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# Colloquium

## *Heat kernels on manifolds with ends*

**Professor Alexander Grigorian**  
University of Bielefeld

### Abstract

The heat kernel of a Riemannian manifold is the minimal positive fundamental solution of the heat equation associated with the Laplace-Beltrami operator. Upper and lower estimates of heat kernels play important role in Analysis on manifolds.

A celebrated theorem of Li and Yau provides two sided Gaussian estimates of the heat kernel on a complete Riemannian manifold of non-negative Ricci curvature.

In this talk we present heat kernel estimates on a complete manifold with ends, assuming that the heat kernel on each end satisfies the Li-Yau estimate.

It turns out that the behaviour of the heat kernel on the entire manifold depends on the property of the ends to be parabolic or not (a manifold is called parabolic if Brownian motion on it is recurrent, or, equivalently, if any positive superharmonic function is constant).

The talk is based on joint papers with L.Saloff-Coste and S.Ishiwata.

Date: 6 April 2018 (Friday)  
Time: 11:00am - 12:00noon  
Venue: Room 222, Lady Shaw Building,  
The Chinese University of Hong Kong, Shatin

*All are Welcome*