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Quantum Teleportation

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Abstract: Quantum information is very different from its classical counterpart. In particular, it cannot be measured reliably, it cannot be cloned or broadcast, and any attempts at measuring it spoils it irreversibly. These are the properties that make quantum cryptography possible, allowing perfectly secure transmission of confidential information. On the other hand, those same properties make the transmission of quantum information rather delicate, and seemingly impossible if only a classical channel is available. Nevertheless, quantum teleportation is a technique that allows transmission of quantum information through a classical channel, provided sender and receiver had previous access to a quantum channel; arbitrarily faithful transmission is possible even if the prior quantum channel is noisy. We call this process "teleportation" because the information has to disappear from the sender's location before it can appear at the receiver's. The first successful teleportation was experimentally realized in a Roman laboratory in July 1997.

This talk will not assume prior knowledge in quantum mechanics.

Joan Boyar