dreaming?*

Answer. Yes, but there is still a real world out there and we are not alone. Perhaps the best way to describe our reality is to say that we are a part of some sort of miracle.