

Goals

- Describe and analyze 2 qubit systems

Emma

Noel

Eric

Gebre

Jacob

Tianzhi

Hamilton

Jack

Steph

Graham

Jacqueline

Walter

Zach

Bryan

Brendan

Caroline

Zale

Scott

Michael

What is $|1\rangle \otimes (\sqrt{\frac{1}{3}}|0\rangle + \sqrt{\frac{2}{3}}|1\rangle)$?

A. $\sqrt{\frac{1}{3}}|01\rangle + \sqrt{\frac{2}{3}}|11\rangle$

B. $\sqrt{\frac{1}{3}}|10\rangle + \sqrt{\frac{2}{3}}|11\rangle$

C. $\sqrt{\frac{1}{3}}|01\rangle + \sqrt{\frac{2}{3}}|10\rangle$

D. $\sqrt{\frac{1}{3}}|00\rangle + \sqrt{\frac{2}{3}}|11\rangle$

If $|\psi\rangle_{AB} = \sqrt{\frac{1}{2}}|01\rangle_{AB} + i\sqrt{\frac{1}{2}}|10\rangle_{AB}$, what is $\langle\psi|_{AB}$?

A. $\sqrt{\frac{1}{2}}\langle 01|_{AB} - i\sqrt{\frac{1}{2}}\langle 10|_{AB}$

B. $\sqrt{\frac{1}{2}}\langle 10|_{AB} - i\sqrt{\frac{1}{2}}\langle 01|_{AB}$

If $|\psi\rangle_{AB} = |01\rangle_{AB}$, and $|\phi\rangle_{AB} = |10\rangle_{AB}$,
what is $\langle\phi|\psi\rangle$?

A. 0

B. 1

C. $\langle\phi|\psi\rangle$ is not a valid construct

If $|\psi\rangle_{AB} = |\psi_1\rangle_A |\psi_2\rangle_B$ is a quantum state, what is $\langle\psi|\psi\rangle$?

A. 0

B. 1

C. $\langle\psi|\psi\rangle$ is not a valid construct

What is Alice and Bob's Success Probability?

$$M(\theta) = \left\{ \begin{array}{l} \text{Outcome 0} \quad \quad \quad \text{Outcome 1} \\ \downarrow \quad \quad \quad \downarrow \\ \cos \theta |0\rangle + \sin \theta |1\rangle, \quad -\sin \theta |0\rangle + \cos \theta |1\rangle \end{array} \right\}$$

Case 1: $x=y=0$. Alice: $M(0)$. Bob: $M\left(\frac{\pi}{8}\right)$.

(To simplify, only calculate the probability of good outcomes.)