

Troian Replies: Binary mixtures undergoing spinodal decomposition near a wall exhibit growth exponents considerably larger than those obtained in bulk [1-4]. Though it remains unknown whether the accelerated growth stems from the more wetting or less wetting phase, the domain growth kinetics must be affected both by the geometric constraint on diffusive growth near a wall as well as by surface interactions. To investigate the geometric consequences only, I have proposed a model which couples anisotropic diffusive growth to the process of domain coalescence [5,6]. Since a nearby wall creates anisotropic, elongated domains which undergo coalescence more frequently, one must investigate the effect of domain collisions and coalescence in any growth model.

Generalizing the derivation for isotropic systems [7], I assume that the rate of domain growth is driven by the gradient in the local interfacial curvature. Surface domains with higher interfacial curvature, namely, those consisting of the less wetting phase, will grow faster. This model for curvature driven diffusive growth is based on the presence of two length scales, R_B and R_S , where R_i is the average *radius of curvature* of domains in the bulk (B) and near the wall (S). Since the less wetting domains exhibit highly curved interfaces at a wall enriched with the more wetting phase, isolated surface domains will exhibit a radius of curvature $R_S \ll R_B$, as drawn in Fig. 1 [6]. Within this model I find that isolated domains growing by diffusion near a wall have growth exponents between 1/3 and 1/2, depending on the quench depth, which establishes the initial ratio R_S/R_B . In addition, coalescence of fully three dimensional domains growing along a wall increases the individual growth exponents threefold. This general model for binary phase separation predicts the exact same range of exponents measured experimentally. The model also predicts exponents for the average number and area of the less wetting surface domains, both of which can be measured directly.

Keblinski *et al.* state that the inequality $R_S \ll R_B$ is invalid. To clarify their misunderstanding, I explicitly refer to Fig. 2 of Ref. [2] and Fig. 13 of Ref. [3]. The length scale measured in these light scattering experiments is $2\pi/q_m$, where q_m is the wave vector of the peak position in $S(q,t)$, the scattered intensity. This length scale is a direct measure of the spatial correlation of the interfaces separating the two phases of the binary mixture. For well defined interfaces, this length scale is the average interface-to-interface distance in the coarsening binary mixture, which in *isotropic* and *critical* mixtures is also equal to the size of the growing domains. How do the radii of curvature used in the model relate to the size of the

growing domains measured experimentally? Since domain growth is driven by the interfacial curvature, the radii of curvature must scale in time as the size of the growing surface and bulk domains. The first important point is that the radii of curvature used in the model scale similarly in time but are not equal in magnitude to the two length scales $2\pi/q_m^i$ (where $i = B$ or S) measured experimentally.

The second important point to emphasize is that the experiments measure length scales which *include* the effect of domain coalescence occurring at the wall. Though the size of the surface structures are initially characterized by the inequality $R_S \ll R_B$, coalescence will quickly cause the anisotropic surface domains to merge and form structures which become significantly larger than the bulk structures. This is precisely the main point of my Letter: Through coalescence, surface domains starting with $R_S \ll R_B$ quickly evolve into structures with $R_S^C \gg R_B$ where C refers to growth by diffusion *and* coalescence. Finally, investigations of composition waves with wave vectors normal to a planar surface [8] may bear little relation to the experiments of Refs. [1-4] which probe the growth kinetics of structures parallel to a surface. Composition waves reflect the existence of well formed alternating layers of wetting and nonwetting phases. Cumming *et al.* find, however, that the fast surface signal disappears once a continuous surface layer has formed.

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Received 25 January 1994

PACS numbers: 64.60.Ht, 68.35.Fx, 68.45.Gd, 68.55.-a

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