Abstract Submitted for the MAR07 Meeting of The American Physical Society

Multiple-Scattering of Millimeter Waves in Random Dielectrics¹ DUSTIN MCINTOSH, JOHN A. SCALES, L. D. CARR, Dept. of Physics, Colorado School of Mines, Golden, CO 80401 USA, VALENTIN FREILIKHER, Dept. of Physics, Bar-Ilan University, Ramat-Gan 52900, Israel, YU. P. BLIOKH, Physics Dept., Technion-Israel Institute of Technology, Haifa 32000 Israel — We investigate millimeter wave localization in random binary-layered dielectrics composed of subwavelength scatterers. We measure the broad-band phase-dependent reflection and transmission response of the system. The random dielectrics exhibit band gaps and transmission resonances, the hallmark of localization. The band gaps correspond to forbidden mode propagation; the resonances to effective cavities in the system. These cavities are associated with enhanced attenuation and slow light which we observe in both experiment and theory. These effects are a result of weak multiple-scattering by the layer boundaries due to the disorder in the dielectric stack.

 $^1\mathrm{We}$ acknowledge the National Science Foundation for support.

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Date submitted: 26 Nov 2006 Electronic form version 1.4