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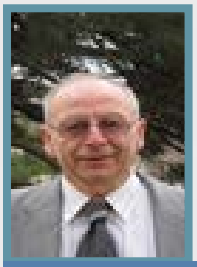

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Creating materials with a desired refraction coefficient

The theory of acoustic and electromagnetic (EM) wave scattering by one and many small impedance particles of arbitrary shapes is developed. The basic as-sumptions are: $a<<d<<\lambda$, where a is the characteristic size of particles, d is the smallest distance between the neighboring particles, λ 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 wave focusing property.

Equation is derived for the EM field in the medium in which many small impedance particles are embedded. Similar results are obtained in [6] for heat transfer in the media in which many small particles are distributed.

The theory presented in this talk is developed in [1]-[9].

Practical realizations of this theory are discussed in [9].

Biography

Alexander G Ramm Alexander G Ramm, PhD, was born in Russia, emigrated to the USA in 1979, and is a US citizen. He is Professor of Mathematics with broad interests in analysis, scattering theory, inverse problems, theoretical physics, engineering, signal estimation, tomography, theoretical numerical analysis, and applied mathematics. He is the author of 700 research papers, 17 monographs, and the editor of three books. He has lectured in many universities throughout the world, presented approximately 150 invited and plenary talks at various conferences, and has supervised 11 PhD students. He was a Fulbright Research Professor in Israel and in Ukraine, distinguished visiting professor in Mexico and Egypt, a Mercator Professor, an invited plenary speaker at the 7th PACOM, won the Khwarizmi International Award, and received other honors. Recently he solved inverse scattering problems with non-over-determined data and the many-body wave scattering problem when the scatterers are small particles of an arbitrary shape. Ramm used this theory to provide a recipe for creating materials with a desired refraction coefficient. He gave a solution to the Pompeiu problem and proved the Schiffer's conjecture.