Exponential mixing of flows for geometrically finite hyperbolic manifolds with cusps

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Abstract

Let $\mathbb{H}^n$ be the hyperbolic n-space and Γ be a geometrically finite discrete subgroup in $\mathrm{Isom}_+(\mathbb{H}^n)$ with parabolic elements. We investigate whether the geodesic flow (resp. the frame flow) over the unit tangent bundle $\mathrm{T}^1(\Gamma\backslash\mathbb{H}^n)$ (resp. the frame bundle $\mathrm{F}(\Gamma\backslash\mathbb{H}^n)$) mixes exponentially. This result has many applications, including spectral theory, prime geodesic theorems, orbit counting, equidistribution, etc.

I will start with a survey of the past results, methods, and related problems on this topic. Along the way, I will present the joint work with Jialun Li, Pratyush Sarkar.