

**Anisimov *et al.* Reply:** We thank Bagnuls and Bervillier [1] for emphasizing the difference between regular (noncritical) behavior outside the critical region and mean-field critical behavior, which is characterized by the mean-field (classical) critical exponents within the critical domain. In our paper [2] we definitely refer to the latter case, since we consider the behavior of the susceptibility at  $\tau = (T - T_c)/T < 10^{-2}$ . Bagnuls and Bervillier claim that the nonmonotonic crossover from the classical behavior to the asymptotic scaling behavior within the critical domain is impossible. They are correct if the crossover is controlled by a *single crossover parameter*. However, the main point of our paper [2] is that the sharp and sometimes nonmonotonic crossover behavior of the susceptibility, *observed experimentally within the critical domain* for several binary ionic solutions, can be perfectly described by a crossover model that includes *two independent crossover parameters*.

It has been shown by Anisimov *et al.* [3] that a single-parameter model, based on renormalization-group matching [4], gives a crossover behavior of the free energy similar to those based on the  $\varepsilon$  expansion [5] and on the field theory [6]. In this model, if the system-dependent coupling constant  $u$  in the Landau-Ginzburg-Wilson Hamiltonian, reduced by the dimensionless (in units of an average intermolecular distance) microscopic cutoff  $\Lambda$ , is less than  $u^*$  (the universal renormalization-group-theory fixed-point value of the coupling constant), i.e.,  $\bar{u} = u/u^* \Lambda < 1$ , the mean-field behavior is recovered in the limit  $\bar{u}\Lambda/\kappa \ll 1$  and controlled by the Gaussian fixed point at which  $\bar{u}\Lambda = 0$ . The parameter  $\kappa$  is inversely proportional to the correlation length  $\xi$  in such a way that  $\Lambda/\kappa = q_D \xi$  with  $q_D$  the actual microscopic cutoff wave number. In *simple fluids* the cutoff parameter  $\Lambda$  is of order unity (the characteristic microscopic scale is of the order of a molecular size). This is why the crossover to the classical regime is not completed within the critical domain where  $\xi$  is large, unless there is a special reason for very small  $u$  like near tricriticality. If  $\bar{u} \geq 1$ , the crossover scale is not defined by this model. For  $\bar{u} = 1$  all the correction-to-scaling terms in the Wegner expansion disappear and the critical exponents within the entire critical domain are equal to their asymptotic (Ising) values. For  $\bar{u} > 1$  the effective critical exponent of the susceptibility monotonically increases with increase of  $\tau$  (negative Wegner corrections), and the crossover to the classical regime never happens either.

The correlation length  $\xi$  implied by the Landau-Ginzburg-Wilson theory refers to the correlation length associated with the critical fluctuations only. Specifically, a rigorous analysis of the spherical model led Nicoll and Bhattacharjee [4] to replace  $\bar{u}\Lambda/\kappa$  in the crossover function by  $\bar{u}(1 + \Lambda^2/\kappa^2)^{1/2}$ . In this form the two crossover parameters  $\bar{u}$  and  $\Lambda$  are separated, i.e., they control the crossover behavior independently, and the mean-field regime is recovered in the limit  $\Lambda/\kappa \ll 1$ .

For the case  $\bar{u} < 1$ , which is realized in simple fluids [3], such a modification of the crossover function has not much significance: the crossover is still monotonic and is in practice not completed within the critical domain, since  $\xi$  is large and  $\Lambda$  is of order unity. In *complex fluids*, however, the crossover parameter  $\Lambda$  is not necessarily associated with the actual microscopic cutoff but rather may reflect another characteristic spacing on a scale larger than a molecular size. If  $\Lambda$  is small enough (i.e., the characteristic spacing is large), the nonasymptotic behavior of the model of Nicoll and Bhattacharjee implies that the crossover to the mean field is still possible within the critical domain even for  $\bar{u} \geq 1$ . We note that the effective coupling constant  $u \propto \bar{u}\Lambda$  may be small if  $\Lambda$  is small. In this case the crossover is not monotonic, since it is controlled by the two independent crossover parameters:  $\bar{u} > 1$  is responsible for a negative first Wegner correction amplitude and drives the effective susceptibility exponent upward with an increase of  $\tau$ , and small  $\Lambda$  provides a decrease of the exponent downward to the mean-field value even for relatively large  $\xi$ . We realize that this model when being applied to complex fluids is essentially phenomenological. In particular, there is no rigorous theoretical foundation for this model at  $\bar{u} > 1$  [7]. The apparently small "cutoff"  $\Lambda$  in complex fluids may effectively reflect the renormalization of the coupling constant  $u \propto \bar{u}\Lambda$  due to the coupling between different order parameters [7] or a crossover between two different universality classes. Therefore alternative approaches to a description of the crossover phenomena in complex fluids are worthy to consider and further experiments are highly desirable.

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