GEOMETRY OF NONLINEAR DIFFUSION: GRADIENT ESTIMATES AND FUNCTIONAL INEQUALITIES ON SMOOTH METRIC MEASURE SPACES

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In this talk I will discuss certain aspects of functional inequalities and nonlinear diffusion equations on smooth metric measure spaces. The Laplace-Beltrami operator gives its place to the Witten or weighted Laplacian and gradient estimates of Hamilton-Souplet-Zhang, Aronson-Benilan and Li-Yau types will be established under different curvature conditions and lower bounds on the Bakry-Emery Ricci tensors. If time allows, I will present applications of the above to entropy dissipation inequalities and characterisation of ancient/eternal solutions.