

Abstract Submitted
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From nucleus to phase: Growing dynamics of critical nucleus in polymer blends¹ DADONG YAN, XINGHUA ZHANG, Department of Physics, Beijing Normal University, Beijing 100875 — In metastable system, nonclassical critical nucleus is not a drop of stable bulk in core wrapped with a sharp interface, but a diffuse structure depending on the metastability. Thus, forming a critical nucleus does not mean the birth of a new phase. Also, the dynamics of nucleus' growing before the phase is born is still unknown. In present work, the nonclassical growing dynamics of the critical nucleus is addressed in the metastable polymer blends by incorporating self-consistent field theory and external potential dynamics theory, and leads to an intuitionistic description for the results of scattering experiments. Our results suggest that the growth of nonclassical critical nucleus is not self-similarly, but forms shell structure, which gives the scattering peak at nonzero wavenumber in the experiments. This phenomenon comes from the spinodal-decomposition-like behaviors constrained within the critical nucleus. The growing dynamics of the critical nucleus can be considered as a spinodal-assistant nucleation process.

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