Hezari, Hamid; Sogge, Christopher D.
A natural lower bound for the size of nodal sets. (English) Zbl 1329.35224

Summary: We prove that, for an $n$-dimensional compact Riemannian manifold $(M,g)$, the $(n-1)$-
dimensional Hausdorff measure $|Z_\lambda|$ of the zero-set $Z_\lambda$ of an eigenfunction $e_\lambda$ of the Laplacian having
eigenvalue $-\lambda$, where $\lambda \geq 1$, and normalized by $\int_M |e_\lambda|^2 dV_g = 1$ satisfies

$$C|Z_\lambda| \geq \lambda^{\frac{n}{2}} \left( \int_M |e_\lambda|^2 dV_g \right)^2$$

for some uniform constant $C$. As a consequence, we recover the lower bound $|Z_\lambda| \geq \lambda^{(3-n)/4}$.

MSC:
35P15 Estimates of eigenvalues in context of PDEs
35R01 PDEs on manifolds
58C40 Spectral theory; eigenvalue problems on manifolds

Keywords:
eigenfunctions; nodal lines

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