

Absorption-Amplification Response with or Without Spontaneously Generated Coherence in a Coherent Four-Level Atomic Medium

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**Abstract:** We discuss and analyze the absorption-amplification properties of a weak probe field in a typical four-level atomic system in the presence of an additional coherence term, the spontaneously generated coherence term. The influences of the spontaneously generated coherence and a coherent pump field on the probe absorption (amplification) are investigated in detail. We show that the absorption of such a weak probe field can be dramatically enhanced due to the presence of the spontaneously generated coherence. At the same time, the probe-absorption profile exhibits the double-peak structure and the probe-absorption peak gradually decreases as the pump intensity increases. On the contrary, the amplification of such a weak probe field near the line center of the probe transition can be achieved by adjusting the coherent pump field intensity in the absence of the spontaneously generated coherence.

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