Graduate School Event

Thesis Defense: Spectral Rigidity and Nonrigidity of Dynamical Systems

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Host: Maksym Serbyn

We study spectral rigidity and nonrigidity phenomena in dynamical systems. The central question is whether a dynamical system can be determined, up to a natural conjugacy, by its spectrum.The first part of the talk focuses on standard maps from the viewpoint of action spectra. We construct nontrivial deformations of the standard map that preserve the symplectic actions of infinitely many periodic orbits accumulating onto an invariant curve. This result can be viewed as a symplectic twist-map analogue of length-spectral nonrigidity phenomena for Riemannian manifolds and convex billiards, motivating the problem of constructing analogous “partially length-isospectral” deformations of strictly convex billiard tables. The proof combines a resonant normal form construction with Picard iteration schemes to produce a sequence of periodic orbits accumulating on an invariant curve with a Liouville rotation number. The second part of the talk briefly explores rigidity questions for Liouville metrics on the two-dimensional torus. A long-standing folklore conjecture asserts that Liouville metrics are the only integrable metrics on the torus. We give a length-spectral rigidity result for the class of trigonometric conformal deformations of Liouville metrics by exploiting the dynamical properties of rational tori, which are analogues of resonant convex caustics in billiards. We also establish a complementary classification result showing that marked-length-isospectral Liouville metrics are characterized by rearrangements of the one-dimensional functions appearing in their conformal factors, generalizing a theorem of Abbondandolo and Mazzucchelli. In particular, this result yields many nonrigidity examples within the class of Liouville metrics.

Wednesday, June 17, 2026 03:30pm - 04:30pm
Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101) and Zoom

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.