

1061-53-105

Ailana Fraser*, Department of Mathematics, University of British Columbia, Vancouver, BC V6T 1Z2, Canada, and **Richard Schoen**. *The first eigenvalue of the Dirichlet-to-Neumann map, conformal geometry, and minimal surfaces.*

I will talk about joint work with R. Schoen on a spectral problem for manifolds with nonempty boundary. We consider the relationship of the geometry of compact Riemannian manifolds with boundary to the first nonzero eigenvalue of the Dirichlet-to-Neumann map (Steklov eigenvalue). For surfaces with boundary we obtain an upper bound on the first Steklov eigenvalue in terms of the genus and the number of boundary components of the surface. This generalizes a result of Weinstock from 1954 for surfaces homeomorphic to the disk. We attempt to find the best constant in this inequality for annular surfaces. Motivated by the annulus case, we explore an interesting connection between the Dirichlet-to-Neumann map and minimal submanifolds of the ball that are solutions to the free boundary problem. We then prove general upper bounds for the first Steklov eigenvalue for conformal metrics on manifolds of any dimension which can be properly conformally immersed into the unit ball in terms of certain conformal volume quantities. (Received April 09, 2010)