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Stationary pulses of light: three-dimensional confinement and nonlinear optics AXEL ANDRE, MICHAL BAJCSY, ALEXANDER ZIBROV, MIKHAIL LUKIN, Harvard University — We show that the method of stationary pulses of light [1] can be extended to confine pulses of light in all three spatial dimensions. This is achieved through a waveguiding effect due to the transverse dependence of the index of refraction in an Electromagnetically Induced Transparency (EIT) medium. We experimentally demonstrate this effect and show how it can be used to confine pulses of light in all three spatial dimensions. This method could be used to strongly enhance nonlinear interactions between weak pulses of light [2]. Specifically, we show that an efficient Kerr-like interaction between two pulses can be implemented by exploiting the steep atomic dispersion associated with narrow EIT resonances. [1] M. Bajcsy, A. S. Zibrov, and M. D. Lukin, Nature **426**, 638 (2003). [2] A. André, M. Bajcsy, A. S. Zibrov, and M. D. Lukin, Phys. Rev. Lett. (in press).

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