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## Tubular Neighborhoods of Nodal Sets

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### Abstract

Let  $(M, g)$  be a closed compact smooth Riemannian Manifold of dimension  $n$ . Let  $f$  be an eigenfunction of the Laplace-Beltrami operator on  $M$  with eigenvalue  $\lambda$ .  $\{f = 0\}$  is called the  $\lambda$ -nodal set.

Yau’s conjecture says: The  $(n - 1)$ -dimensional volume of  $\{f = 0\}$  is comparable to  $C\sqrt{\lambda}$ . This conjecture was proved in the case where  $M$  is real analytic by H. Donnelly and C. Fefferman.

We consider a tubular neighborhood  $T_{\lambda,r}$  of radius  $r$  of the  $\lambda$ -nodal set. We show that on real analytic manifolds

$$C_1\sqrt{\lambda}r < \text{Vol}(T_{\lambda,r}) < C_2\sqrt{\lambda}r .$$

This shows a regularity property of the nodal set and may lead to curvature estimates of the nodal set.

*This is joint work with Dmitry Jakobson.*