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On the Inner Radius of Nodal Domains

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Let M be a closed Riemannian manifold of dimension n .
Let f be an eigenfunction of the Laplacian on M with eigenvalue k .
A nodal domain is a connected component of the set $f \neq 0$.
We discuss the asymptotic geometry of nodal domains on M .
We prove that the inner radius R of a nodal domain is bounded by $C_1 / k > R > C_2 / k^{(n-1)/2}$.
In dimension two we have a sharp bound.
One ingredient of our proof is the estimation of the volume of positivity of a harmonic function u in the unit ball with $u(0)=0$, in terms of its growth.

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