Integrating Quantum Concepts into Cybersecurity

Activity 2: Tutorial Teleportation and Entanglement Swapping

1. In the teleportation protocol above derive the last line for the Bell state with i = j = 0.

2. What are the possible outcomes for Bob's photon after measurement by the sender Alice?

3. Hence what would Bob need to do to the photon at the receiver side of the protocol in order to reconstruct the unknown quantum state that the sender had?

4. Does the teleportation protocol give us communication at the speed of light?

5. Does Alice still have the unknown quantum state and Bob have a copy?

6. In theory could you set up entanglement between the North and South poles?

7. If entanglement swapping is employed in a point to point manner from router to router between sender and receiver, with storage at the router prior to sending on the next stage what security implications do you perceive with respect to the teleportation protocol?