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# Did New Scientist just say special relativity is wrong?

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Were coded words used in a recent New Scientist article to say Einstein's special relativity is wrong.

In New Scientist 16 March 2019 Ciaran Lee says [1]: "In the language of classical physics, signals can only travel at the speed of light. This means that objects need more time to communicate with things further away from them than they do with ones in their immediate vicinity – a principle known as locality."

Says "classical physics" but presumably means special relativity.

Ciaran then goes on to say: "In a series of ever more accurate experimental implementations of his ideas from 1972 onwards, entanglement was shown to be a reality. Quantum physics was gleefully non-local."

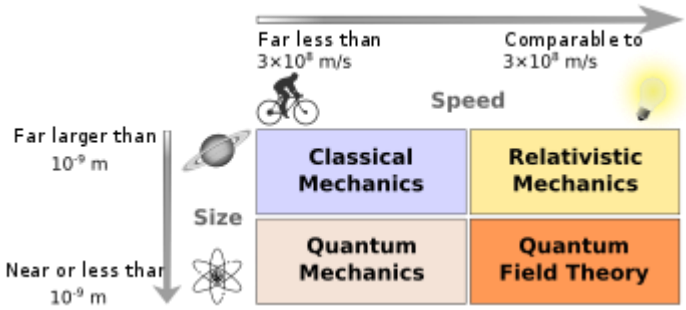
i.e. experiments show non-local and not local. So, all these coded words that are not trying to explicitly state that Einstein is wrong about relativity are really saying special relativity is wrong?

I will now dissect the article in more detail to highlight its wordplay:

He starts: “THROW a ball against a wall. Watch it bounce. Catch it. So far, so good. The ball didn’t suddenly disappear through a wall, or spontaneously turn into something else. This perfectly normal, predictable behaviour you just witnessed is classical physics in action. Up until 1900, it was just called physics.”

Then after 1900 the demarcation between different physics happened.

Wikipedia [2] gives a picture for the four major domains of modern physics:




Lee explains before this splitting of physics, physics made sense: “Whether you were discussing particles or planets, the rules that governed the bouncing of that ball could be used to describe anything in the universe. The world made sense.”

Made sense because there was only “one” physics to consider.

Lee: “Then quantum mechanics happened.”

He should really say that Einstein’s relativity happened as well.

Lee: “Over the space of four breakneck decades, our world became a wildly unfamiliar place. Objects acted as though they could be in two places at once, particles led double lives as waves and information appeared to travel faster than the speed of light. The weirdness of the quantum world has become legendary, but the origins of that weirdness remain deeply mysterious. Theorists like me continue to struggle with a question that seems almost unbearably basic: what gives the quantum world its distinctively counter-intuitive quantum flavour?”

i.e. a mess was made in physics.

Lee: “The truth is that we still don’t know.”

And many physicists accepting the mess as the way things are supposed to be stops the mess from being sorted out, because the mess should never have been made in the first place.

Anyway, Lee says: “And that ignorance has profound consequences for our understanding of reality, as well as our ability to use quantum phenomena in real-world technology. While different proposals have emerged over the years, it seems that we may now be getting closer to the real answer. Nowhere could this be more transformative than in the quest to build a quantum computer. Billed as the superior successor to ordinary PCs, their fabled edge has been attributed to a whole range of quantum phenomena. If we have identified the true root of quantumness, a new computing revolution will soon be here.”

Just waffle as far as I am concerned.

Then we get to the cause of the mess, as Lee says: “It all starts with Albert Einstein. At the beginning of the 20th century, he was at the forefront of a wave of young physicists making radical discoveries about the world around us. In 1905, he convincingly argued that light – long believed by the physics establishment to be a wave – must act in a very particle-like manner. The physics world was confounded further when experiments with subatomic particles called electrons showed them spreading out like waves.”

The idea of wave-particle duality. I favour Bohmian description of pilot waves influencing motion of particles.

Lee: “Explaining these new phenomena involved rethinking the structure of light and matter. Instead of being solid balls, microscopic particles and atoms were found to have altogether slipperier identities. They were best described by mathematical entities known as wave functions, which calculated the probabilities of their being in different places. Until you spotted exactly where they were, all those different possibilities coexisted at once.”

And how do we get to that (?) by considering Newton-Boscovichian point-particles; something that is usually omitted from being mentioned. (See my Boscovich articles etc.)

Lee: “Replacing hard certainties with wave functions and probabilities had some startling consequences. It meant that when faced with a hard barrier, a

particle had a non-zero probability of being located on the other side, allowing it to perform the seemingly impossible feat of tunnelling straight through it."

In wave terms passing through the barrier would be resonance; something also usually omitted from being mentioned.

Lee: "Many physicists didn't like this picture. Chief among them was Einstein, who was appalled at the consequences of the quantum world view he had helped usher in. In an attempt to highlight the absurdity of this radical new physics, he collaborated on a paper with two like-minded colleagues at Princeton University, Boris Podolsky and Nathan Rosen. Known as the EPR paper, after its authors, it laid out a troubling consequence of a universe governed by probabilities. Under the right conditions, EPR explained, two particles could have their wave functions tied together, or entangled, so intimately that any action you performed on one seemed to instantaneously influence the other – no matter how far apart they were."

There is a great deal that could be said about EPR, but I will only deal with some of it.

Lee: "This was heresy. In the language of classical physics, signals can only travel at the speed of light. This means that objects need more time to communicate with things further away from them than they do with ones in their immediate vicinity – a principle known as locality. Following that logic, classical physics says two entangled particles placed a light year apart would need a full 12 months to react to any change in one another. According to EPR, however, such reactions seemed to be instantaneous. Little wonder Einstein called the process "spooky action at a distance"."

This paragraph is hideous in the wordplay that it wants to commit; up until now the wordplay has been fairly mild.

First starting with sentence: "In the language of classical physics, signals can only travel at the speed of light."

Going by wiki for explanation of classical physics [2]: "**Classical physics** refers to theories of physics that predate modern, more complete, or more widely applicable theories. If a currently accepted theory is considered to be modern, and its introduction represented a major paradigm shift, then the previous theories, or new theories based on the older paradigm, will often be referred to as belonging to the realm of "classical physics". As such, the definition of a

classical theory depends on context. Classical physical concepts are often used when modern theories are unnecessarily complex for a particular situation. Most usually *classical physics* refers to pre-1900 physics, while *modern physics* refers to post-1900 physics which incorporates elements of quantum mechanics and relativity."

So, going by that – classical physics is physics pre-Einstein relativity. But wiki goes on to explain:

"Classical theory has at least two distinct meanings in physics. In the context of quantum mechanics, classical theory refers to theories of physics that do not use the quantisation paradigm, which includes classical mechanics and relativity. Likewise, classical field theories, such as general relativity and classical electromagnetism, are those that do not use quantum mechanics. In the context of general and special relativity, classical theories are those that obey Galilean relativity."

i.e. sometimes Newtonian physics is called classical physics and treated separate to Einstein's relativity, and sometimes Einstein's relativity is called classical physics to separate it from quantum physics.

It's just wordplay, so when says:

"In the language of classical physics, signals can only travel at the speed of light."

Really special relativity, and so should be saying:

"In the language of special relativity, signals can only travel at the speed of light."

I would then dispute that as proper understanding of special relativity, but will -pass.

When article says, "classical physics" can give the false impression that is referring to Newtonian physics as having "signals can only travel at the speed of light."- when there is no such restriction in Newtonian physics.

Next says: "This means that objects need more time to communicate with things further away from them than they do with ones in their immediate vicinity – a principle known as locality."

Wiki says of the locality principle [3]: “In physics, the principle of locality states that an object is directly influenced only by its immediate surroundings. A theory which includes the principle of locality is said to be a "local theory". This is an alternative to the older concept of instantaneous "action at a distance". Locality evolved out of the field theories of classical physics. The concept is that for an action at one point to have an influence at another point, something in the space between those points such as a field must mediate the action. To exert an influence, something, such as a wave or particle, must travel through the space between the two points, carrying the influence. The special theory of relativity limits the speed at which all such influences can travel to the speed of light, c. Therefore, the principle of locality implies that an event at one point cannot cause a simultaneous result at another point. An event at point A cannot cause a result at point B in a time less than T=D/c, where D is the distance between the points.”

Really to a large extent it is wordplay meaning special relativity’s lightspeed constancy.

Can have locality principle in context of Newtonian physics or in context of special relativity; but wordplay is that now usually meant in context of special relativity.

Next says: “Following that logic, classical physics says two entangled particles placed a light year apart would need a full 12 months to react to any change in one another.”

Says “classical physics” again by which means special relativity again.

Next says: “According to EPR, however, such reactions seemed to be instantaneous. Little wonder Einstein called the process “spooky action at a distance”.”

Being instantaneous that would be back to Newtonian physics without special relativity lightspeed constancy, and Einstein wouldn’t like his theory to be wrong. (Although I tend to now argue it is messed up, and needs tidying up to dispose of the common beliefs around lightspeed constancy.)

Goes on to say about “Overruling Einstein”, that: “But not everybody got such a fright. Erwin Schrödinger, another pioneer of quantum theory, embraced entanglement as the phenomenon that definitively separated the quantum and classical worlds, calling it the characteristic trait of quantum mechanics. To physicists such as Schrödinger, its very spookiness made it an ideal place to find the key ingredient that gave the quantum world its quantumness.”

Which sounds like people like Schrodinger are prepared to abandon special relativity (with its usual things said about lightspeed constancy).

“All the while, sceptics like Einstein were desperate to explain this bizarre twinning by purely classical means.”

Desperate because Einstein didn’t want his theory abandoned.

“One suggestion was that the two particles had predetermined properties that were uncovered by means of observation. If you took a pair of gloves to opposite ends of the universe, for example, it would hardly be surprising to know that one glove was left-handed as soon as you identified the right-handedness of the other. The handedness of one glove didn’t somehow emerge when the other was examined – it had been an integral part of its identity all along.”

“Such a theory, which appeared to explain entanglement while preserving locality, became the raft that quantum naysayers clung to with increasing desperation. That all changed in 1964, when physicist John Stewart Bell conceived a series of thought experiments that would be able to distinguish between true quantum entanglement and a classical equivalent that preserved locality.”

The article then gets to the relevant sentence:

“In a series of ever more accurate experimental implementations of his ideas from 1972 onwards, entanglement was shown to be a reality. Quantum physics was gleefully non-local.”

Which seems to be a coded way of saying that special relativity is wrong or that the usual beliefs about special relativity are wrong. Also, the sentence is contained in a sub-heading “Overruling Einstein” which further implies the article is saying Einstein is wrong.

The article thus seems to be saying Einstein is wrong about relativity, but is saying it in such a complicated coded way that the usual people who get triggered whenever Einstein is said to be wrong overlook it. Further reading of the article gives no more enlightenment.

Smolin similarly does the wordplay trick with the words “locality”, “classical physics”, “entanglement” in a New Scientist article and says [4]: “Quantum theory also seems to violate the principle of locality, which says that objects or events must be near one another to interact. In classical physics, for example, the gravitational or electrical force between two objects depends on their distance: the closer they are in space, the stronger the force between them. Quantum theory, meanwhile, introduces entanglement, a phenomenon that allows objects to seemingly influence each other instantaneously over any distance.”

**References**

[1] Heart of quantum, Ciaran Lee, New Scientist 16 March 2019 p.38-41

[2] https://en.wikipedia.org/wiki/Classical_physics at 24 August 2019

[3] https://en.wikipedia.org/wiki/Principle_of_locality at 24 August 2019

[4] Quantum weirdness isn't real – we've just got space and time all wrong, Lee Smolin, 21 August 2019 https://www.newscientist.com/article/mg24332440-600-quantum-weirdness-isnt-real-weve-just-got-space-and-time-all-wrong/

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