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On the scaling limit of Onsager's molecular model for liquid crystals

We shall discuss the scaling limit of Onsager's kinetic model for nematic liquid crystals. In the static case, we consider the global minimizers of the Onsager's energy which involves nonlocal molecular interaction and prove that, when the relative size of molecular tends to zero, they will converge to a uniaxial number density function predicted by a weakly harmonic map. This is a joint work with Wei Wang. In the dynamic case, we show that similar scaling limit of solutions to the Doi-Onsager equation with appropriate initial data will converge to a weak solution of harmonic map heat flow. This is a joint work with Wei Wang and Zhifei Zhang.