INTEGRAL GEOMETRY SESSION (THU 8/1/26)

ROOM S204 (14-15.50)

Joonas Ilmavirta (University of Jyväskylä)
***Elastic ray transform* (14-14.20)**

Singularities of solutions to the elastic wave equation travel like point particles. Linearization of travel times of elastic waves leads to a ray transform problem. I will describe the linearization (and how it fails to be linear) and the kernel of the ray transform. This is joint work with Antti Kykkänen and Teemu Saksala.

Miika Sarkkinen (University of Helsinki)
***Non-Abelian light ray transform on stationary Lorentzian manifolds* (14.20-14.50)**

In this talk, we consider the invertibility of a non-Abelian light ray transform on Lorentzian manifolds. We show that the transform arises in the problem of recovering a matrix-valued potential on a general globally hyperbolic manifold M from the knowledge of the source to solution map of a wave equation including a connection 1-form term. Under the assumption that the manifold $M$is stationary and that the connection term is time independent, the non-Abelian light ray transform is reduced, by Fourier slicing with respect to time, to a non-Abelian magnetic X-ray transform on the Riemannian base manifold N. Our main theorem then states that the injectivity of the non-Abelian magnetic X-ray transform on N is sufficient for the injectivity of the non-Abelian light ray transform on M.

Shubham Jathar (LUT University)
***The matrix-weighted real-analytic double fibration transforms* (15-15.20)**

In this talk, we present a microlocal result showing that the real-analytic matrix-weighted double fibration transform determines the analytic wavefront set of a vector-valued function. As an application, we prove the injectivity of the matrix-weighted ray transform on two-dimensional, non-trapping, real-analytic Riemannian manifolds with strictly convex boundary. Furthermore, we show that a real-analytic Higgs field can be uniquely recovered from the nonabelian ray transform on real-analytic manifolds of any dimension, provided the manifold has a strictly convex boundary point.

Eetu Satukangas (University of Jyväskylä)
***One-form tomography in gas giant geometry* (15.30-15.50)**

Gas giant geometry is a special type of Riemannian manifold with boundary that describes acoustic wave propagation in gas giant planets. In this talk I will discuss some properties of the geometry and present a new result, based on joint work with Joonas Ilmavirta and Antti Kykkänen, for the solenoidal injectivity of the geodesic ray transform of one-forms in gas giant geometry. The injectivity result answers the following question in integral geometry: Can we uniquely determine a one-form from its integrals over maximal geodesics in gas giant geometry?