

Abstract Submitted  
for the DAMOP11 Meeting of  
The American Physical Society

**Variations of Positive and Negative Dispersions in Both Highly and Weakly Absorptive Atomic Systems** TONY ABI-SALLOUM, SCOTT SNELL, Widener University, JON DAVIS, FRANK NARDUCCI, Naval Air Systems Command — Positive and negative dispersive media are essential in subluminal, superluminal and negative group velocity pulse propagation applications. Three-level atomic media at resonance, especially the Lambda configuration, are positively dispersive and transparent. In contrast, two-level atomic systems are negatively dispersive and opaque. In this work we study higher level atomic systems comprised of three fields coupled to three levels (double lambda) or four levels (N-Scheme). We explore the systems of interest for critical features such as negative dispersion and transparency, a combination that is needed in numerous applications, e.g. optical gyroscopes. We solve the time dependent equations perturbatively and compare them to well established behavior in three-level systems. Some of the results are analyzed in terms of resonances which control the different features of the observed dispersive and absorptive behaviors.

Tony Abi-Salloum  
Widener University

Date submitted: 01 Feb 2011

Electronic form version 1.4