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IMS/MATH Joint Workshop on Probability and PDEs

23 March 2017 (Thursday)
Room 219, Lady Shaw Building, CUHK

The workshop emphasizes on the recent development on probability and PDEs. Topic includes Dirichlet forms, Laplacians and heat kernels on metric measure spaces.

Organizers: De-Jun Feng, CUHK
Zhouping Xin, CUHK

Speakers:

Zhen-Qing Chen (University of Washington)
Alexander Grigor'yan (Universitat Bielefeld)
Jia-Xin Hu (Tsinghua University)

This event was partially supported by "Programme on PDEs 2016-2017".

All are Welcome

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Time	*Speaker & Title*
2:00pm – 3:00pm	***Prof. Zhen-Qing Chen (University of Washington)*** Harnack inequalities for symmetric non-local Dirichlet forms and their stability **Abstract:** In this talk, we will discuss parabolic and elliptic Harnack inequalities for symmetric non-local Dirichlet forms on metric measure spaces under general volume doubling condition. We will present stable equivalent characterizations of parabolic Harnack inequalitiesin terms of the jumping kernels, variants of cutoff Sobolev inequalities, and Poincare inequalities. In particular, we establish the connection between parabolic Harnack inequalities, elliptic Harnack inequalities, and two-sided heat kernel estimates, as well as with the Holder regularity of parabolic functions for symmetric non-local Dirichlet forms. Stability of elliptic Harnack inequalities will also be discussed, if time permits. Based on joint work with Takashi Kumagai and Jian Wang.
3:15pm – 4:15pm	***Prof. Alexander Grigor'yan (Universitat Bielefeld)*** Random walks on ultra-metric spaces **Abstract:** Given a locally compact separable ultra-metric space with a Radon measure, we construct a class of symmetric Markov semigroups and the corresponding Markov processes. We obtain upper and lower bounds of its transition density and Green function, give a transience criterion, estimate its moments and describe the Markov generator. In particular, our results apply on the field of p-adic numbers, where we obtain new results about the Taibleson and Vladimirov Laplacians.
4:30pm – 5:30pm	***Prof. Jia-Xin Hu (Tsinghua University)*** Two-sided estimates of heat kernels of jump type Dirichlet forms **Abstract:** We prove necessary and sufficient conditions for stable-like estimates of the heat kernel for jump type Dirichlet forms on metric measure spaces. The conditions are given in terms of the volume growth function, jump kernel and a generalized capacity. Joint with Alexander Grigor'yan and Eryan Hu (Bielefeld).

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