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Quiz 19

1. $|\psi\rangle = N\left[\alpha|1\rangle + \beta|2\rangle + \gamma|3\rangle\right]$

Express the 3×3 density matrix $\rho = |\psi\rangle\langle\psi|$ in terms of N, α, β, and γ.

2.
$$\rho = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$$

What is an example of a $|\psi\rangle$ that corresponds to this ρ?

3. $\rho = \begin{pmatrix} 1/2 & 1/4 \\ 1/4 & 1/2 \end{pmatrix}$

Is the system in a pure state? A coherent superposition state? Or a statistical mixture state? What does ρ^2 tell you?

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