Name

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Quiz 20

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1. Write the 2×2 density matrix, $\boldsymbol{\rho}(t)$, for the time evolving state that results from

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for an eigenstate, $\Psi_j(t) = \psi_j e^{-iE_j t/\hbar}$.

* what is $|\Psi(t)\rangle$?

* what is $\boldsymbol{\rho}(t)$?

2. The detector is designed to see only $2^{-1/2}\left(|1\rangle - |2\rangle\right)$. Write the 2×2 **D** matrix.

3. The **D** matrix is independent of time because the detector is not moving. But the expectation value for **D**, the detected intensity, is time dependent because $\boldsymbol{\rho}(t)$ contains time dependent coherence terms. Compute $\langle \mathbf{D} \rangle_t = \text{Trace}(\mathbf{D}\boldsymbol{\rho})$.