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Boris Khesin*, Department of Mathematics, University of Toronto, Toronto, ON M5S 2E4, Canada. *Beyond Arnold's geodesic framework of an ideal hydrodynamics I.*

In the talk we start discussing two ramifications of Arnold's group-theoretic approach to ideal hydrodynamics as the geodesic flow for a right-invariant metric on the group of volume-preserving diffeomorphisms. We show that problems of optimal mass transport are in a sense dual to the Euler hydrodynamics. By regarding volume-preserving diffeomorphisms as a subgroup of all diffeomorphisms, one can describe L^2 and H^1 versions of the Kantorovich-Wasserstein and Fisher-Rao metrics on the spaces of densities. In particular, the Hunter-Saxton equation naturally appears within this framework. Moreover, many equations of mathematical physics, such as fluids with moving boundary, have Lie groupoid, rather than Lie group, symmetries (this is a joint work with Anton Izosimov). (Received February 04, 2018)