Grannan and Yu Reply: Before we address the specific concerns of the preceding Comment [1], we would like to put the physics in perspective. The main feature of a Coulomb glass is the competition between randomness and the long-range Coulomb interaction. A practical realization of this is found in doped, compensated semiconductors where the disorder is produced by the random placement of donor and acceptor impurities. The majority carriers remaining in the impurity band interact with one another via Coulomb interactions. They are also subjected to a random field due to the ionized minority and majority impurities.

This can be modeled by a Hamiltonian [2] in which both the positions of the sites as well as the on site energies are random:

$$H = \sum_i n_i \phi_i + \sum_{i<j} \frac{(n_i - K)(n_j - K)}{r_{ij}}, \qquad (1)$$

where n_i is the occupation number operator of site i, ϕ_i is a random on site energy $r_{ij} = |r_i - r_j|$ and K is a compensating background charge making the whole system charge neutral. Usually half the sites are occupied and $K = \frac{1}{2}$.

This Hamiltonian is difficult to solve, so it is simplified with the hope that the exact nature of the randomness is not crucial to the physics. One way is to put the sites on a lattice and allow ϕ_i to be random. This gives the Efros-Shklovskii or ES model to which Vojta and Schreiber refer [2]. On the other hand, Xue and Lee [3] as well as ourselves [4] have chosen to put the disorder in the randomness of the sites and eliminate the random on site potential ϕ_i. As a result, the half-filled system has particle-hole symmetry, which allows one to map it onto a spin glass. Although the ES model is more commonly used, both versions are simplifications of the general Hamiltonian given in Eq. (1).

As Vojta and Schreiber point out, for short-range interactions, the ES model can be mapped onto the random field Ising model (RFIM), while the spin glass model can be mapped onto the Edwards-Anderson (EA) model of a short-range spin glass [5]. It is well known that these models belong to different universality classes, though our understanding of these systems continues to evolve. For example, contrary to the statement of Vojta and Schreiber, Mezard and Monasson [6] have recently found that the RFIM *does* have an equilibrium spin-glass-like phase characterized by replica symmetry breaking. This phase occurs at intermediate temperatures above the ferromagnetic transition temperature. (The usual paramagnetic phase exists at high temperatures.)

For the spin glass model one can define an Edwards-Anderson order parameter [5]. However, as Vojta and Schreiber point out, the Edwards-Anderson order parameter is not appropriate for the ES model because it is nonzero at all temperatures. One of the difficulties of the ES model has been the lack of an order parameter for a glassy phase. However, this does not necessarily mean that there is no phase transition to a glassy phase. It may simply indicate that no one has been able to define a suitable order parameter.

With long-range interactions we found that the spin glass model has a glassy phase with a nonzero Edwards-Anderson order parameter at low temperatures. For the ES model, it is not known whether or not there is a phase transition because the effect of long-range interactions on the RFIM is not well understood [7].

However, we believe that the qualitative features we found are characteristic of a Coulomb glass, i.e., a disordered system with long-range Coulomb interactions. In particular, the Coulomb interactions lead to strong correlations that are manifested in two ways. First, there is a phase transition that is depressed in temperature due to screening. (The nature of this transition is model dependent, and the transition may be entirely suppressed by screening in some models.) Second, there is a Coulomb gap in the single particle density of states

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