1079-65-311 **Peijun Li*** (lipeijun@math.purdue.edu), Department of Mathematics, Purdue University, West Lafayette, IN 47907. *Generalized Foldy-Lax formulation and its application to the inverse scattering.*

We consider the scattering of a time-harmonic plane wave incident on a two-scale heterogeneous medium, which consists of scatterers that are much smaller than the wavelength and extended scatterers that are comparable to the wavelength. A generalized Foldy-Lax formulation is proposed to capture multiple scattering among point scatterers and extended scatterers. Our formulation is given as a coupled system, which combines the original Foldy-Lax formulation for the point scatterers and the regular boundary integral equation for the extended obstacle scatterers. An efficient Gauss-Seidel iterative method is proposed to solve the coupled system, where only a linear system of algebraic equations for point scatterers or a boundary integral equation for a single extended obstacle scatterer is required to solve at each step of iteration. In contrast to the standard inverse obstacle scattering problem, the proposed inverse scattering problem is not only to determine the shape of the extended obstacle scatterer but also to locate the point scatterers. Based on the generalized Foldy–Lax formulation, an imaging function is developed to visualize the location of the point scatterers and the shape of the extended obstacle scatterer. (Received January 17, 2012)