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**An iterative algorithm for uncertainty quantification in a
class of stochastic wave propagation models**

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We consider absorption and scattering of acoustic waves from uncertain configurations comprising multiple particles with various material properties (sound-soft, sound-hard, absorbing and penetrable) and develop tools to address the problem of quantifying uncertainties in the acoustic cross sections of the configurations. The uncertainty arises because the locations and orientations of the particles in the configurations are described through random variables, and statistical moments of the far-fields induced by the stochastic configurations facilitate quantification of the uncertainty. We develop an efficient iterative algorithm, based on a hybrid of the stochastic pseudospectral discretization (to truncate the infinite dimensional stochastic process) and an efficient stable truncated version of T-matrix approach (for cost effective realization at each multiple particle configuration corresponding to the pseudospectral quadrature points) to simulate the statistical properties of the stochastic model. We demonstrate the efficiency of the algorithm for configurations with non-smooth and non-convex bodies with distinct material properties, and random locations and orientations with normal and log-normal distributions.