1077-65-1112 **Tiara D. Turner*** (tdturner09@students.desu.edu), Department of Mathematical Sciences, Delaware State University, Dover, DE 19901, **Jiguang Sun** (jsun@desu.edu), Department of Mathematical Sciences, Delaware State University, Dover, DE 19901, and **Xia Ji** (jixia@lsec.cc.ac.cn), Institute of Computational Mathematics and, Scientific/Engineering Computing, Chinese Academy of Science, Beijing, 100190, Peoples Rep of China. *A mixed finite element method for Helmholtz transmission eigenvalues.*

The transmission eigenvalue problem has important applications in inverse scattering. Since the problem is not self-adjoint, the computation of transmission eigenvalues needs special treatment. Based on a fourth order reformulation of the transmission eigenvalue problem, we choose a mixed finite element method. The method has two major advantages: 1) the formulation leads to a generalized eigenvalue problems naturally without the need to invert a related linear system, and 2) the non-physical zero transmission eigenvalue, which has an infinitely dimensional eigenspace, is eliminated. To solve the resulting non-Hermitian eigenvalue problem, we propose an iterative algorithm using restarted Arnoldi method. To make the computation efficient, the search interval is decided using a Fabra-Khan 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 be modified to compute transmission eigenvalues for other models such as elasticity problem. (Received September 16, 2011)