ATELIER SUR LA GÉOMÉTRIE DES VALEURS PROPRES ET FONCTIONS PROPRES
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WORKSHOP ON GEOMETRY OF EIGENVALUES AND EIGENFUNCTIONS
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Fast computation of high-frequency Dirichlet eigenmodes via the spectrum of the Neumann-to-Dirichlet map

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We present and analyze a new method for numerical computation of the spectrum and eigenfunctions of a planar star-shaped domain with Dirichlet boundary condition. The method is "fast" since it is computes a cluster of eigenfunctions (numbering of order the square-root of the eigenvalue) in the time usually taken to compute a single one. In practice, with 400 wavelengths across the domain, and relative error 1e-10, this speed-up is around 1e3. It is related to the "scaling method", but, in constrast, has a rigorous error analysis and allows higher-order accuracy.

Joint work with Andrew Hassell, ANU.

I will also present results from a numerical study of the conjectures of Bogomolny-Schmit on the number of nodal domains of chaotic eigenmodes.

Joint work with undergraduate Kyle Konrad, Dartmouth.

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