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Quantitative Resolvent and Eigenfunction Estimates for the Faber-Krahn Inequality

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For a bounded open set in Euclidean space with the same volume as the unit ball, the classical Faber-Krahn inequality says that the first Dirichlet eigenvalue of the Laplacian is at least that of the unit ball. We prove that the deficit in the Faber-Krahn inequality controls the square of the distance between the resolvent operator for the Dirichlet Laplacian of a given set and the resolvent operator on the nearest unit ball, as well as the squared L2 norm between kth eigenfunctions on this set and on the nearest ball for every k. This talk is based on joint work with Mark Allen and Dennis Kriventsov.