



From 08.02.2017, 16:33 clock

nature

Quantum physics

Einstein was wrong

Viennese quantum physicists prove with ancient light that quantum entanglement exists.

Vienna. (Est) Only when you look, they both stand still: particles, which obey the laws of quantum mechanics, behave quite sneaky, because behind the backs of the researchers they do nobody knows what. Only when scientists measure the state of two entangled particles do they instantaneously assume the identical state, and the question is whether the measurement influences or creates the state, or whether it is not.



Not so spooky:

The problem of quantum entanglement, which Albert Einstein denounced as a "spooky distance", could be summarized in this way. Only the measurement on one of two entangled particles automatically determines the undefined state of the other to this point. This happens even over long distances - for example, if one particle is in Vienna and the other is in space, they can not exchange information at all, as one would expect. Einstein assumed that the setting of the measuring instruments could influence the particle states and a linkage could be simulated. Quite physically, quantum physicists are convinced that the physics of the smallest particles simply follow more crazy rules than those of the visible matter.

In fact, particles that remain undefined without an observer are difficult to reconcile with our world view. In order to prove the entanglement, physicists must therefore be innovative. They let measurement settings of random generators or over thousands of arbitrary decisions of humans determine. A team led by Anton Zeilinger from the Institute for Quantum Optics and Quantum Information (IQOQI) of the Austrian Academy of Sciences (ÖAW) has taken a step further: it left the choice to the stars.

The Viennese physicists first produced cross-linked pairs of photons in the laboratory and sent them from the Hedy-Lamarr telescope on the roof of their institute in the ninth district of Vienna to separate measuring stations near the Austrian National Bank and the University of Natural History. There are astronomical telescopes that capture the light of two stars from opposite directions of the Milky Way. The incident photons controlled the settings for measuring the entangled particles.

Einstein wanted to explain quantum confusion with the physics of Newton, in which he sought hidden variables. Such variables are now excluded by the Viennese researchers. Your Conclusion: Einstein was wrong. Since the photons are taken from stars, the light years are both from each other as well as from the earth, the choice of the measurement setting should have been 600 years ago.

More from the department

How more controls the migration of migratory birds

Viennese researcher: messenger solves "pulling unrest" in singing birds.

[continue](#)

Herbal predators

Fabulous as a spare parts storage

"Bat Bot": robots like the bats

Popular content

Most read

1. The hip swing is important
2. Einstein was wrong
3. Disaster year of space travel
4. Thinning protection film instead of air conditioning
5. Psychotherapy can change brain

Most commented

1. Recipe for large quantum computers
2. Psychotherapy can change brain
3. "Enlightenment campaigns do not lead to the goal"
4. Einstein was wrong
5. She has different stress than he does

[advertising](#)

dossier



Special: The World of Miracles

Tags

Bat Bot Evolution Bat Flight

"Loophole of free choice"

"The likelihood that there are hidden variables that could lead to the entanglement is now even lower than before, because an influence on the measuring result would have had to take place well before Gutenberg's invention of book printing", explains Zeilinger to the journal Physical Review Letters "published experiment."

As early as 1964, the Northern physicist John Stewart Bell had formulated a proposal on how the quantum-physical entanglement can be tested experimentally. Since then, numerous "Bell tests" have been carried out to prove the "spooky remote effect". However, the experiments contained loopholes, so that skeletal skepticism could not be completely disproved. "One is the" loophole of free choice, "says first author Johannes Handsteiner. This means that the particles and the measuring device could theoretically have been causally influenced before the experiment.

"In order to exclude an 'agreement' between the particle and the measuring device, the exact setting of the latter must be chosen freely and independently of the particles," explains Steiner. Each stellar light particle determines the setting of the measurement on the earth by its color, which was fixed at the time of its creation at the star. "We were able to close the 'loophole of free choice' by 16 orders of magnitude," Zeilinger said. The researchers are now planning to go back in time, if possible until shortly after the Big Bang.

Comments (2) |  To press

Tags

Quantum physics , entanglement , Anton Zeilinger , Johannes Handsteiner , Einstein , Sternenlicht

[2 reading commentaries](#)

Ihr Name *

Ihre E-Mail-Adresse *

By submitting the comment, you acknowledge our [online terms of use](#).

Notify me of replies

Geben Sie hier Ihren Kommentar ein... Enter your comment here ...

T H P I E

Submit

* Required fields (e-mail address will not be published)

Das könnte Sie auch interessieren



Keine Rückfahrt ohne Entwerter

Wien. "I hob den Foaschein ned zwickn kennan, i hob kan Entwerter g'funden." Ein Satz, der früher bei der Fahrsteinkontrolle ins Reich der faulen... [weiter](#)



voestalpine bricht der Gewinn ein

Wien/Linz. Der börsennotierte Stahlkonzern voestalpine hat in den ersten drei Quartalen des Geschäftsjahres 2016/17 unter dem Strich deutlich weniger verdient... [weiter](#)

Trump kündigt harten Kurs gegen Kriminalität an

Washington. Zur Amtseinführung seines Justizministers Jeff Sessions hat US-Präsident Donald Trump einen rigorosen Kurs in der Verbrechenbekämpfung ange... [weiter](#)



Sie hat anders Stress als er

Wien/Tübingen. (est/apa) Die einen werden cholerisch, die anderen nervös oder gar krank. Wiederum andere laufen unter Druck zu Höchstform auf, denn jeder Mensch... [weiter](#)

 powered by plista

[start page](#)

[news](#)

[World](#) [Europe](#) [Austria](#) [Vienna](#) [Culture](#) [Economy](#) [Sports](#) [Elections](#)

[Topics Channel](#)

[Education](#) [Digital](#) [Integration](#) [Literature](#) [Way of life](#) [Music](#) [Law](#) [Reflections](#) [Games](#) [City & Land](#) [Wissen](#)

Molecular Biology Robot Science Robotics

Ab 03.02. in den neuen „Zeitreisen“:

Henri Rousseau als Mensch und Maler



Reviews	Editorials Glossen Gastkommentare Comments Blogs Readers' Forum Analyzes Portraits Cartoons
Dossiers	1914 Armenian genocide Protection of species Asylum Autism Brexit 360 ° -eXodus Boko Haram CES Comics & Mangas Digitization Dylan February 1934 Fukushima Greece Debt Iran 2017 IS- Terrormiliz 2017 Artificial Intelligence The Kurds Network Policy OSCE Parking in Vienna President T Pentagon of the 60s / 70s Prater Stories Space Travel Salzburger Festspiele Scroll Stories Shakespeare Raumvisionsen Start-Up-Boom Syria - A Destroyed Land TTIP UN General Secretariat US Election 2016 Viennale Forest Christmas Vienna Congress Zika Virus
Official Journal	Search Current Issue Alte Ausgaben Konkurse My Area Jobs Info Immobilien
Subscription	Subscription offers Abovorteile ABO + Abo-Service
Side dishes	WienerJournal extra ProgramPoints Future Atlas Together Weinzeit
Companies	Contact Editorial office WZ Jobs at Wiener Zeitung Editorial office Imprint Terms and Conditions Deutsch Information about Wiener Zeitung
Full text search	
