Meeting: 1003, Atlanta, Georgia, SS 4A, AMS-SIAM Special Session on Theoretical and Computational Aspects of Inverse Problems, I

1003-65-999 **Fatih Ecevit*** (ecevit@math.umn.edu), 127 Vincent Hall, 206 Church St. S.E., Minneapolis, MN 55455, and **Fernando Reitich** (reitich@math.umn.edu), 127 Vincent Hall, 206 Church St. S.E., Minneapolis, MN 55455. *A high-frequency integral equation method for electromagnetic and acoustic sctattering : rate of convergence of multiple-scattering iterations.*

In this talk, we shall present an analysis of a recently proposed integral equation method for the solution of high-frequency electromagnetic and acoustic scattering problems that delivers error-controllable solutions in frequency-independent computational times. Within single scatterer configurations the method is based on the use of an appropriate ansatz for the unknown surface densities and on suitable extensions of the method of stationary phase. The extension to multiple-scattering configurations, in turn, is attained through consideration of an iterative (Neumann) series that successively accounts for multiple reflections. Here we shall show that the convergence properties of this series in the high frequency regime depends solely on geometrical characteristics. Moreover, in the case of two interacting convex structures, the convergence rate can be explicitly found. Finally, we shall show that this insight suggests the use of alternative summation mechanisms that can greatly accelerate the convergence of the series. (Received October 01, 2004)