

Abstract Submitted  
for the MAR07 Meeting of  
The American Physical Society

**Photonic bandgap properties of gradient-index thin films with one-dimensional periodicity and anisotropic structure.** MATTHEW HAWKEYE, University of Alberta, MICHAEL BRETT — Glancing angle deposition is a single-step fabrication technique providing *in-situ* control over the internal columnar structure of the deposited thin film. Using this technique, the density of thin TiO<sub>2</sub> films are varied sinusoidally along the substrate normal direction with a physical periodicity equivalent to wavelengths in the visible spectrum. As radiation propagates in the film, constructive and destructive interference effects lead to the observation of photonic bandgap properties. Optical characterizations of the films are performed to examine the properties of the photonic stopband. These results examine stopband behavior for light at non-normal incidence and of different polarization states. The incorporation of structural defects in the film to introduce and control optical states within the stopband is also studied. The observed properties are related to the structure of the films using effective medium theory and solution of Maxwell's equations in anisotropic media.

Matthew Hawkeye  
University of Alberta

Date submitted: 20 Nov 2006

Electronic form version 1.4