Quantum ooga-booga basics

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Recap

$$|1
angle,\,|0
angle,\,H,\,X,\,Y,\,Z,\,R_X(heta),\,R_Y(heta),\,R_Z(arphi)$$
 alt text $|\psi
angle=e^{i\gamma}(\cosrac{ heta}{2}|0
angle+e^{iarphi}\sinrac{ heta}{2}|1
angle)$ Superposition & entanglement alt text

Phase kickback

alt text

Superdense coding

Bell states

$$|\Phi^+
angle= ext{CNOT}\,(H\otimes I)|0
angle\otimes|0
angle=rac{1}{\sqrt{2}}(|00
angle+|11
angle)$$
 , encodes 00

$$|\Phi^-
angle= \qquad (Z\otimes I)|\Phi^+
angle = rac{1}{\sqrt{2}}(|00
angle - |11
angle)$$
 , encodes 10

$$|\Psi^{+}
angle = (X\otimes I)|\Phi^{+}
angle = rac{1}{\sqrt{2}}(|01
angle + |10
angle)$$
 , encodes 01

$$|\Psi^{-}
angle = (iY\otimes I)|\Phi^{+}
angle = rac{1}{\sqrt{2}}(|01
angle - |10
angle)$$
 ,

Phase oracle & other

alt text