

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Negative refraction in the polariton regime: an illustration of a nonlinear process in negative refractive materials** DAVID WARD, KEITH NELSON, Massachusetts Institute of Technology, KEVIN WEBB, Purdue University — A phonon-polariton is an admixture of light waves and lattice vibrations which can be generated through impulsive stimulated Raman scattering—a nonlinear interaction between near and far-infrared radiation. Characteristic to the polariton regime is polariton dispersion, in which an avoided crossing between electromagnetic and vibrational degrees of freedom result in two branches for the dispersion relation separated by a bandgap. Through finite-difference-time-domain (FDTD) simulations, we illustrate a third branch that occurs in the bandgap when a magnetic resonance is introduced that overlaps with the existing ionic resonance. We demonstrate the consequences of this new branch on Cerenkov-like terahertz radiation generated through difference frequency mixing and ISRS.

David Ward  
Massachusetts Institute of Technology

Date submitted: 04 Dec 2004

Electronic form version 1.4