Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Inverse Mapping Structures onto Transparency[1] KIM F. FERRIS, XIN SUN, PAUL A. WHITNEY, Pacific Northwest National Laboratory — Composite materials have continued to make a number of improvements in physical properties (mechanical moduli), but lag behind in optical responses such as transparency. The hybrid nature of the composite material, particle and host matrix, divides light scattering issues into particle size regimes, where the particle size d >> lambda and approximations such as anomalous dispersion have proven useful, and d<< lambda where more exacting methods are necessary. The real-life difference between the 'design' particle size and the practical particle size distribution often finds contributions to light scattering losses from both regimes. Using a ceramic-polymer composite as a case example, we have used black box optimization methods to examine the practical bounds for each regime and to assess design rules. These guidelines suggest limitations for particle morphologies and the optical properties of the component materials.

[1]The authors gratefully acknowledge financial support from the US Dept of Energy and the Office of Science/ Advanced Scientific Computing Research program.

Kim Ferris
Pacific Northwest National Laboratory

Date submitted: 26 Nov 2007 Electronic form version 1.4