Abstracts

Propagation and Scattering in Radially Flowing Media

D. Censor. "Propagation and Scattering in Radially Flowing Media." 1969 Transactions on Microwave Theory and Techniques 17.7 (Jul. 1969 [T-MTT]): 374-378.

The first-order (in v/c) vector wave equation for electromagnetic waves in moving media is solved for radially moving media. Two modes of flow are considered, the two-dimensional case of media flowing radially, symmetrically with respect to the z axis, and the three-dimensional case where the flow is symmetrical with respect to the origin. It is shown that the solution differs from the case of media at rest by a scalar multiplicative factor, involving the radius and the velocity. Propagation of a plane wave is discussed, and the local behavior is interpreted in terms of a ray propagating in the moving medium. It is shown that for an outgoing flow, the ray moves away from the origin in the finite domain. At large distances the ray enters and emerges from the medium in the same direction. Scattering by a cylinder and by a sphere, symmetrical with respect to the two-, and three-dimensional flow, respectively, are discussed. It is shown that the scattering amplitude is velocity-independent. This result is contrasted with former cases of scattering in moving media.

❑ Return to main document.