1067-60-1648 **Elton P Hsu*** (ehsu@math.northwestern.edu), Department of Mathematics, Northwestern University, 2033 Sheridan Road, Evanston, IL 60208. *Stochastic Completeness and Escape Rate of Brownian Motion on a Riemannian Manifold.*

A geodesically complete Riemannian manifold is called stochastically complete if its minimal heat kernel is integrated to one. Since the heat kernel is the transition density function of Riemannian Brownian motion, a manifold is stochastically complete if and only if Brownian motion does not explode. To find a proper geometric condition for stochastic completeness is an old geometric problem. The first result in this direction was due to S. T. Yau, who proved that a Riemannian manifold is stochastically complete if its Ricci curvature is bounded from below by a constant. It has been know for quite some time that the property of stochastic completeness is intimately related to the volume growth of a Riemannian manifold. We study stochastic completeness by looking at the more refined question of upper escaping rates of Riemannian Brownian motion. We show how the Neumann heat kernel, time reversal of reflecting Brownian motion, and volumes of geodesic balls come together and give an elegant and often sharp upper bound of the escaping rate solely in terms of the volume growth function without any extra geometric restriction. This is a joint work with Guang Nan Qin of Institute of Applied Mathematics of the Chinese Academy of Sciences. (Received September 21, 2010)