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Correlation functions of single atom resonance fluorescence with slow light media[1] FRANK A. NARDUCCI, JON P. DAVIS, Naval Air Systems Command, TONY ABI-SALLOUM, Widener University — We consider the resonance fluorescence emitted by a single atom as the field passes through a slow light medium in the regime where the bandwidth of the slow light medium is narrower than the full Mollow spectrum of the emitted light. We first consider the second-order (in the field) correlation function and show how to properly account for the bandwidth of the slow-light medium. We then consider a standard Hanbury-Brown Twiss interferometer modified by placing a slow light medium in one arm. The fourth order (in the field) correlation functions that result from properly considering the bandwidth of the slow light medium depend on non-time ordered operators. We demonstrate how to evaluate these correlation functions. By making an assumption about the functional form for the dispersion of the slow medium, we derive an analytic albeit very complex expression for the correlation functions. Adjusting the center frequency of the slow light medium with respect to the atomic frequency allows us to explore the modifications of the correlations function as different components of the Mollow spectrum are delayed by the slow light medium. The results of these numerical simulations will be presented.

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