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**WENYU PAN**, University of Chicago

*Exponential mixing of geodesic flows for geometrically finite hyperbolic manifolds with cusps*

Let  $\mathbb{H}^n$  be the hyperbolic  $n$ -space and  $\Gamma$  be a geometrically finite discrete subgroup in  $\text{Isom}_+(\mathbb{H}^n)$  with parabolic elements. In the joint work with Jialun LI, we establish the exponential mixing of the geodesic flow over the unit tangent bundle  $T^1(\Gamma \backslash \mathbb{H}^n)$  with respect to the Bowen-Margulis-Sullivan measure. This kind of result is known to have many immediate applications in number theory and geometry, which includes counting closed geodesics and shrinking target problems. Our approach is to construct coding for the geodesic flow and then prove a Dolgopyat-type spectral estimate for the corresponding transfer operator. I will also discuss the application of obtaining a resonance-free region for the resolvent on  $\Gamma \backslash \mathbb{H}^n$ .