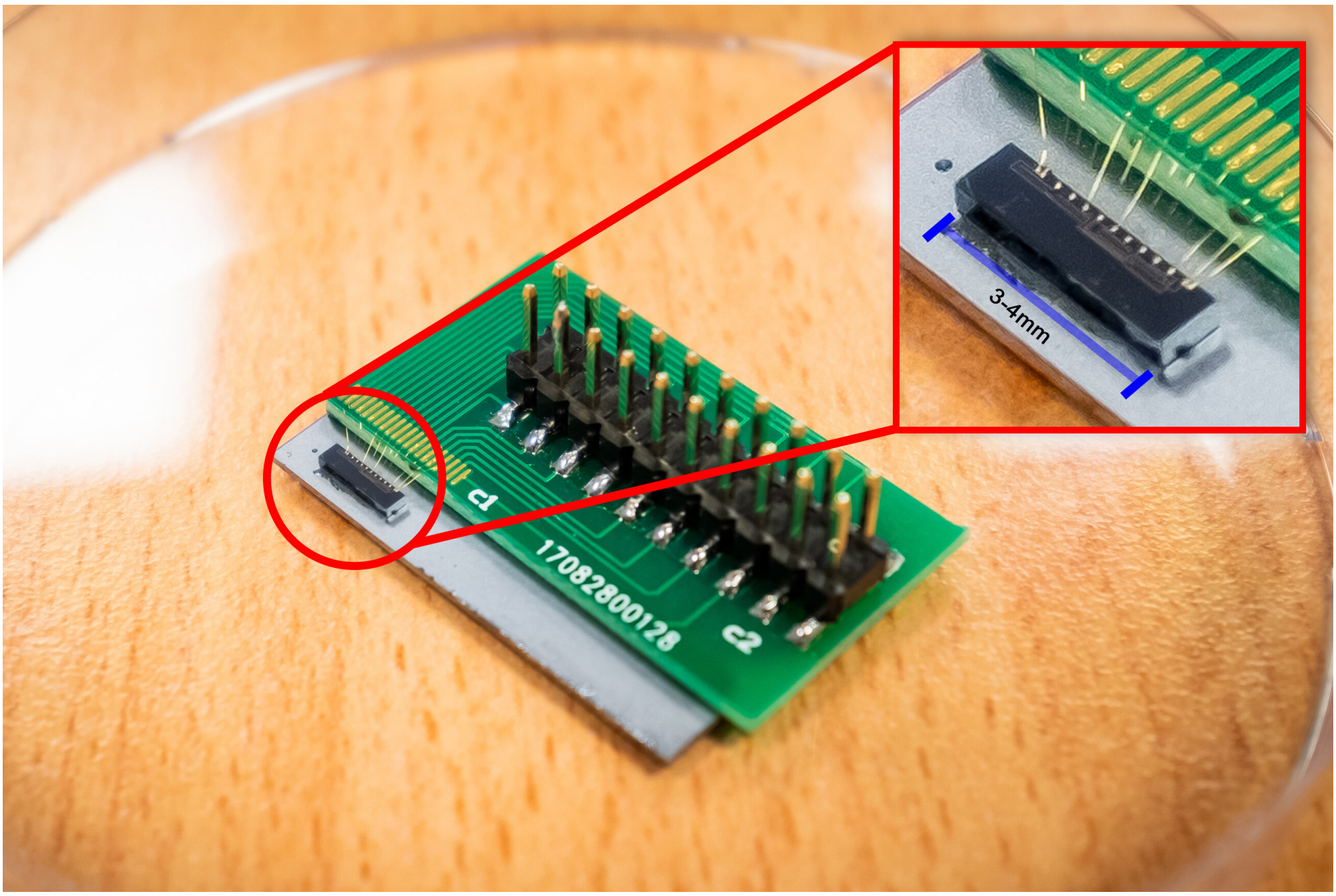
RESEARCHERS ARE DEVELOPING A QUANTUM CHIP THAT IS 1000 TIMES SMALLER THAN CURRENT CONFIGURATIONS

October 31, 2019 Science 3 Views



<img src = "https://scx1.b-cdn.net/csz/news/800/2019/6-ntusingapore.jpg" alt = "Researchers at NTU Singapore are developing a quantum chip that is 1000 times smaller It also takes 1000 times less space than current quantum communication setups and opens doors to more secure communication technologies that can be used in compact devices such as smartphones, tablets, and smartwatches Image credits: NTU Singapore

Researchers at Nanyang Technological University, Singapore (NTU Singapore) have developed a quantum communication chip that is 1000 times smaller than current quantum setups, but offers the same superior safety quantum technology for which it is known.

Most leading security standards for secure communication methods – from withdrawing cash at an ATM to buying goods online on a smartphone – do not rely on quantum technology. The electronic transmission of the personal identification number (PIN) or password can be intercepted and present a security risk.

The tiny chip is about three millimeters in size and uses quantum communication algorithms to increase security compared to existing standards. For this purpose, passwords are integrated into the information

provided, thus forming a secure quantum key. Once the information is received, it is destroyed along with the key, making it a highly secure form of communication.

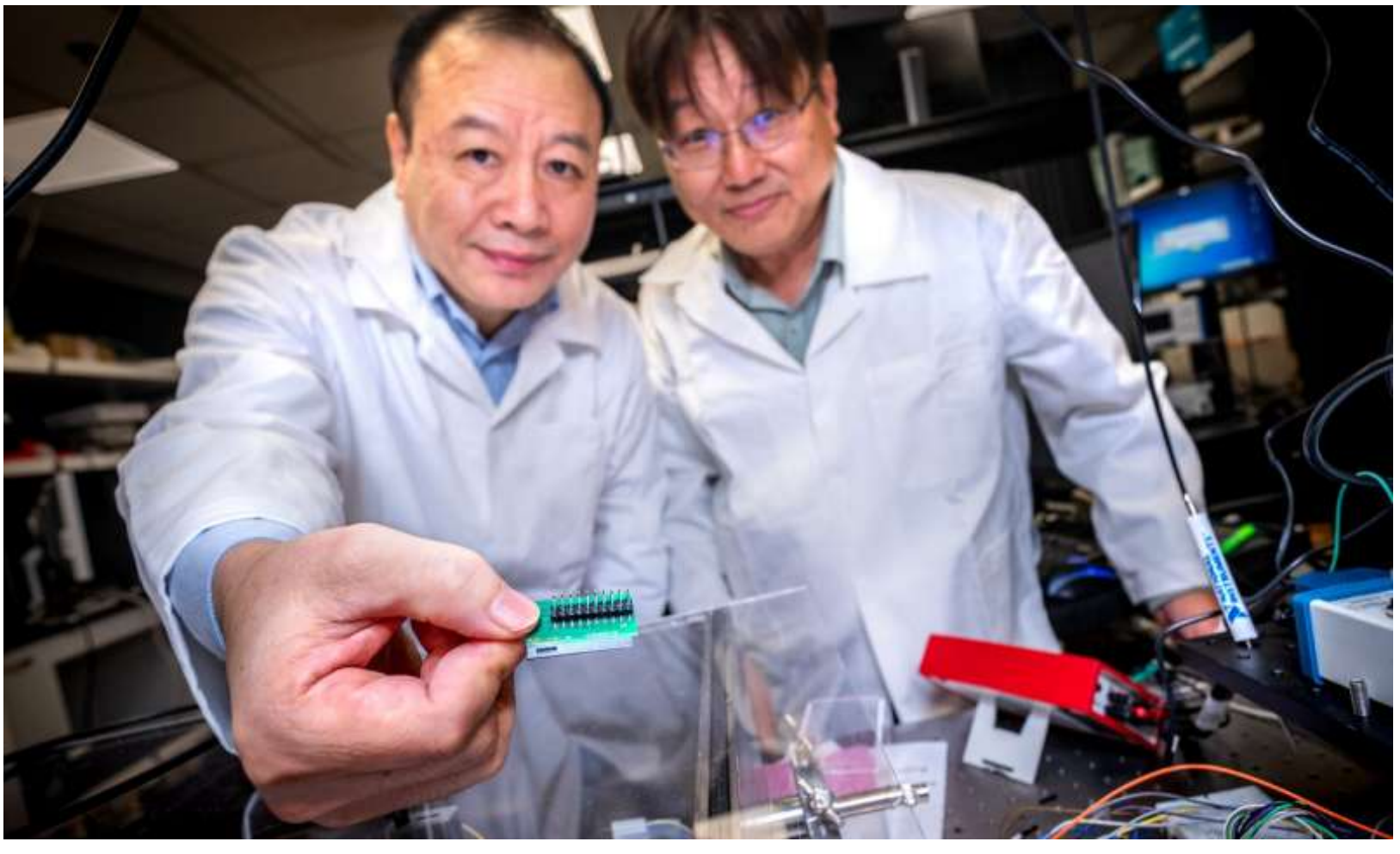
It also requires 1000 times less space than current quantum communication setups, which can be as big as a refrigerator or even take up the space of an entire room or office floor. This opens doors to safer communication technologies that can be used in compact devices such as smartphones, tablets and smartwatches. It also forms the basis for better encryption methods for online transactions and electronic communications.

Led by NTU Professor Liu Ai Qun and Associate Professor Kwek Leong Chuan, the team's findings were published in a leading journal. *Nature Photonics* .

Prof. Liu from the Department of Electrical and Electronic Engineering at NTU said, "In today's world, cyber security is very important because many of our data is stored and communicated digitally, and almost all digital platforms and repositories require user input of passwords and biometric data and as long as they can be intercepted or decrypted, Quantum technology eliminates this by integrating both the password and the information into the message being sent. "

Assoc Prof Kwek explains that the Quantum communication using random code strings works to encrypt the information that can only be opened by the int terminated receiver with the correct key. It is not necessary to transfer additional passwords or biometric data, as is common in current forms of communication.

"It's like sending a secured letter Imagine the person who wrote the letter locked the message in one The recipient needs the same key to open the key Quantum technology Ensures secure key distribution and prevents key manipulation, "said Assoc Prof Kwek, a physicist at NTU's National Institute of Education.



(LR) The NTU-Prof. Liu Ai Qun and Assoc. Prof. This is 1,000 times smaller than the current setups and provides almost no hackable encryption levels. Picture credits: NTU Singapore

Military-grade communications technology made cost effective

The world's largest technology companies, including Google and IBM, are seeking to develop quantum supercomputers that would revolutionize computing at unimaginable speeds today.

A highly anticipated strength of quantum technology lies in cryptography, the art of secret communication.

With the proliferation of Internet services, e-mail and messaging platforms such as WhatsApp, Facebook, Skype, Snapchat, Telegram, etc. have created their own secure communication channels. so-called "classic channels".

In contrast, quantum channels that transmit information have security protocols that are integrated into the encrypted data. Each channel is clearly different, reducing or even eliminating the risk of intercepting or losing information during transmission.

Put simply, quantum technology requires no additional transmission of passwords or biometric data required in "classical channels". "This eliminates the risk of eavesdropping or information loss and produces near-unbreakable encryption.

The quantum communication chip developed by NTU researchers will be cost-effective because it uses industry-standard silicon materials, making it easy to manufacture

Prof Liu said, "This is the future of communications security, and our research brings us closer to quantum computing and communication. It will help promote the development of next-generation communication devices and improve digital services such as online financial portals of banks and digital government services. "

The NTU team is now trying to develop a hybrid network of traditional optical communication systems and quantum communication systems, which will improve the compatibility of quantum technologies that can be used in a wider range of applications, such as Internet connectivity.

Meter-independent quantum communication without encryption

Further information:

G. Zhang et al., An Integrated Silicon Photonics Chip Platform for Continuously Variable Quantum Key Distribution, *Nature Photonics* (2019). DOI: 10.1038 / s41566-019-0504-5