



# Applied Mathematics

## McGill Applied Mathematics Seminar

Oct. 16, 2006, 2:35 pm Monday  
At McGill, Burnside Hall 1205

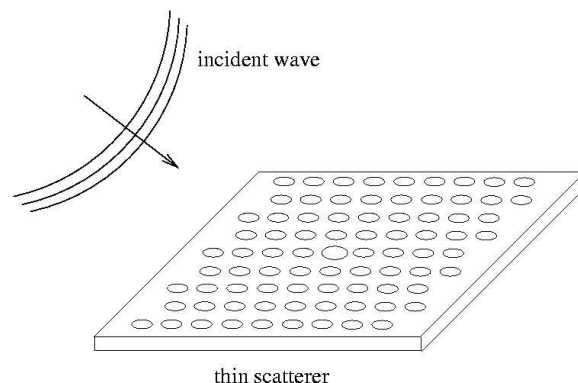
“An approximate method for scattering by thin structures”

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*Coffee and refreshments will be served after the seminar*

### Abstract:

Scattering of waves of a thin structure is considered in this work. The Helmholtz equation with a variable coefficient models the wave phenomena. The scatterer is assumed to have a high (possibly periodic) index of refraction while at the same time it is very small in one of the dimensions. We show that if the index scales as  $O(1/h)$ , where  $h$  is the thickness of the scatterer, then an approximate solution, based on perturbation analysis can be obtained. The approximate solution consists of a leading order term plus a corrector, each of which solves an integral equation in two dimensions for a three dimensional problem. We provide error analysis on the approximation. The approximate method can be viewed as an efficient computational approach since it can potentially greatly simplify scattering calculations. Applications in mind are for the modeling and design of photonic band gap materials. This is joint work with F. Santosa and J. Zhang



Scattering from a 2-D grating with inclusions.