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Observation of Quantum Destructive Interference in Inelastic Two-Wave Mixing.

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Using room-temperature ^{87}Rb atoms we demonstrate a quantum destructive interference between two one-photon excitation pathways in an inelastic two-wave mixing scheme that corresponds to the "strong-storage and weak-retrieval" of an optical field. This destructive interference is fundamentally different from the usual electromagnetically-induced-transparency because it is critically dependent on the generation and propagation of a wave-mixing field. We also show that contrary to the common belief, that the maximum atomic coherence in general does not lead to the maximum mixing-wave conversion efficiency.