Kim *et al.* Reply: In discussing our Letter [1], it is important (1) to understand the phrase "confined-to-propagating transition of LO phonons" properly and (2) to realize how the experimental hot phonon occupation number can be sensitive to such a transition.

When we suggest that LO phonons are propagating and not confined, we do not intend to imply directly that there is a significant probability of finding the GaAs LO phonons in the alloy barrier region. The eigenvector ratio of the Comment [2] represents this probability calculated from the elegant model of Ref. [3]. However, it should be noted that a static and periodic model such as that of Ref. [3] always produces wave functions extended throughout the superlattice (propagating) where phonon vibrations between adjacent wells are in phase (coherent), regardless of what the eigenvector ratio or Brillouin zone width [2] might be. What makes the phonons truly confined in the well regions is the *random phases or loss of coherence between the phonon vibrations of adjacent wells* introduced by disorder [4] or finite lifetime. Such incoherent vibrations cannot be represented by coherent wave functions such as those used in the Comment.

On the other hand, our hot phonon technique is sensitive to the coherence length of the Raman active LO phonon and yields much smaller phonon occupation numbers when phonons become confined [1,5]. Since Raman active modes include only a small part of the phonon modes participating in the electron-LO-phonon scattering, *this large change in the occupation number does not imply in any way the same change in the overall coupling strength.*

Recently, there have been various theoretical studies on the effects of x and L_b on the phonon properties in $GaAs/Al_xGa_{1-x}As$ superlattices (SL's) [4,6,7]. In Refs. [4] and [6], dynamical considerations such as *enhanced coupling or tunneling of GaAs LO phonons of the wells through the energetically close GaAs-like LO phonons of the barriers* are included as well as random alloy and interface disorders, and scatterings by these random disorders. The transition from the confined to the propagation of LO phonons [6,7], or that from the diffusive to the ballistic energy transport of LO phonons [4] as x or L_b become small, are reported. The results of these studies are in good agreement with our Letter [1] and our recent work [8] performed on over 30 SL samples with wide ranges of x and L_b, summarized as a phase diagram in Fig. 1.

In conclusion, we feel that the main interpretation of our Letter cannot be disputed by the static and periodic calculations of the Comment which deal with different issues. It is clear that more theoretical studies such as those of Refs. [4,6,7] which include dynamical and random aspects of the problem are needed to unravel the characteristics of optical phonons in superlattices as functions of both L_b and x.

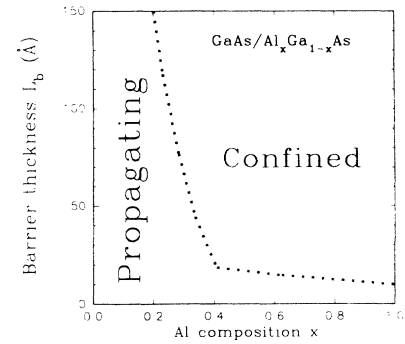

FIG. 1. An experimental phase diagram of sample parameters x and L_b, separating regions of propagating and confined LO phonons.

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