

An E-Mail “Interview”

I thought these questions from *El Mundo* journalist Daniel Arjona, and my answers, might be of interest to my Twitter followers. I’ve done some minor copyediting.

1. *What is, in your understanding, the biggest challenge Physics is facing nowadays? Why?*

I think the biggest challenge is something at the border between physics, biology, and philosophy: understanding how Mind emerges from Matter. There are many other big challenges within more the more conventional parts of physics (including physical cosmology), notably exploring the Universe through gravity waves, identifying what the “dark matter” is, and exploiting our discoveries of the recent past, on many fronts (nanotechnology, more efficient and cheaper (quantum?) computing, doing materials science and chemistry by simulation, new tools for medicine and biology, ...).

2. *Don’t you think, sometimes, that quantum probability and subjectivity prove that we are missing something, even if theory works perfectly?*

I think that if anything is lacking it is our understanding of the theory, not the theory itself.

3. *Is String Theory a dead end? Is there news coming, regarding scientific advances, or experimental confirmations?*

Many very smart people continue to work on string theory, and I expect that they’ll continue to do interesting work, in mathematics if nothing else. Whether they’d be more productive doing something else, is another question. It is unfortunate that in the early days people got carried away, and promised much more than the theory could reasonably be expected to deliver.

4. *Does the Dark Energy really exist, or are we only inventing a word to name our own ignorance?*

There is certainly a cluster of empirical phenomena that the words “Dark Energy” is used to describe, which is not going away. The real question is whether we can integrate it into our understanding of the physical world, which is in many other respects profound, in a worthy way.

5. *Do you believe in any type of anthropic principle? Why?*

There are weak versions of the anthropic principle, that should not be controversial. For example, if you want to explain why we find ourselves in a very atypical location in the universe (on a water-dominated planet in a temperate zone ...), it's clearly necessary and appropriate to talk about the conditions necessary for complex and ultimately sentient objects to emerge. It is the scope of anthropic reasoning that's debatable. I hope we can avoid appealing to it very much in fundamental physics, but time will tell.

6. *How is it possible that Social Sciences still fighting with Science?*

Are they? If so it's a one-way fight, because scientists aren't paying attention.

7. *Do you think human intelligence has the capacity to achieve global knowledge one day, or is there any intrinsic limitation that could disallow it?*

I think human brains and senses as naturally evolved are severely limited, in many ways. Our speed of thought and capacity for accurate memory, for example, are completely dwarfed by machines we already build and use. In the future, I think, there will be forms of intelligence, designed (at first) by humans and perhaps involving man-machine cooperation or even hybridization, that will interact with and understand the world at a different, higher level.