Linear Growth of Continuous-Wave Four-Wave Mixing with Dual Induced Transparency

WANG Wen-Yi[1] and LI Jia-Hua[2]

[1] National Key Laboratory for Laser Technique, Huazhong University of Science and Technology, Wuhan 430074, China
[2] Department of Physics, Huazhong University of Science and Technology, Wuhan 430074, China
(Received: 2004-2-12; Revised: 2004-3-9)

Abstract: Using Schrödinger-Maxwell formalism, we propose and analyze an optical four-wave mixing (FWM) scheme for the generation of coherent light in a coherent six-level atomic medium based on dual electromagnetically induced transparency (EIT). We show that the significantly enhanced conversion efficiency enabled by ultraslow propagation of pump waves has no direct relationship with the single-photon detuning, which is different from the FWM with a single EIT. The most important feature is that our scheme is also capable of inhibiting and delaying the onset of the detrimental three-photon destructive interference that looks like a recent scheme [Phys. Rev. Lett. 91 (2003) 243902] and may be used for generating short-wave-length coherent radiation.

[Full text: PDF]

Close