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Aurelia Minut* (aurelia@math.msu.edu), Department of Mathematics, A 214 Wells Hall, Michigan State University, East Lansing, MI 48824. *L^p Estimates for Maxwell's Equations in Stratified Media.*

In this talk we report on a work which has been partially motivated by recent research on surface-enhanced nonlinear optical effects. This is joint collaboration with G. Bao and Z. Zhou. One of the many important applications of nonlinear optical phenomena is a method for obtaining coherent radiation through second-harmonic generation (SHG) at a wavelength shorter than that of available lasers. Unfortunately, nonlinear optical effects are generally so weak that their observation requires extremely high-intensity laser beams. The existence and regularity of solutions of a system of Maxwell's equations in periodic structures is currently the subject of experimental and theoretical research with the goal to model the surface-enhanced SHG of nonlinear optics. Dobson and Friedman showed the existence and uniqueness of the solutions of Maxwell's equations in a periodic structure that separates two homogeneous materials and is piecewise \mathcal{C}^2 . The thrust of our work is to establish, by an integral-equation approach, interior L^p -type estimates for the solutions of Maxwell's equations with source term in a \mathcal{C}^2 periodic structure that separates two nonlinear materials. These estimates yield the regularity of the solutions. (Received October 02, 2000)