Cheat sheet 2: EIT Pulse Propagation and Storage

# Pulse propagation – Static control field1

Input ­– Output relation in frequency domain:

Optical depth :

Resonant optical depth for

Group delay:

Spectral width of the transparency window:

Fractional delay:

# Dark-State Polaritons2,3

Slowly varying operators

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Interaction Hamiltonian in continuous limit

Time evolution in slowly-varying amplitude approximation and for low excitation

Adiabatic limit

Introduce polariton field with , such that

Example plot for light storage2:

# Further reading (optional)

1. Fleischhauer, M., Imamoglu, A. & Marangos, J. Electromagnetically induced transparency: Optics in coherent media. *Rev. Mod. Phys.* **77,** 633–673 (2005).

2. Fleischhauer, M. & Lukin, M. D. Dark-State Polaritons in Electromagnetically Induced Transparency. *Phys. Rev. Lett.* **84,** 5094–5097 (2000).

3. Fleischhauer, M. & Lukin, M. D. Quantum memory for photons: Dark-state polaritons. *Phys. Rev. A* **65,** 022314 (2002).