Ricci-Tersenghi *et al.* Reply: In their Comment [1] to our paper [2] de Candia and Coniglio show evidence that the equilibrium overlap distribution $P(q)$ of the frustrated Ising lattice gas (FILG) do not coincide with the one that could be estimated from the off-equilibrium correlation and response functions presented in [2], for low temperatures and large chemical potentials. From the theoretical point of view one expects the relation between static and dynamic quantities to hold as long as one-time observables (such as energy or density) converge to the equilibrium values [3].

In order to clarify what is happening in the glassy phase of the FILG, we have performed a new large set of simulations, working mainly at $\beta J = \infty$ and $\beta\mu = 10$. At equilibrium we find a $P(q)$ with two clear peaks and a continuous part in between (as in [1]). Whether the continuous part disappears in the thermodynamical limit, thus suggesting a one step replica symmetry broken (RSB) solution, is hard to decide at present.

In the out of equilibrium regime (quenching from $\beta\mu = -\infty$ to $\beta\mu = 10$) we have repeated all the experiments presented in [2], but now letting the density grow even after the waiting time t_w. The results (see Fig. 1) are indeed different from those where the density is kept fixed after time t_w. In Fig. 1 we clearly see that for large waiting times the agreement between static and dynamic susceptibilities is very good indicating that the system is not trapped in any long-lived metastable state.

Still the open question is why in the experiments presented in [2] (and confirmed in [1]) the responses are so different and seem not to be related to the corresponding static susceptibilities. The answer is related to the sudden change of dynamics at time t_w: up to t_w we evolved the system in a grand canonical ensemble where the density tends to increase thanks to the large chemical potential, while after time t_w we kept the density fixed, allowing the system to evolve only in a canonical ensemble. In order to verify this hypothesis we have done the following numerical experiment: after quenching the system we let it evolve for t_w time steps within the grand canonical ensemble and for αt_w more in the canonical one. Finally at time $(1 + \alpha)t_w$ we switch the field on and we measure the response [always with a fixed density $\rho(t_w)$]. For $\alpha = 0$ we recover the behavior reported in [1,2]. Nevertheless for large α the system "forgets" the drastic change of the dynamics done at time t_w, thermalizing in the canonical ensemble at a fixed density $\rho(t_w)$ and the dynamical susceptibilities are in agreement with the static ones measured at the same density as can be seen in Fig. 2.

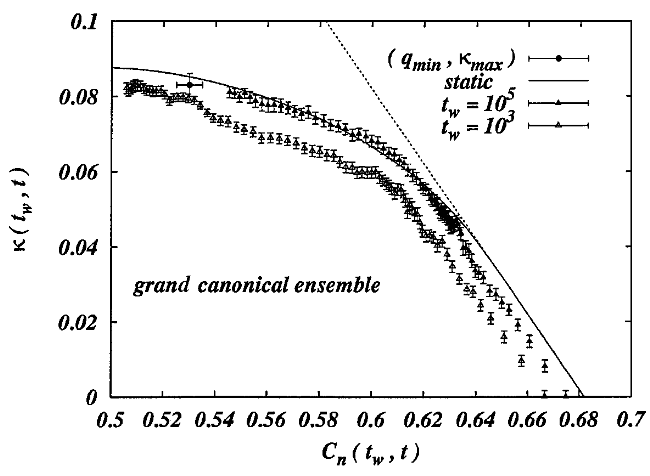

FIG. 1. Grand canonical response versus correlation.

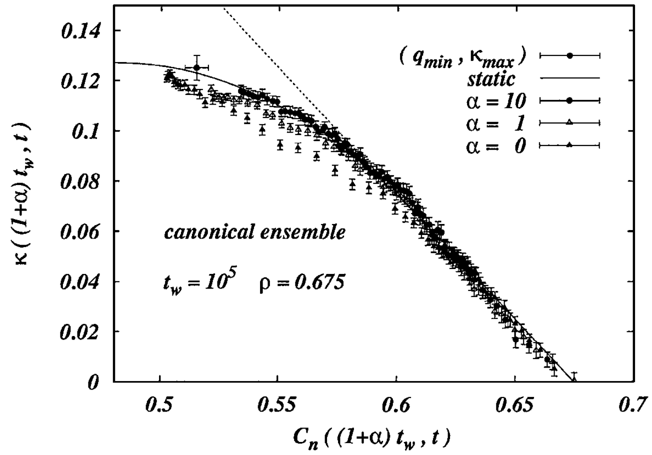

FIG. 2. Canonical response versus correlation.

It must be emphasized that, in both figures, the off-equilibrium results obtained with $L = 40$ systems are still compatible with linear fits and that the curvature of the static result ($L = 10$) may show strong finite size effects.

Concluding, we have shown that the link between static and dynamic susceptibilities is valid on the time scales we can reach in our simulations for both the canonical and the grand canonical ensembles. Regarding the kind of RSB solution present in the glassy phase of the 3D FILG (whether it is characterized by one or infinite RSB steps), we believe that further studies are needed in order to clarify this point. The model still seems to be a good candidate for a 3D system with 1-RSB.

F. Ricci-Tersenghi,[1] G. Parisi,[2] D.A. Stariolo,[3] and J.J. Arenzon[3]
[1]Abdus Salam ICTP, Trieste, Italy
[2]Università di Roma "La Sapienza," Roma, Italy
[3]Universidade Federal do Rio Grande do Sul
Porto Alegre RS, Brazil

Received 8 December 2000
DOI: 10.1103/PhysRevLett.86.4717
PACS numbers: 75.10.Nr, 05.50.+q, 75.40.Gb, 75.40.Mg

[1] A. de Candia and A. Coniglio, preceding Comment, Phys. Rev. Lett. **86**, 4716 (2001).
[2] F. Ricci-Tersenghi, D.A. Stariolo, and J.J. Arenzon, Phys. Rev. Lett. **84**, 4473 (2000).
[3] S. Franz, M. Mezard, G. Parisi, and L. Peliti, Phys. Rev. Lett. **81**, 1758 (1998).