



PT-symmetric quantum state discrimination

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Suppose that a system is known to be in one of two quantum states, $|\psi_1\rangle$ or $|\psi_2\rangle$. If these states are not orthogonal, then in conventional quantum mechanics it is impossible with one measurement to determine with certainty which state the system is in. However, because a non-Hermitian PT-symmetric Hamiltonian determines the inner product that is appropriate for the Hilbert space of physical states, it is always possible to choose this inner product so that the two states $|\psi_1\rangle$ and $|\psi_2\rangle$ are orthogonal. Thus, quantum state discrimination can, in principle, be achieved with a single measurement.

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