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**Fabrice Baudoin** and **Nicola Garofalo\*** ([garofalo@math.purdue.edu](mailto:garofalo@math.purdue.edu)), Department of Mathematics, 150 N. University Street, West Lafayette, IN 47907-2067. *Perelman's entropy and doubling property on Riemannian manifolds.*

The purpose of this work is to study some monotone functionals of the heat kernel on a complete Riemannian manifold with nonnegative Ricci curvature. In particular, we show that on these manifolds the gradient estimate of Li and Yau, the gradient estimate of Lei Ni, the monotonicity of the Perelman's entropy and the volume doubling property are all consequences of an entropy inequality recently discovered by the authors in their work on the sub-Riemannian Ricci tensor. Such inequality is a linearized version of a logarithmic Sobolev inequality that is due to D. Bakry and M. Ledoux. (Received January 14, 2010)