

**Semyon Dyatlov**

**Title: A microlocal toolbox for hyperbolic dynamics**

Abstract: I will discuss recent applications of microlocal analysis to the study of hyperbolic flows, including geodesic flows on negatively curved manifolds. The key idea is to view the equation  $(X + \lambda)u = f$ , where  $X$  is the generator of the flow, as a scattering problem. The role of spatial infinity is taken by the infinity in the frequency space. We will concentrate on the case of noncompact manifolds, featuring a delicate interplay between shift to higher frequencies and escaping in the physical space.

I will show meromorphic continuation of the resolvent of  $X$ ; the poles, known as Pollicott-Ruelle resonances, describe exponential decay of correlations. As an application, I will prove that the Ruelle zeta function continues meromorphically for flows on non-compact manifolds (the compact case, known as Smale's conjecture, was recently settled by Giulietti-Liverani-Pollicott and a simple microlocal proof was given by Zworski and the speaker). Joint work with Colin Guillarmou.