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On a relation between Dirichlet-to-Neumann and Laplacian spectra on manifolds

The Dirichlet-to-Neumann operator is a first order elliptic pseudodifferential operator. It acts on smooth functions on the boundary of a Riemannian manifold and maps a function to the normal derivative of its harmonic extension. The eigenvalues of the Dirichlet-to-Neumann map are also called Steklov eigenvalues. It has been known that the geometry of the boundary has a strong influence on the Steklov eigenvalues. In this talk, we show that for every $k \in \mathbb{N}$, the k-th Steklov eigenvalue σ_k is comparable to the square root of the k-th eigenvalue of the Laplacian $\sqrt{\lambda_k}$ on the boundary. More precisely, we show that there exists a constant C depending only on geometry near the boundary such that $|\sigma_k - \sqrt{\lambda_k}| < C$. This is joint work with Bruno Colbois and Alexander Girouard.