Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

**Wave Propagation in High Impedance Surfaces** MICHAEL PETRAS, Freescale Semiconductor, RAMAMURTHY RAMPRASAD, University of Connecticut — High impedance (hi) surfaces are artificially structured surfaces that form A sub-class of 2-d photonic band gap (pbg) materials. An interesting feature Of metallo-dielectric hi surfaces is the presence of a surface Electromagnetic (em) band gap at frequencies where the wavelength is larger Than the lattice dimension—a feature absent in all-dielectric pbg Materials. Due to this "sub-wavelength" behavior, effective medium Theories (emt) can be used to describe their dispersion characteristics. A General emt framework has been developed, and a new mechanism to describe The occurrence of band gaps in hi surfaces is presented. It is shown that The eigenmode of a surface em wave at any frequency can be written as a Linear combination of two "pure" modes: a backward mode that propagates Below the surface, and a forward mode that resides on the surface. At the Band gap frequencies these two modes cancel, resulting in no propagation. It Is anticipated that this model will be a powerful tool for understanding and Exploring a large class of periodic systems.

Michael Petras
Freescale Semiconductor

Date submitted: 30 Nov 2004 Electronic form version 1.4