

Direct and Inverse scattering from obstacles with generalized boundary conditions.

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The talk will focus on the use Generalized Impedance Boundary Conditions (GIBC) in direct and inverse scattering problems at a fixed frequency. We shall first motivate these non standard boundary conditions from asymptotic analysis of thin coatings or imperfectly conducting obstacles and analyze the scalar scattering problem for a general setting of these boundary conditions. We then consider the corresponding inverse problem where one is interested in recovering the geometry of an obstacle from measured diffracted waves without exact knowledge of the GIBC. This problem is tackled with the use of the Factorization method. We next investigate complementary inversion algorithms based on a steepest descent methods for specific class of these boundary conditions. The talk will be mainly dedicated to the scalar problem. However, possible generalizations to the full Maxwell problem will be outlined. We conclude with 2-D and 3-D numerical results and some open problems. This work has been achieved in the framework of the PhD thesis of Nicolas Chaulet and in collaboration with Mathieu Chamaillard and Laurent Bourgeois.