

Quantum Physics

Doppler-free Adiabatic Self-Induced Transparency

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We demonstrate that a Doppler broadened two-level medium can be made transparent to a laser pulse by an appropriate adiabatic variation of the laser field amplitude and its nominal detuning. This new technique of adiabatic self-induced transparency (ASIT) is compared with the well known self-induced transparency (SIT) phenomenon, showing that the adiabatic method is much more robust to variations of the system parameters. We also discuss a possible experimental implementation of ASIT using 87-Rb atoms.

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