Spectrum and Dynamics
Spectre et dynamique
(Org: **Yaiza Canzani** (University of North Carolina at Chapel Hill), **Federico Rodriguez Hertz** (Pennsylvania State University) and/et **Dmitry Jakobson** (McGill University))

TATYANA BARRON, University of Western Ontario
Vector-valued Poincaré series on G/K

In the presence of an action of a discrete group on a symmetric space, Poincaré series may be used in different ways: for example, to construct eigenfunctions of the Laplacian. I will present recent results on Poincaré series that are holomorphic vector-valued automorphic forms on the unit ball (or, more generally, on a bounded symmetric domain) and will discuss related analytic questions.

RICHARD FROESE, University of British Columbia
Resonances lost and found

We compute the large L asymptotics of the resonances for one dimensional Schrödinger operators $H_L = V_1(x)+\mu(L)V_2(x-L)$, where V_1 and V_2 are compactly supported and $\mu(L) \sim e^{-cL}$ for $c \geq 0$. These are compared to the Schrödinger dynamics of H_L. This is joint work with Ira Herbst.

ALEX KONTOROVICH, Rutgers
The SuperPAC: Superintegral Packing Arithmeticity Conjecture

We describe our ongoing work with K. Nakamura to classify all (super)integral sphere packings in all dimensions; they should all come from arithmetic hyperbolic reflection groups. No prior knowledge of these topics is assumed.

JEAN LAGACÉ, Université de Montréal
The Steklov spectrum of cuboids

Almost nothing is known in general about the Steklov spectrum of domains or manifolds with singularities on the boundary. In this joint work with A. Girouard, I. Polterovich and A. Savo, we use right cuboids as a model for such domains and obtain various spectral properties: two terms spectral asymptotics, characterisation of the eigenfunctions and scarring sequences, bottom of the spectrum behaviour and shape optimisation for the first eigenvalue. I will formulate more precisely those results and I will make some remarks as to how they would help us understand the general spectral properties of domains with singular boundaries.

PABLO SHMERKIN, Torcuato Di Tella University and CONICET
Normal numbers and fractal measures

I will present a geometric-dynamical criterion for a Radon measur on $\mathbb{R}$ to be supported on numbers normal to a given base. The criterion is given in terms of the spectrum of a dynamical system that acts on measures via magnification and renormalization. I will discuss a number of applications that recover, unify and substantially generalize a number of earlier results in the field. Joint work with Mike Hochman.

CHRIS SOGGE, Johns Hopkins University
On the concentration of eigenfunctions

I shall present some results in global harmonic analysis that concern properties of eigenfunctions on compact Riemannian manifolds. Using local arguments we can show that L^p norms of eigenfunctions over the entire manifold are saturated if and only if there are small balls (if p is large) or small tubular neighborhoods of geodesics (if p is small) on which the eigenfunctions have very large L^p mass. Neither can occur on manifolds of nonpositive curvature, or, more generally, on manifolds without conjugate points.

XIANGJIN XU, Binghamton University - SUNY

Gradient estimates for spectral clusters and Carleson measures on compact manifolds with boundary.

On a compact Riemannian manifold (M, g) with boundary, we first study some Bernstein type inequality on the subspace of $L^2(M)$ generated by eigenfunctions of eigenvalues less than $L(> 1)$ associated to the Dirichlet (Neumann) Laplace–Beltrami operator on M. On these spaces we give a characterization of the Carleson measures and the Logvinenko–Sereda sets for Dirichlet (or Neumann) Laplacian on M, which generalized the corresponding results of J. Ortega-Cerda and B. Pridhnani on a compact boundaryless manifold (Forum Math. 25 (2013), DOI 10.1515 / FORM.2011.110).

STEVE ZELDITCH, Northwestern University

Intersections of nodal sets and curves and geometric control

Many years ago, Toth and I proved that for real analytic plane domains, the number of zeros of an eigenfunction on a "good" real analytic curves was bounded by the frequency. 'Good' is a kind of non-degeneracy condition resembling a Carleman lower bound on the curve. My talk first gives a generalization to all dimensions: in any dimension and for any real analytic metric, the number of zeros of the restriction of the eigenfunction to a 'good curve' is bounded by the frequency. Moreover we give a robust criterion for a curve to be 'good' in dimension two. Roughly speaking it is good if it is asymmetric with respect to geodesics and if the flowout of the unit sphere bundle along the curve fills out the unit sphere bundle in measure. The same criterion is valid for hypersurfaces in higher dimensions. Joint work with J. Toth.