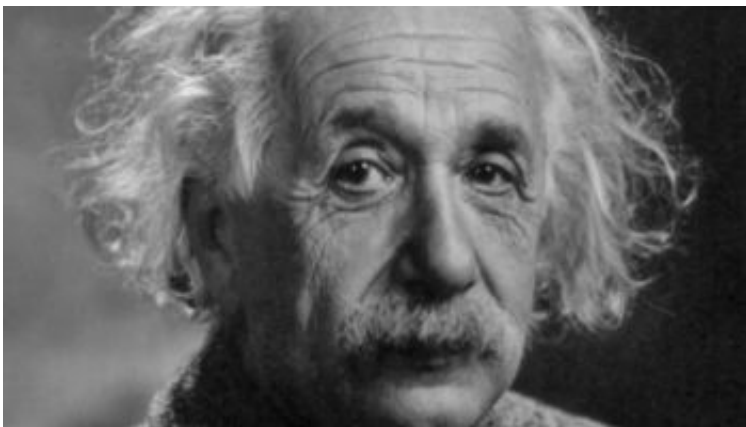


Einstein's 'spooky' theory may lead to ultra-secure internet

March 24 2014



Albert Einstein

(Phys.org) —Einstein's scepticism about quantum mechanics may lead to an ultra-secure internet, suggests a new paper by researchers from Swinburne University of Technology and Peking University.

Associate Professor Margaret Reid from Swinburne's Centre for Quantum and Optical Science said Einstein's reservations about quantum mechanics were highlighted in a phenomenon known as "'spooky' action at a distance."

In 1935 Einstein and researchers highlighted a 'spooky' theory in [quantum mechanics](#), which is the strange way [entangled particles](#) stay connected even when separated by large distances.

"Until now the real application of this has been for messages being shared between two people securely without interception, regardless of the spatial separation between them," Professor Reid said.

"In this paper, we give theoretical proof that such messages can be shared between more than two people and may provide unprecedented security for a future quantum internet."

In the 1990s, scientists realised you can securely transmit a message through encrypting and using a shared key generated by Einstein's strange entanglement to decode the message from the sender and receiver. Using the quantum key meant the message was completely secure from interception during transmission.

Sending Einstein's entanglement to a larger number of people means the key can be distributed among all the receiving parties, so they must collaborate to decipher the message, which Professor Reid said makes the message even more secure.

"We found that a secure message can be shared by up to three to four people, opening the possibility to the theory being applicable to secure messages being sent from many to many.

"The message will also remain secure if the devices receiving the message have been tampered with, like if an iPhone were hacked, because of the nature of Einstein's spooky entanglement.

"Discovering that it can be applied to a situation with more parties has the potential to create a more secure internet – with less messages being intercepted from external parties."

The paper was published in *Physical Review Letters*.

More information: Genuine Multipartite Einstein-Podolsky-Rosen Steering, Q.Y. He and M. D. Reid, *Phys. Rev. Lett.* 111, 250403 (2013)
link.aps.org/doi/10.1103/PhysRevLett.111.250403

Provided by Swinburne University of Technology

Citation: Einstein's 'spooky' theory may lead to ultra-secure internet (2014, March 24) retrieved 24 April 2024 from
<https://phys.org/news/2014-03-einstein-spooky-theory-ultra-secure-internet.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.