

The Brownian traveller on manifolds

David Krejčířík

Nuclear Physics Institute ASCR, Řež, Czech Republic

krejcirik@ujf.cas.cz

We study the influence of the intrinsic curvature on the large time behaviour of the heat equation in a tubular neighbourhood of an unbounded geodesic in a two-dimensional Riemannian manifold. Since we consider killing boundary conditions, there is always an exponential-type decay for the heat semigroup. We show that this exponential-type decay is slower for positively curved manifolds comparing to the flat case. As the main result, we establish a sharp extra polynomial-type decay for the heat semigroup on negatively curved manifolds comparing to the flat case. The proof employs the existence of Hardy-type inequalities for the Dirichlet Laplacian in the tubular neighbourhoods on negatively curved manifolds and the method of self-similar variables and weighted Sobolev spaces for the heat equation.

References

- [1] *M. Kolb, D. Krejčířík*: The Brownian traveller on manifolds. *J. Spectr. Theory*, to appear; preprint on arXiv:1108.3191 [math.AP].