



Sub-Gaussian heat kernel bounds and singularity of energy measures for symmetric diffusions

Naotaka Kajino
RIMS, Kyoto University

This talk will present the result of a joint work with Mathav Murugan (University of British Columbia) that, for a symmetric diffusion on a complete locally compact separable metric space, two-sided sub-Gaussian heat kernel bounds imply the singularity of the energy measures with respect to the reference measure.

For self-similar (scale-invariant) diffusions on self-similar fractals, the singularity of the energy measures is known to hold in many cases by Kusuoka (1989, 1993), Ben-Bassat, Strichartz and Teplyaev (1999), Hino (2005), and Hino and Nakahara (2006), but these results heavily relied on the self-similarity of the space.

It was conjectured, and had remained open for the last two decades to prove, that the singularity of the energy measures should follow, without assuming the self-similarity, just from two-sided sub-Gaussian heat kernel bounds of the same form as those for diffusions on typical self-similar fractals. The main result of this talk answers this conjecture affirmatively.

The first half of the talk will be devoted to a brief introduction to self-similar diffusions (and their associated Dirichlet forms) on self-similar fractals and to sub-Gaussian heat kernel bounds for symmetric diffusions, so that the talk will (hopefully) be accessible even to those without prior knowledge about diffusions on fractals.