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Stopping a weak laser beam on a dielectric surface.

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We show that a probe laser can be 'stopped' and its energy can be stored in the chemical bonds of electric dipoles located on the dielectric surface. The process can be induced by a stronger coupling laser, which imposes its frequency of vibration to the oscillating dipoles, and can be measured from light detected along the path of least time of the probe laser. Although the process locks the probe laser beam due to interference with a coupling laser, similar as in electromagnetic induced transparency, in our case the dielectric is transparent (rather than opaque) to both lasers and the process of locking the weak laser is induced on the surface (rather than inside bulk matter). We adopt a Brewster angle (BA) method which allows us to assess the polarization of light reflected by the surface. The normalization of the parallel component to the total component of the reflectance near BA, where this component nearly vanishes, shows a parabolic variation. From the signal near the vanishing reflectance, the BA value and the refractive index of the dielectric can be extracted with high precision. This parabolic curve is modulated by an interference pattern with a maximum at a BA value associated to the coupling laser, and with several minima of interference which follow a $\cos^2$ variation. A low capacitor voltage supplies energy to the electric dipoles and increases their frequency of vibration (Bahrim et al. J. of Appl. Math. and Phys., 2, 1105-12 (2014)). This shift varies proportional with the separation between the minima of interference and is consistent with the destructive interference between a weak probe and a stronger coupling laser.

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