1058-65-252 **Peter B Monk*** (monk@math.udel.edu), Department of Mathematical Sciences, Newark, DE 19716. *The Interior Transmission Problem in Acoustics.*

As a result of studies of the far field pattern of the scattered wave for time harmonic acoustic and electromagnetics, a new class of interior problem arises termed the "Interior Transmission Problem" (ITP). The ITP is not a standard elliptic problem, and a study of the solvability of this problem gives rise to a non-standard eigenvalue problem for the ITP. The proof of existence and properties of these eigenvalues is not straightforward. I shall survey the ITP and its properties in acoustics, and describe numerical schemes for computing transmission eigenvalues. Remarkably, transmission eigenvalues can be observed from far field data, and the resulting eigenvalues can be used to estimate properties of the scatterer. The interior transmission problem has similarities with problems involving negative index of refraction. (Received February 16, 2010)