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Fluctuating Hybrid lattice Boltzmann method for nematic liquid crystals GANNA PIATKOVSKA, COLIN DENNISTON, Univ of Western Ontario
— As one goes from micron to nanometer lengths scales in a liquid crystal, thermal fluctuations become increasingly important and can have significant impact on colloids and polymers immersed in the liquid crystal. We develop and test numerically a Hybrid lattice Boltzmann model for liquid crystal hydrodynamics that incorporates the thermal fluctuations of tensor order parameter. It is shown that a good equilibration is obtained over a wide range of length scales using uncorrelated noise. We find the condition on the system's correlation lengths when the use of correlated noise would be necessary to achieve an equilibration. In particular, in simulations without electric field, the mesh size should be chosen in such a way that the correlation length defined by the elastic constant is less than 2 in lattice units. When the electric field is present, the situation is more complex since the correlation length associated with the electric field comes into play. Some applications of the introduced noise are considered.

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