

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Time-dependent response of vapor-cell Rydberg EIT in pulsed optical and RF fields RACHEL SAPIRO, GEORG RAITHEL, DAVID ANDERSON, Rydberg Technologies — We investigate the time dependence of atom-light and atom-RF field interactions in Rydberg electromagnetically-induced transparency (EIT) in a room temperature and heated vapor cell. Quantum-optical transients are observed with rapid onset and dissolution of EIT induced by coupler-light pulses. The formation and dissolution time of the transient EIT regime, and its dependencies on light intensity and Rydberg-atom density are studied. Simulations of pulsed EIT are performed by solving a time-dependent three-level master equation with mean-field level-shift corrections, and averaging over the Maxwell velocity distribution in the cell. The results are in excellent agreement with experimental observations, including accurately reproducing quantum-optical transients observed at both onset and dissolution. Time-dependent responses of EIT to RF-field pulses are also investigated.

Rachel Sapiro
Rydberg Technologies

Date submitted: 01 Feb 2020

Electronic form version 1.4