

Satellites

China sends first 'unhackable' message to satellite

China's quantum satellite, nicknamed Micius after a 5th century BC Chinese scientist, was launched last year © AFP



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AN HOUR AGO by: Tom Mitchell and Xinning Liu in Beijing

Chinese scientists have sent the first quantum transmission from earth to an orbiting satellite, marking another key step in the creation of an “unhackable” global communications network.

In a summary of their experiment published on Thursday in the scientific journal [Nature](#), the team led by Pan Jianwei said the transmissions had travelled as far as 1,400km between base stations in central and western China and a satellite launched last year.

“Previous [quantum] teleportation experiments between distant locations were limited to a distance of the order of 100km,” the scientists wrote.

Unlike traditional communications, which can be tapped surreptitiously, anyone attempting to eavesdrop on a quantum communication creates a disturbance that can be detected by the network’s users.

“China is now the world’s leader in quantum communication technologies and is actively co-operating with scientists from Austria, Germany and Italy in this field,” said Peng Chengzhi, a member of the research team and a professor at the University of Science and Technology in Hefei, Anhui province. “China will lead the quantum space race for the next five years.”

Tim Byrnes, a quantum physicist at New York University’s Shanghai campus, described the result as “truly remarkable”. He noted that before China’s successful experiments, including a

transmission from space to Earth in June, the longest distance travelled by a quantum communication had been 143km.

Development of quantum communications on terrestrial networks has been impeded by the particles in the earth's atmosphere. According to Prof Peng, a quantum communication along fibre-optic cables between Beijing and Shanghai would require more than 30 transfer stations. "We need to decode the information and re-encrypt it at each station," he said.

As a result, quantum physicists have turned their attention to space-based networks.

"These experiments show that you can really overcome this issue by going to space," Mr Byrnes said. "The reason is simple — space is a vacuum and light can travel long distances unimpeded. The US, Europe and Japan have been trying to do this for years."

The \$100m [Micius satellite](#) involved in the experiments was successfully launched in August 2016. It is named after an ancient Chinese philosopher and scientist.

Chinese scientists hope to launch a second quantum communications satellite by the summer of 2021.

Ronald Hanson at the Technical University of Delft, in Holland, called Thursday's announcement "a very important milestone" but noted that technical hurdles remained.

"We are still very far from making a global quantum network; this is not the last missing link," Prof Hanson said. "Such satellite links would need to be linked with local quantum processors and memories — systems that we are working on."

In July, Chinese scientists said they had [successfully deployed](#) a local-area quantum network in Jinan, a city in eastern Shandong province. The Jinan network will also be a key link in a 2,000km quantum network being built between Beijing and Shanghai.

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