



## THE INTERIOR-EXTERIOR DUALITY FOR DISCRETE GRAPHS

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The interior-exterior duality was initially introduced to denote a relationship between two dual problems: Given a finite domain in  $R^2$ , and Dirichlet boundary conditions on its boundary, the Laplace operator in the exterior allows scattering solutions and an on shell scattering matrix  $S(k)$ , while in the interior the Laplacian has a discrete spectrum with eigenvalues  $k_n^2$ . The i-e duality states that  $k \rightarrow k_n$  if and only if an eigenvalue of the scattering matrix approaches unity. In this lecture I shall construct a scattering operator for the discrete graph Laplacian, and derive a similar condition for the interior spectrum from the corresponding scattering matrix.