

Less is More: Geometric Inverse Problems with Partial Data

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There is a geophysical question of determining the inner structure of the Earth from the measurements of travel times of seismic waves at the surface. The mathematical formulation of the question consists of recovering a function or more generally a Riemannian metric from the distance or lens data, which is known as the boundary or lens rigidity problem. The linearization of the problem is concerned with the inversion of the X-ray transform of scalar functions or tensor fields, and has important applications in medical imaging techniques. In this talk, the speaker will present recent progress on inverting X-ray transforms with a possible weight through a local-to-global approach initiated by Uhlmann and Vasy. He will also discuss their applications to the rigidity problems, as well as to other non-linear inverse problems. Part of the talk is based on joint work with Gabriel Paternain, Mikko Salo and Gunther Uhlmann.