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On the Geometry of Configuration Spaces and Particle Systems

Wednesday, 7 December 2022 14:00 (50 minutes)

The configuration space U(X) over a base space X is the space of all locally finite point measures on X. The space U(X) being equipped with the vague topology, the L^2-transportation distance and a point process, it is a Polish extended metric measure space. In this talk, we show that U(X), equipped with the Poisson point process, satisfies synthetic lower Ricci curvature bounds if and only if so does X. As a byproduct, we obtain the Sobolev-to-Lipschitz property on U(X), which confirms the conjecture by Röckner-Schied (J. Funct. Anal. '99). We discuss several applications to the corresponding infinite-particle systems such as the integral Varadhan short-time asymptotic of the heat flow on U(X) and a new characterisation of ergodicity of particle systems in terms of the L^2-transportation distance. If time allows, we also explain the case beyond the Poisson point process. This talk is based on the joint work with Lorenzo Dello Schiavo (Institute of Science and Technology Austria).

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