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Scattering by obstacles, by A. G. Ramm, D. Reidel Publishing Company, Dordrecht, Boston, Lancaster, Tokyo, 1986, xiv + 423 pp., $89.00. ISBN 90-277-2103-3.

For well over a hundred years, scattering theory has played a central role in mathematical physics. From Rayleigh's explanation of why the sky is blue, to Rutherford's discovery of the atomic nucleus, through the modern medical applications of computerized tomography, scattering phenomena have attracted, perplexed and challenged some of the outstanding scientists and mathematicians of the twentieth century. Broadly speaking, scattering theory is concerned with the effect an inhomogeneous medium has on an incident particle or wave. In particular, if the total field is viewed as the sum of an incident field u^i and a scattered field u^s then the direct scattering problem is to determine u^s from a knowledge of u^i and the differential equation governing the wave motion. Of equal (or even more) interest is the inverse scattering problem of determining the nature of the inhomogeneity from a knowledge of the asymptotic behavior of u^s, i.e., to reconstruct the differential equation and/or its domain of definition from the behavior of (many) of its solutions. The above oversimplified description obviously covers a huge range of physical concepts and mathematical ideas, and for a sample of the many different approaches that have been taken in this area the reader can consult the monographs of Bleistein [**1**], Colton and Kress [**3**], Jones [**5**], Lax and Phillips [**8**], Newton [**9**], Reed and Simon [**10**], and Wilcox [**12**].

The simplest problems in scattering theory to treat mathematically are those of time harmonic acoustic waves which are scattered by either a penetrable inhomogeneous medium of compact support or by a bounded impenetrable obstacle. In addition to their appearance in realistic physical situations (e.g., acoustic tomography and nondestructive testing) such problems also serve as models for more complicated wave propagation problems involving electromagnetic waves, elastic waves, or particle scattering. To mathematically model these two problems, assume the incident field is given by the time harmonic plane wave

$$u^i(\mathbf{x}, t) = \exp[ik\mathbf{x} \cdot \alpha - i\omega t]$$