# OPTIMAL TRANSPORT, FOKKER-PLANCK DIFFUSION AND PERELMAN'S RICCI FLOW

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**Abstract**: We study the optimal transport problem between the Fokker-Planck diffusions on compact Riemannian manifolds equipped with Perelman's Ricci flow and conjugate heat equation. We prove that, whenever the Riemannian metric evolves along the Perelman's Ricci flow and the potential function evolves along the conjugate heat equation, the Wasserstein distance between two backward Fokker-Planck diffusions is non-decreasing In time. Moreover, we prove the displacement convexity of certain Bolztmann type entropy functionals on the Wasserstein space over compact manifolds equipped with Perelman's Ricci flow. Our work extends some previous results due to Otto, Villani, Sturm, von Rennese, McCann, Topping and Lott. This is a joint work with Songzi Li (Fudan University).