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A tiny chip gives quantum connectivity to smartphones and laptops

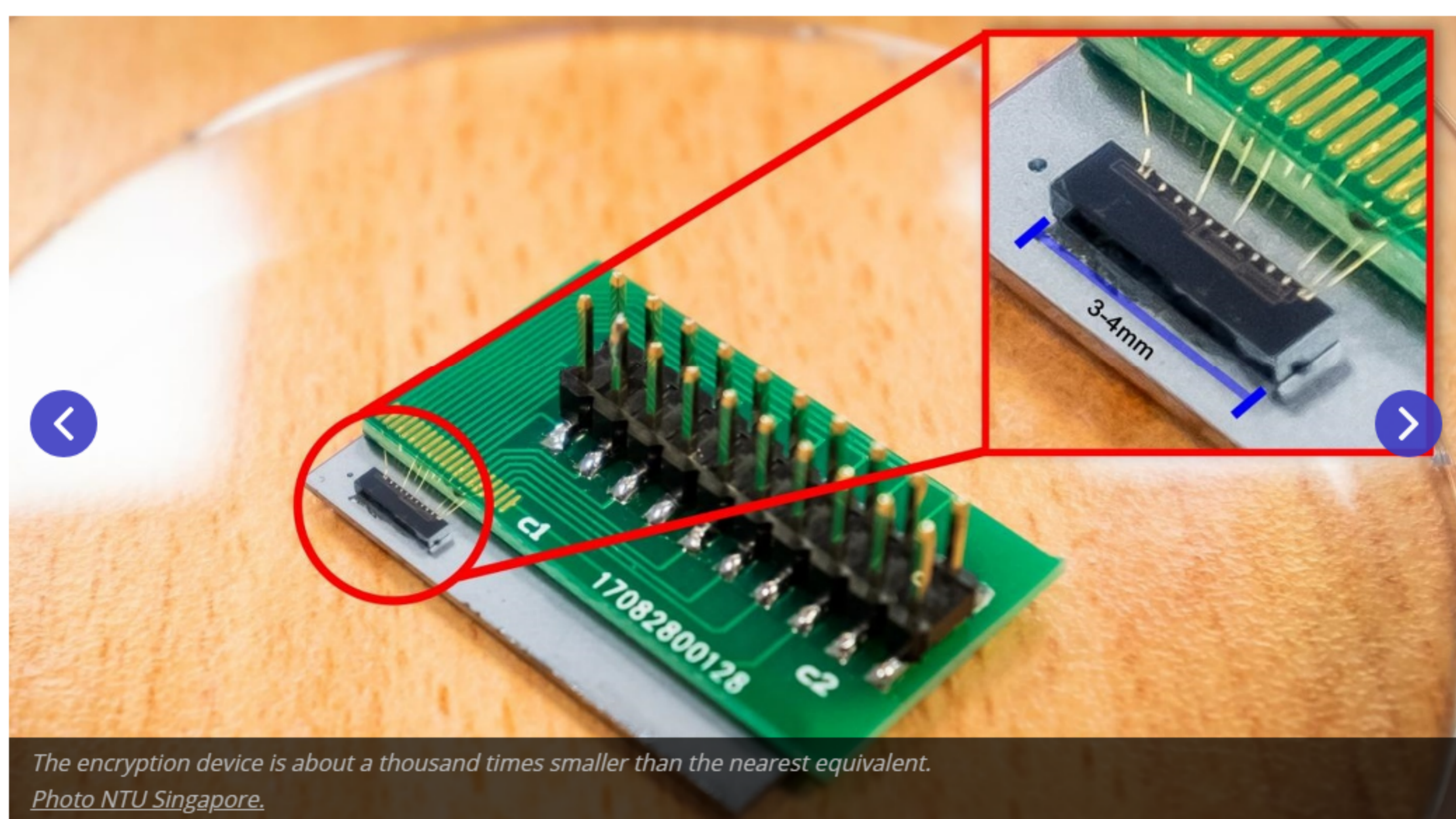
#Technics

#link

quantum technologies

records

cybersecurity



The encryption device is about a thousand times smaller than the nearest equivalent.
Photo NTU Singapore.



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Quantum information security guarantees absolute security. However, until now, devices for such encryption were the size of a refrigerator, or even the size of a room. Now, engineers have created a small encryption chip that can be integrated into any wearable device.

The achievement is described in a [scientific article](#) published in the journal Nature Photonics by a group led by [Ai Qun Liu](#) from Nanyang University of Technology in Singapore.

"Vesti.Nauka" (nauka.vesti.ru) [spoke in detail](#) about the principles of quantum information protection. Recall that in the quantum distribution of keys, the participants in the conversation generate a random cipher known only to both of them. This eliminates the need for passwords or other identifiers that may be stolen.

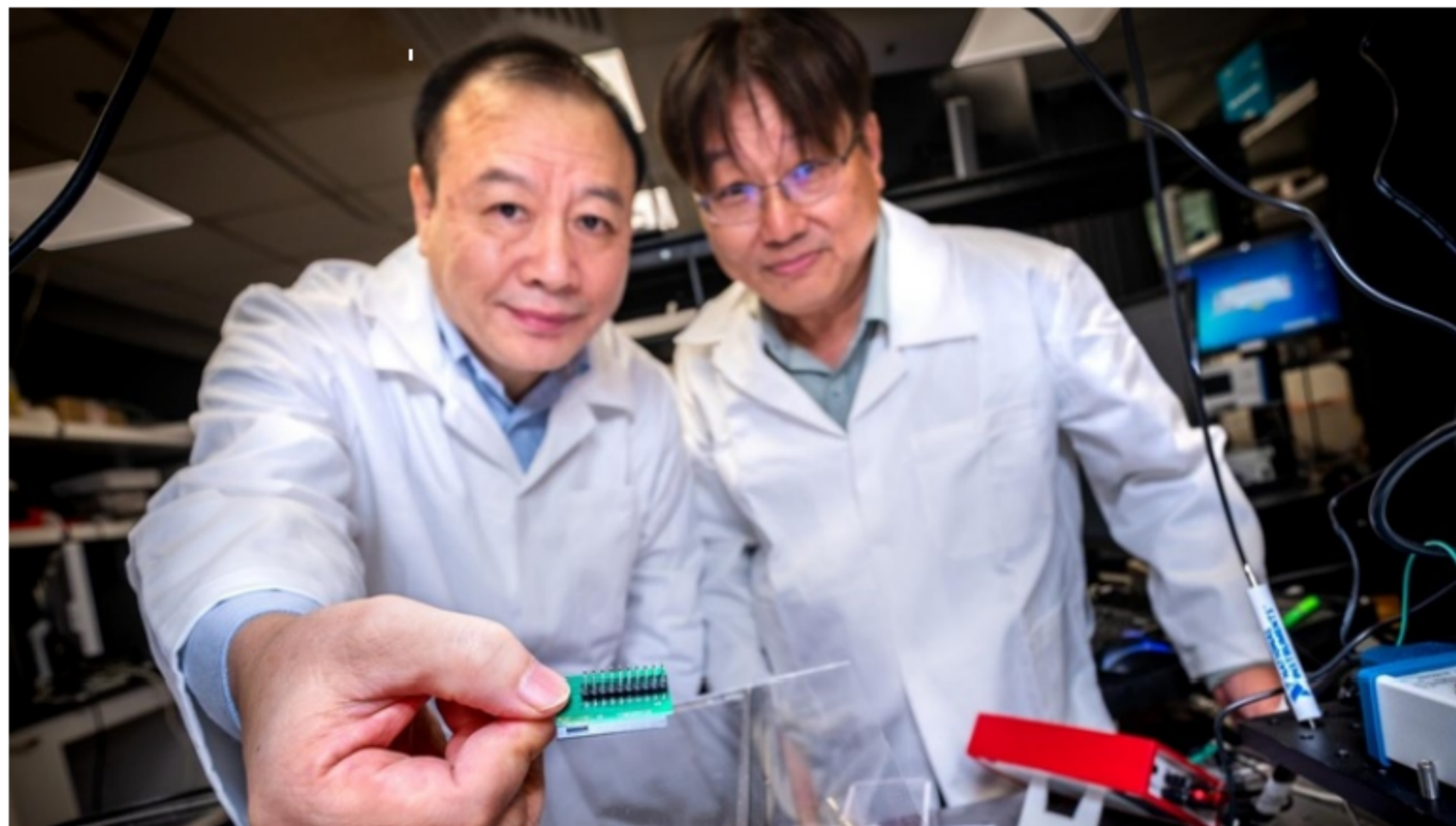
An attempt to intercept the quantum key leads to a failure in the communication channel, and the interlocutors stop transmitting data, as they immediately learn about the hack. It is impossible to get around this effect, since it is based on the fundamental laws of physics.

"In the modern world, cybersecurity is very important, since most of our data is stored and transmitted digitally. Almost all digital platforms and repositories require users to enter their passwords and biometric data, and as long as they are, they can be "Intercepted or decrypted. Quantum technology eliminates this situation, because both the password and the information are integrated into the sent message, forming a quantum key," Liu explains in a [press release](#) .

However, the widespread adoption of this technology is hindered by an unfortunate fact: equipment for generating quantum keys is already very cumbersome. In the best case, such a device is the size of a large refrigerator, but it can also occupy an entire room.

However, Liu and the team made a breakthrough by packing everything necessary for quantum encryption (except for the laser) into a three millimeter chip. Such a device is about a thousand times smaller than its closest competitor.

The secret key generation rate is 0.14 kilobits per second, and one such chip can communicate over a hundred kilometers of optical fiber.



The new chip will be able to provide even smartphones with secure quantum communications.
Photo NTU Singapore.

It is important that the chip is made of materials standard for electronics, such as silicon. That is, the novelty should be quite cheap in production.

"This is the future of secure communications, and our research brings us closer to quantum computing and communication. This [achievement] will help initiate the creation of next-generation communications devices, as well as improve digital services such as financial online banking portals and e-government services," sums up Liu.

Now the authors are working to integrate their development into classic fiber-optic communication systems.

By the way, earlier Vesti.Nauka wrote about the first tests of a [high-speed quantum communication line](#) in Russia and how the GLONASS satellites set a [record for the quantum communication range](#) .