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Slow light with bacteriorhodopsin solutions CHANDRA YELLESWARAPU, FRANCISCO ARANDA, REJI PHILIP, RAO DEVULAPALLI, University of Massachusetts - Boston — Slow light in gases and solids has been studied in recent years. Various applications are possible depending on the modulation frequency and the amount of delay that can be induced in the traveling wave. Recently we demonstrated ultra slow light in the biological photo-membrane bacteriorhodopsin (bR) polymer film at room temperature [Phy. Rev. Lett., **95**, 2536011, 2005]. By exploiting the photoisomerization property of bR for coherent population oscillation, the group velocity is controlled from about 0.1 mm/sec to the speed of light. But as bR is embedded in a polymer matrix, the isomerization rates are slow and hence limited to low modulation frequencies. On the other hand bacteriorhodopsin solution can be used for obtaining slow light at higher modulation frequencies. Studies in solution also offer the advantage of changing the optical density at ease resulting in longer pulse delays. Detailed results on slow light where the delay is varied with modulation frequency, optical density and all-optical control with a blue laser beam will be presented.

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