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Title: Some variational models related to liquid crystals

Abstract: We will discuss Onsager-type models in the theory of nematic liquid crystals. The idea is to find critical points of (free energy) functionals of the probability density of orientations of liquid crystalline particles. Some physical motivation will be given, though the emphasis will be placed on rigorous analysis of the arising models. The mathematical topics that we will touch include calculus of variations, theory of integral equations, special functions, theory of bifurcations.