Towards a Description of Twist Waves in Liquid Crystals using Mesoscopic Continuum Physics

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ABSTRACT

Mesoscopic Continuum Physics introduces variables describing the microstructure – like orientation of crystals – into the domain of the fields, thus treating them equivalently to space. The theory of Mesoscopic Continuum Physics has been reformulated, resulting in more compact equations. In this formulation the balance of spin shows up naturally as component equations of the balance of momentum, this is an advantage over the standard formulation, in which it seems to be postulated separately. Starting from this, a wave equation for twist waves has been derived on the mesoscopic space. Twist waves are one of the fundamental modes of orientation waves in liquid crystals. A short repetition of twist-waves of liquid crystals in the Ericksen-Leslie theory is given and compared to a description using the mesoscopic theory.