

Kern *et al.* Respond: Szeftel addresses two points: (1) the presence of the energy gap in the Rayleigh curve at \bar{M}_0 and (2) the identification of the modes.

In response to (1): There are two different aspects here; the *existence* and the *size* of the gap. The existence has been theoretically predicted a long time ago (Refs. 2 and 3 in our Letter¹). Szeftel now proposes an alternate calculation to predict the same. Our "elementary argument" was meant only to make the existence plausible on the basis of textbook knowledge for readers less familiar with the details of the subject. They might prefer such intuitive arguments, which in some cases may certainly turn out to be misleading. Whether this is the case here is an open question. However, the main point concerning the energy gap has been its *size*. This point has, unfortunately, not really been addressed by Szeftel. The experimental value is one order of magnitude larger than the value obtained from a model with nearest-neighbor interactions and central forces when reasonable parameters are used (Ref. 10 in Ref. 1 and our own calculations). For some particular force-constant combinations a somewhat better agreement can be obtained which, however, introduces additional modes not observed in the experiment. One may solve the issue either by speculating about the reason for the absence of the additional modes in the experimental data (and about the particular force constants) or by looking for a more elaborate, physically reasonable model. We have chosen the latter alternative and have included in the model three-body interactions of the bond-stretching type, which appear to account for the observed large splitting.

In response to (2): This point has been brought up by Fig. 4 in Ref. 1 which is, indeed, misleading. The 9.5-

meV mode denoted "dispersionless" in the figure is obviously not seen in the experiment being odd under reflection along $\bar{\Gamma M}$. However, all four theoretical dispersion curves in Fig. 3(b) of Ref. 1 and Fig. 7 of He and Rahman² are obtained exclusively from spectral densities of *even* modes. This is explicitly stated on p. 5022 of Ref. 2. As is obvious from these plots, the theoretical calculations do predict the existence of two dispersionless (even!) modes at 9.5 and 10.0 meV, respectively. We thus see no particular reason to agree with Szeftel's statement that these two dispersionless modes represent "a single, continuous phonon branch."

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¹K. Kern, R. David, R. L. Palmer, G. Comsa, J. He, and T. S. Rahman, Phys. Rev. Lett. **56**, 2064 (1986).

²J. He and T. S. Rahman, Phys. Rev. B **34**, 5017 (1986).