Title: Gradient estimates for some evolution equations on complete smooth metric measure spaces

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In this paper, we consider the following general evolution equation

\[ u_t = \Delta_f u + au \log^a u + bu \]

on a smooth metric measure space \((M^n, g, e^{-f} dv)\). We give a local gradient estimate of Souplet–Zhang type for positive smooth solutions of this equation provided that the Bakry–Émery curvature is bounded from below. When \(f\) is constant, we investigate the general evolution equation on compact Riemannian manifolds with nonconvex boundary satisfying an \emph{interior rolling \(R\)-ball} condition. We show a gradient estimate of Hamilton type on such manifolds.

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