1096-65-1046 **Tiara D. Turner*** (tdturner@umes.edu), 1 College Backbone Road, Department of Math and Computer Science, Kiah Hall 1122, Princess Anne, MD 21853, **Jiguang Sun** (jiguangs@mtu.edu), Fisher 313, Department of Mathematical Sciences, 1400 Townsend Drive, Houghton, 49931, and **Xia Ji**. *A Mixed Finite Element Method for Helmholtz Transmission Eigenvalues.*

The transmission eigenvalue problem has important applications in inverse scattering. Since the problem is non-self-adjoint, the computation of transmission eigenvalues needs special treatment. Based on a fourth-order reformulation of the transmission eigenvalue problem, a mixed finite element method is applied. The method has two major advantages: 1) the formulation leads to a generalized eigenvalue problem naturally without the need to invert a related linear system, and 2) the nonphysical zero transmission eigenvalue, which has an infinitely dimensional eigenspace, is eliminated. To solve the resulting non-Hermitian eigenvalue problem, an iterative algorithm using restarted Arnoldi method is proposed. To make the computation efficient, the search interval is decided using a Faber-Krahn type inequality for transmission eignevalues and the interval is updated at each iteration. The algorithm is implemented using Matlab. The code can be easily used in the qualitative methods in inverse scattering and modified to compute transmission eigenvalues for other models such as elasticity problem. (Received September 12, 2013)