

Bay Area Microlocal Analysis Seminar

Monday, January 27th, at Stanford

3:15-4:15pm, Room 381U

“Seeing Through Space Time”

GUNTHER UHLMANN

(University of Washington)

Abstract We consider inverse problems for the Einstein equation with a time-dependent metric on a 4-dimensional globally hyperbolic Lorentzian manifold. We formulate the concept of active measurements for relativistic models. We do this by coupling Einstein equations with equations for scalar fields. The inverse problem we study is the question, do the observations of the solutions of the coupled system in an open subset U of the space-time with the sources supported in U determine the properties of the metric in a larger domain? To study this problem we define the concept of light observation sets and show that these sets determine the conformal class of the metric. This corresponds to passive observations from a distant area of space which is filled by light sources. We will also consider inverse problems for other non-linear hyperbolic equations.

This is joint work with Y. Kurylev and M. Lassas

AND

4:30-5:30pm, Room 381U

“Microlocal approach to dynamical zeta functions”

MACIEJ ZWORSKI

(UC Berkeley)

Abstract Dynamical zeta functions of Selberg, Smale and Ruelle are analogous to the Riemann zeta function with the product over primes replaced by products over closed orbits of Anosov flows. In 1967 Smale conjectured that these zeta functions should be meromorphic but admitted that a positive answer would be a little shocking. Nevertheless the continuation was proved in 2012 by Giulietti–Liverani–Pollicott. In my talk I will present a proof of this result obtained by Dyatlov and myself and inspired by a trace formula of Guillemin and by recent work of Faure–Sjöstrand. It is based on a simple idea involving wave front sets and propagation of singularities: we apply methods of microlocal analysis to the generator of the flow, in particular, propagation of singularities results due to Duistermaat–Hörmander, Melrose and Vasy.

<http://math.stanford.edu/~andras/PDE/PDE.html>

Organizers: András Vasy & Maciej Zworski