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WAVE SCATTERING BY MANY SMALL IMPEDANCE PARTICLES AND CREATING MATERIALS WITH A DESIRED REFRACTION COEFFICIENT

Alexander G Ramm
Kansas State University, USA

The theory of acoustic and electromagnetic (EM) wave scattering by one and many small impedance particles of arbitrary shapes is developed. The basic assumptions are: a d, where a is the characteristic size of particles, d is the smallest distance between the neighbouring particles, is the wavelength. This theory allows one to give a recipe for creating materials with a desired refraction coefficient. One can create material with negative refraction: the group velocity in this material is directed opposite to the phase velocity. One can create a material with a desired permeability. Equation is derived for the EM field in the medium in which many small impedance particles are embedded. Similar results are obtained in for heat transfer in the media in which many small particles are distributed.

ramm@math.ksu.edu