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Modeling of twist grain boundaries in block copolymers: structure, stability, and motion XUSHENG ZHANG, ZHI-FENG HUANG, JORGE VINALS, McGill University — Twist grain boundaries, which are widely observed in block copolymer samples of lamellar phase, have been investigated through both direct numerical solution and multiscale analysis of a coarse-grained mesoscopic model equation. We show that the twist boundary profile can be well described by two sets of appropriate amplitude equations characterizing the slow evolution of lamellae. Stability of the grain boundary configuration has been examined, and our results show that the boundary width, albeit varying with twist angle, is of order $\epsilon^{-1/4}$, with ϵ the measure of the distance from the order-disorder threshold. We also study the motion of twist grain boundaries subjected to slow transversal modulations of lamellae, and obtain both analytically and numerically the traveling velocity of the boundary as well as its dependence on modulation wave number.

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