

Goals

- Describe general qubit states
- Investigate cloning
- Analyze communication protocols

No Cloning

- Assume for contradiction that U is a cloner.
- Then $U|\psi\rangle_A|0\rangle_B = |\psi\rangle_A|\psi\rangle_B$ for all $|\psi\rangle \in \mathbb{C}^d$, where $U \in \mathbb{C}^{d^2 \times d^2}$, $|0\rangle \in \mathbb{C}^d$.
- Consider the action of U on $|\phi\rangle$ and $|\psi\rangle$, two states that are not orthogonal.
- ...Find a contradiction...
- (Hint – inner products are your friend.)