

1096-35-273

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Li-Yau type gradient estimates and new bound estimates for the parabolic kernel of the Schrödinger operator on manifolds with negative curvature. Preliminary report.

In the first part of this talk, we get new Li-Yau type gradient estimates for positive solutions of parabolic equations of the type

$$(\Delta_g - q(x, t) - \partial_t)u(x, t) = 0$$

on Riemannian manifolds with $\text{Ricci}(M) \geq -k$, $k \in \mathbb{R}$. As applications, several parabolic Harnack inequalities are obtained and they lead to new estimates on the parabolic kernel of the Schrödinger operator on manifolds with negative curvature, which generalized the classical results by Li and Yau [Acta Math. 156 (1986) 153-201.] (Received August 26, 2013)