$|\psi_{AB}\rangle \neq |\psi_A\rangle \otimes |\psi_B\rangle$

in any basis

Can more than 2 states be entangled? Yes!
but min=2.

Bell Basis

$$\underbrace{|\psi\rangle_A = e^{i\theta}|\psi\rangle_A = e^{i\theta_1}|\psi_A\rangle}_{\text{all same}}$$

$$\langle\psi_A|\psi_A\rangle = \langle\psi_A|e^{-i\theta}e^{i\theta}|\psi_A\rangle$$
$$= \langle\psi_A|\psi_A\rangle$$

$$|\phi^+\rangle = \frac{1}{\sqrt{2}}\left[|0_A\rangle \otimes |0_B\rangle + |1_A\rangle \otimes |1_B\rangle\right]$$
$$|\phi^-\rangle = \frac{1}{\sqrt{2}}\left[|0_A\rangle \otimes |0_B\rangle - |1_A\rangle \otimes |1_B\rangle\right]$$
$$|\psi^+\rangle = \frac{1}{\sqrt{2}}\left[|0_A\rangle \otimes |1_B\rangle + |1_A\rangle \otimes |0_B\rangle\right]$$
$$|\psi^-\rangle = \frac{1}{\sqrt{2}}\left[|0_A\rangle \otimes |1_A\rangle - |1_A\rangle \otimes |0_B\rangle\right]$$

$$|\phi^+\rangle = e^{i\pi}|\phi^+\rangle$$

if you rotate one basis vector & not the other then you have an intermediate phases.

Alice & Bob entangled

$$|\phi^+\rangle = \frac{1}{\sqrt{2}}\left[|0_A 0_B\rangle + |1_A 1_B\rangle\right]$$

$$|0_A 0_B\rangle = |0_A\rangle \otimes |0_B\rangle$$

$$|1_A 1_B\rangle = |1_A\rangle \otimes |1_B\rangle$$

$$\langle A \otimes B | q \otimes s\rangle = \langle A|q\rangle \otimes \langle B|s\rangle$$

$$|n\, m\, l\, s\rangle = |n\rangle \otimes |m\rangle \otimes |l\rangle \otimes |s\rangle$$

Teleportation

↳ without a particle Bob can recreate Alice's state

If things are entangled, won't Alice's measurement collapse Bob's state?

measurement (Entangled state) ~~[illegible]~~ = Unentangled

$$|\phi^+\rangle = \frac{1}{\sqrt{2}}\left[|0_A 0_B\rangle + |1_A 1_B\rangle\right]$$

State of alice discloses state of Bob