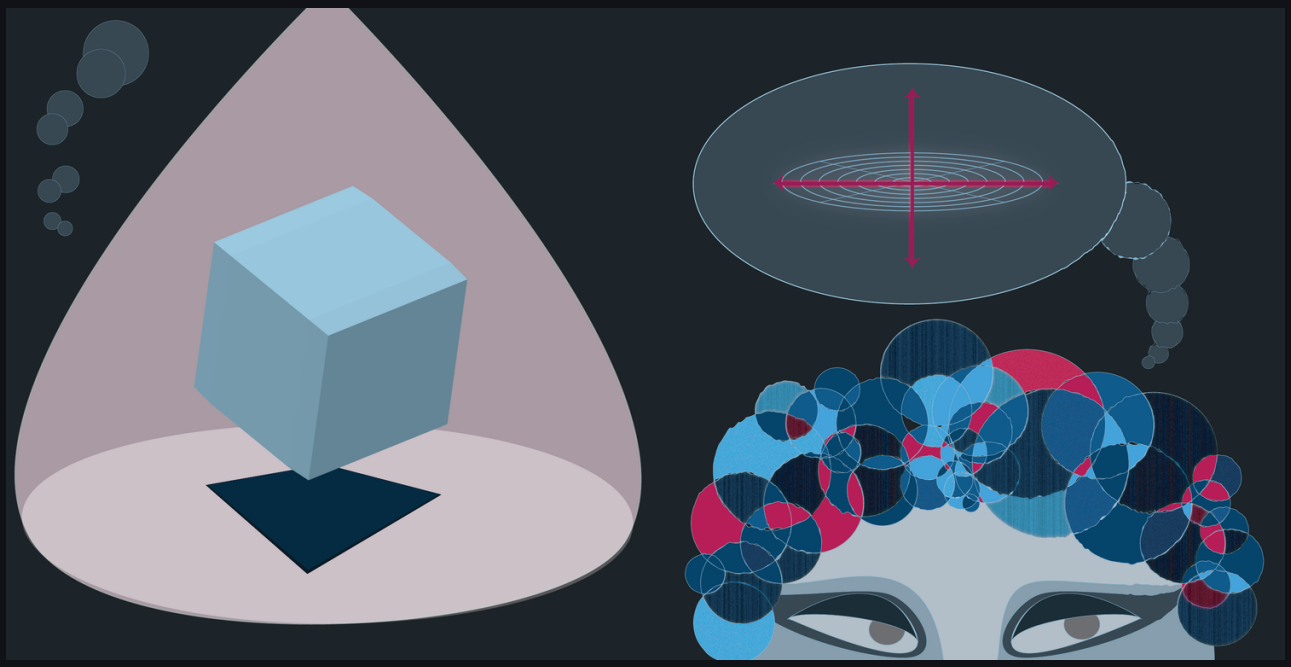

Mar 12

What Does It Mean For Something To Exist In Physics?

Astrophysics & Cosmology, Material Science, Mechanics

The word 'exist' is central to many, if not all, scientific discussions yet is almost never defined unambiguously and then utilized in such a consistent fashion that it can be applied across subject matters without contradiction. It seems that this confusion is perhaps central to the apparent stagnation of theoretical physics. The discipline is seemingly unable to rectify General Relativity with Quantum Mechanics, and this appears to be at the heart of the modern scientific failure to establish a unified physical picture of our universe. Because physics is foundational to chemistry, biology, and hence all of science, this is a serious issue*.

Math, a quantitative system of deductive inference, has been wildly effective precisely for its syntactical flexibility. As a means of communicating ideas, math utilizes a highly generalizable architecture that it can, with astonishing clarity, describe any idea no matter how abstract or *unreal*. Math also allows us to describe any recurring events parametrically in order make extraordinary predictions.

Math has thus allowed for the efficient technological production of a wide stable of useful inventions from the radio to the television, but it cannot save physics.

Why? Because despite the technological success of math's flexible syntax, its failure to distinguish between objects and ideas has evinced endless confusion for science at

large, the most prevalent of which concern the well-known logical fallacy of reification, whereby a map is mistaken for the physical ground it stands on.

Obviously, scientists who predominantly examine a map in order to develop a new more detailed map are going to lose touch with reality.

Unfortunately, many leading physicists since Einstein have concerned themselves almost exclusively with pure mathematics; i.e. the map.

Here's the thing, a word is merely a symbol for an idea. All words, and hence all ideas regardless of the language, can be divided into one of two categories: objects and ideas. For the purposes of explaining phenomena in physical reality, an existing object is a body with a location. An object is a thing with a surface: boundaries separating the inside from the out. Objects have inward extension. An idea, on the other hand, ideas abstractly link one existing object and another or an additional idea. Thinkers across the ages including Aristotle, Euclid, DeCusa, and Aquinas were acutely aware of this distinction and went to great lengths to preserve the dichotomy. An idea is thus irrational for the purposes of physics if it cannot be whittled down to its component physical actors.

The trouble is that mathematics, as a pure discipline, has no built-in distinction between objects and ideas. As long as actions can be quantitatively related, a logical mathematical statement can be made. Physics, on the other hand, necessarily begins with existing objects. Many will recall kinematic diagrams from introductory physics classes where a block is forced about on a table or within a pulley system.

We always start with such an object in physics because it is the science that principally deals with the dynamics of existing bodies.

The authority of mathematics took Einstein, himself, quite by surprise it seems. He once wrote:

> *"How can it be that mathematics, being after all a product of human thought which is independent of experience, is so admirably appropriate to the objects of reality?'*

The answer is that while mathematics can indeed describe objects adeptly, it can just as well describe ideas and it absolutely cannot tell you which is which. This means that math is not the cure-all for explaining natural phenomenon. As I've said previously, math is merely a tool and like a sharp blade, if applied incorrectly can wreak a lot of havoc.

Dr. Sabine Hossenfelder, a recent defector from the mathematical physics camp, has gone to great lengths to reveal the extent of this confusion in her book, "Lost in Math." Hossenfelder details discussions with various leading experts from the field as they detail their passion for aesthetic beauty in theoretical math. None seem in any way concerned with physical objects in their work. Recall that the particles of the standard model are in fact indexed matrices of dynamic measurements.

Even fermions like the electron turn out to be functions which describes the predictable results of experimental activities. It turns out that subatomic physics is built entirely out of relationships between actions, without a single physical actor.

In the Lab...

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Apr 18, 2021, 2:12 PM

Think about it, when was the last time you saw a non-symbolic illustration of an electron? You haven't. Even works like this, which claim to have photographed an electron, turn out to be indirect visual [illegible] imaged because the electron is an accounting notion, not a physical object. The notion of electron actually represents the location and momentum of the electrically interactive surface of the atom. And while this way of treating the electron has done wonders for technology, it has taken us farther and farther from understanding the atom's physical structure and how it mechanistically accomplishes its mysteries: light, gravity, electricity, magnetism, and chemical bonding.

How can we retain the distinction between object and idea at this point in our scientific evolution? Well, the initial solution is to unambiguously **reserve the word 'exist' for physical objects with definite locations** and instead **call upon the word "occur" for ideas like time, patterns, functions, and dynamics.** Let's call this the "Something, Somewhere" principle of physics. We must always start a physical model with some existing structures, located somewhere specific with respect to other objects, otherwise we are describing a sea of activity with no actors.

An object can *only* be conceived of so long as it has a surface with boundaries separating the inside from the out. Afterall one can conceive of a unicorn so long as it is described, mathematically or otherwise. But in order for that object to exist it has to also have physical place: a set of static distances to all the other objects in the scene.

> In physics, moving inexistent objects or even real ideas about is egregiously fallacious. Only existents move in physics. And only such objects can ever be regarded to cause motion, and hence phenomena.

It's time we got down to using consistent language in our physical theories, so that we can begin to explain what is actually happening out there. If I have a deadline to meet, that deadline occurs, it does not exist. Similarly, the photon doesn't exist, it occurs. The atom and the Earth exist. Bosons, electrons, and all other waves are actions, not actors. They don't exist, they occur. Once we make it past this confusion, I believe we can finally get down to making sense of the very tiny and very large parts of our universe. It will also require us to identify or at least hypothesize physical actors, which might be responsible for all this well-documented quantum and relativistic activity.

**While the above views are my own, the idea of the abuse of the word "exist" in science was first brought to my attention by Bill Gaede. You can check him out at his YouTube channel here. Blogger Fatfist also inspired ideas in this post and throughout this channel.*

Michael Shilo DeLay, Ph.D.

Michael Shilo is a secretary of Nature. He completed his graduate work at Columbia University investigating the mechanics of nano-confined water.

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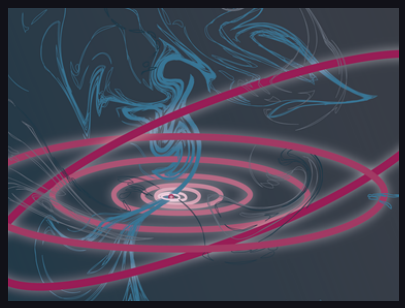

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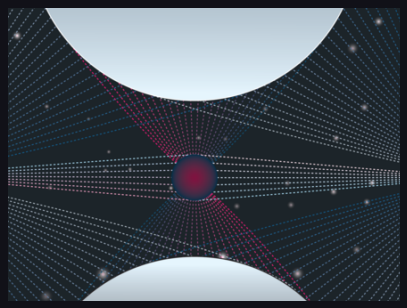

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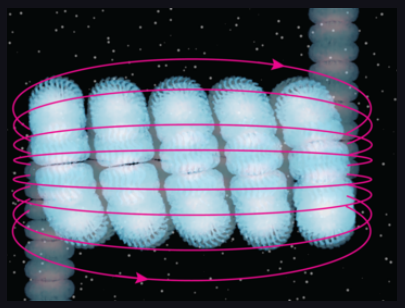

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