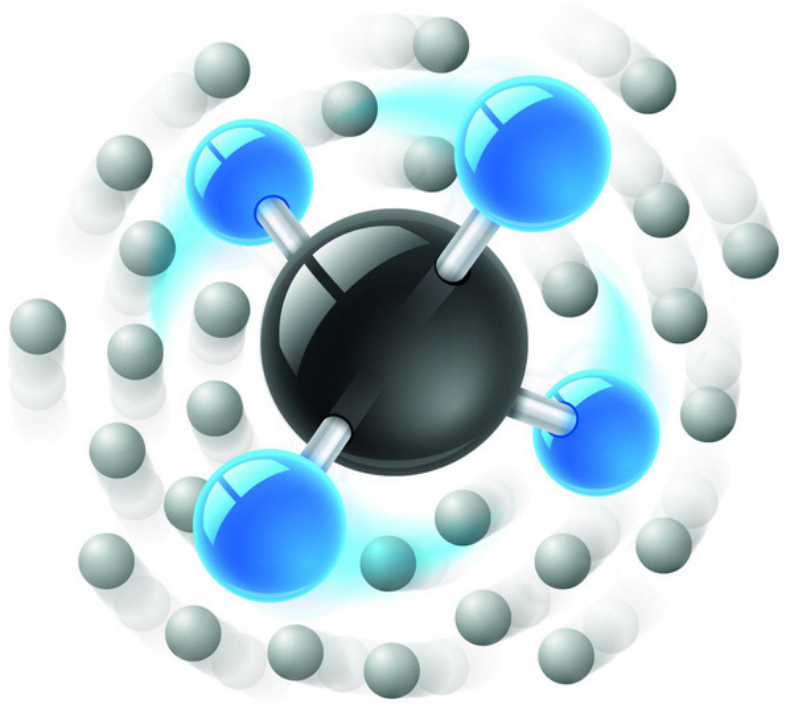
Science has found evidence of the immortality of pseudo-particles: they replicate themselves after decay

If the concept of immortality existed, would physics be overthrown?

Nothing exists forever. Humans, planets, stars, galaxies . maybe even the Universe itself, everything perish in accordance with the cycle of birth - death. But that rule does not necessarily exist in the quantum world because recently, scientists have discovered quasiparticle in many quantum systems that can literally immortal.

The quasiparticles are not a seed of electrons or quarks that we know of. They are just a disturbance taking place inside matter, created by the electric or magnetic force in the solid and acting like particles. While a particle (electron, proton or neutron) can freely float in space, a pseudo-particle can exist only in systems interacting between many particles (mostly solids).



Pseudo-immortals still undergo decay, but the strange thing is that after decaying, they can reorganize themselves back to their original state.

This seems to be challenging the second law of thermodynamics, asserting that entropy in an isolated system can only increase but not decrease: everything can only be broken, not built by itself. rebuild. However, the discovery of immortal particles does not cause scientists headaches, because humanity still knows too little about the quantum world - where the laws go against the physical model. tissue we still know.

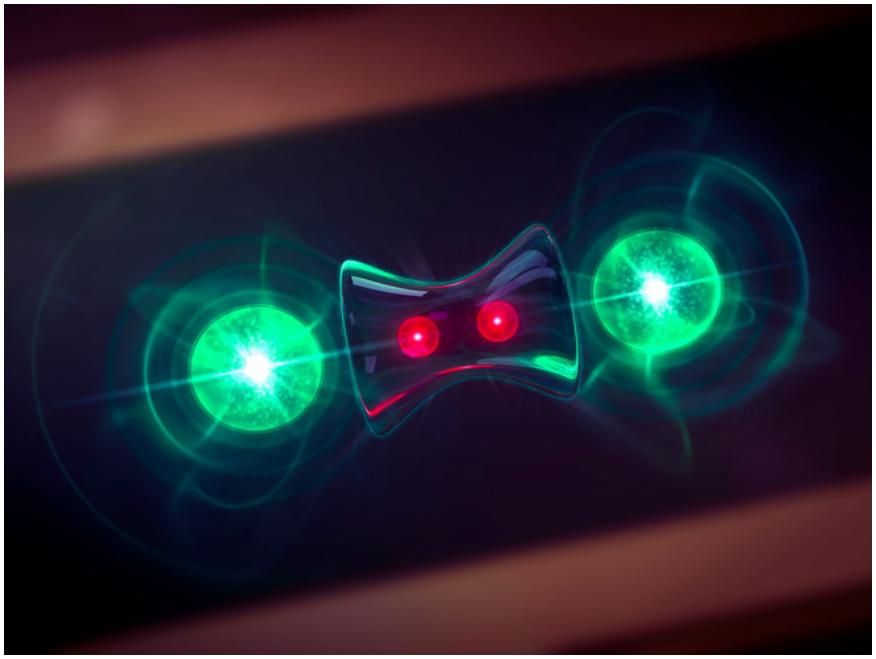
We all know that the strong interaction is the binding force between quarks, the particles that make up the atomic nucleus, which holds protons and neutrons in the nucleus together. With some heavy elemental nuclei, some neutrons are isolated from the proton, causing the nucleus to decay. But in June 2019, physicist Frank Pollman of Munich Technical University again discovered something strange: "Previously, we assumed that pseudo-particles in quantum systems, the interaction decays after a for a while, but now we know one more thing: the strong interactions can even stop the nucleus from completely decaying. "

The scientists involved in the study developed arithmetic models to calculate the complex interactions of pseudo-particles, then ran simulations on a supercomputer to observe how they decay.

" *After seeing the results of the simulation, we have to admit that the pseudo-particles decay, but then identical particle entities appear from the debris* ," said physicist Ruben Verresen. of Munich Technical University and Max Planck's Institute of Physics.

"If decay takes place at a super fast speed, an inverse reaction will occur after a certain amount of time and the debris will converge. This process can recur infinitely creating a knife. action between decay and rebirth. "

And finally physicists have shown that it doesn't violate the second law of thermodynamics. Because the oscillation is a wave transformed into matter, this is described by the concept of wave-particle duality, a content contained in quantum mechanics. Besides, the entropy of quantum systems containing pseudo-particles does not decrease, they remain the same. While this is strange, it does not break the laws of physics.



In fact, this finding has solved several other problems. In previous experiments, the magnetic compound $Ba_3CoSb_2O_9$ had an unstable structure, but now the magnetic particles included in this substance (called magnons) are missing links. to decode this phenomenon. According to computer simulations, they have rearranged themselves after decay.

In addition, physicists have also deciphered the phenomenon of helium becoming a superfluid liquid at an absolute low temperature of -273.15 ° C, and this transition can be explained by the fact that helium is also full. The pseudo-particle is called roton.

At present, these findings are theoretical, but researchers believe that the immortality of pseudo-particles will provide the potential for long-term data storage in quantum computer systems.

The research has been published in Nature.