

# PDE-based and IE-based methods for inverse scattering with no forward solver

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In this talk, we first present a new partial differential equation (PDE) based method to solve the inverse scattering problems (ISP) where forward solver is not needed. Subsequently, the connection between the PDE-based inversion method, using the Helmholtz equation, and the conventional integral equation (IE) based inversion method, using the Lippmann-Schwinger equation, is to be discussed. On the other hand, in a recent work [1] we have proposed a new IE, using which in the IE-based inversion method one is able to solve the highly nonlinear ISP with strong scatterers. With such a new IE and the connection between the PDE- and IE-based inversion methods, we propose a new PDE, using which the PDE-based inversion method can also solve the highly nonlinear ISP. Pros and cons of both PDE- and IE-based inversion methods will be discussed also.

## *Reference:*

[1] Zhong Y, Lambert M, Lesselier D and Chen X 2014 A new integral equation method to solve highly nonlinear inverse scattering problems *Inverse Problems* submitted.