



Chinese Cyber Warfare Advance in Quantum Teleportation

There's a new arms race heating up, one that involves not nuclear weapons or satellite-guided bombs but communications. In May of this year, Chinese engineers achieved a significant technological breakthrough, broadcasting an encrypted signal 10 miles using a new technique called "quantum teleportation."

What *Time* magazine termed "China's Quantum Leap Forward" doesn't use transporter rooms or tractor beams; instead, it's a new way of communicating information that takes advantage of a well-known principle of quantum physics to maintain encryption.



The process involves changing the quantum states of pairs of photons that are linked ("entangled"). When the state of one photon is modified, the change is adopted by the other in what Einstein famously called "spooky action at a distance." The photons are then transported by a blue laser beam. In this way, information can now be transmitted — over short distances at least — that in theory cannot be intercepted by an outside observer, thanks to what is known as the Uncertainty Principle. This principle states that it is impossible to observe directly the energy state of a given particle, because the act of observation (i.e., bombarding it with photons or other particles that can give information to the observer) will have the effect of changing the state of the particle under observation. There is thus observational uncertainty built into all observations of the quantum micro-universe.

The significance of the Chinese breakthrough is potentially very great. It could mean that the Chinese have uncovered the Holy Grail of cryptography, an encoding process that is impossible to decrypt. No one — in theory at least — could intercept or otherwise "listen in" on the teleported information without interfering with the quantum states of the intercepted photons and corrupting the information. While 10 miles is not a very large distance, it is far enough for military satellites to send encrypted messages to ground bases. Blue lasers are being used for teleportation because they penetrate farther underwater, and are therefore likely to be of use for China's growing submarine fleet.

The United States has also been working on quantum teleportation, and claims to have achieved a 14-mile broadcast of quantum information. While the United States still enjoys technological and material edges over China in most military sectors, it is clear that the Chinese are making significant advances in cyber warfare, and are attempting to build a 21st-Century military equipped to challenge U.S. dominance in the Pacific Basin, if not worldwide.



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