Alexander G Ramm, Res. Rev. J Mat. Sci. 2017, 5:7
DOI: 10.4172/2321-6212-C1-011

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Wave scattering by many small impedance particles and creating materials with a desired refraction coeffcient

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 <<λ, 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 permeability.
- 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]-[6].

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Biography

A.G.Ramm was born in USSR and emigrated to USA in 1979. he is a US citizen, professor of mathematics at KSU, an author of more than 660 papers in mathematical and physical Journals, of 15 monographs, and an editor of 3 books. His scientific interests include differential and integral equations, operator theory, mathematical physics, especially scattering theory and inverse problems, numerical analysis, especially methods for solving ill-posed problems, various problems of applied mathematics and theoretical engineering. Professor A.G.Ramm was awarded many honors, including Fulbright Research Professorships in Israel and Ukraine, Mercator Professorship, NATO and DAAD professorships and grants, Khwarizmi international award, distinguished professorships in some countries and distinguished lectureships of London Mathematical Society and Hong Kong Mechanical society, and many other honors and awards. He gave invited plenary talks at many conferences throughout the world.

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