Wang and Harris Respond: The numerical evidence against the proposed[1] existence of a splay-rigid phase in the randomly diluted network of central-force springs presented in the Comment of Tremblay *et al.*[2] is suggestive but not, we feel, definitive. The quantity that they have studied is not the most suitable one for discussing the competition between total and splay rigidity because the boundary conditions used probably favor total rigidity at the expense of splay rigidity. To illustrate this point consider the cluster shown in Fig. 1. There bonds a, b, and c are in the same splay-rigid cluster in the sense that a nonzero torque is required to change the orientation of any one of them with respect to any other. However, neither bond a nor bond b is totally rigid with respect to bond c. Now consider the result obtained by application of the techniques used in the Comment. By attachment of a rigid bus bar to bonds a and b the entire cluster is rendered totally rigid. Probably the boundary conditions using rigid bus bars is equivalent to application of a surface "field" whose effect is to convert some splay-rigid clusters into totally rigid ones. E. Marshall and one of the present authors (A.B.H.) are studying simulations in which no additional bus bars are involved in order to avoid possible bias.

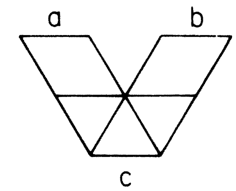

FIG. 1. Small splay-rigid cluster which becomes totally rigid when rigid bus bars are connected at the top and bottom of the cluster.

We should note some implications of the nonexistence of a splay-rigid phase. Consider the indicator function $\nu_{bb'}^{\mathrm{SR}}$ which is unity if bonds b and b' are splay rigid with respect to one another and is zero otherwise, and the analogous function $\nu_{bb'}^{\mathrm{TR}}$ for total rigidity. Correlations are measured by the configurational averages, denoted $[\ldots]_{\mathrm{av}}$, of these functions. Since all totally rigid bonds are perforce splay rigid, but the converse is not true, it is clear that $[\nu_{bb'}^{\mathrm{SR}}]_{\mathrm{av}}$ cannot fall off more rapidly with separation than $[\nu_{bb'}^{\mathrm{TR}}]_{\mathrm{av}}$. Suppose now that a splay-rigid phase does not occur. At the rigidity transition one could imagine that splay rigidity was noncritical and was driven by total rigidity. This situation would then be analogous to the percolation threshold where biconnectedness is noncritical and is driven by ordinary single connectedness. However, then it would be puzzling as to how splay rigidity could have stronger correlations than the supposedly sole critical variable associated with total rigidity. A more plausible scenario would be that splay and total rigidity are simultaneously critical at the rigidity threshold. Since these two variables have different symmetry, one might ask whether there is some consistency relation which forces them to be simultaneously critical. We have constructed (to be published) a model with local randomness which does exhibit splay rigidity, so that it is definitely possible for splay rigidity to be critical while total rigidity is noncritical. Thus the nonexistence of a splay-rigid phase would raise a puzzling question as to why splay rigidity and total rigidity are accidentally simultaneously critical in this model.

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[1]Jian Wang and A. Brooks Harris, Phys. Rev. Lett. **55**, 2459 (1985).

[2]R. R. Tremblay, A. R. Day, and A.-M.S. Tremblay, preceding Comment [Phys. Rev. Lett. **56**, 1425 (1986)].