Erratum: Self-consistent generalized Langevin equation for colloidal mixtures [Phys. Rev. E 72, 031107 (2005)]

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We report that Eq. (25) of this paper contains a mistake deriving from the accidental mixing of two conventions for the normalization of the intermediate scattering functions and other related properties. The correct form of this equation is

$$\Delta\zeta_\alpha^*(t) \equiv \frac{\Delta\zeta_\alpha(t)}{\zeta_\alpha^0} = \frac{D_\alpha^0}{3(2\pi)^3}\int d^3\mathbf{k}k^2F_\alpha^s(k,t)\sum_{\beta,\gamma=1}^{\nu}F_{\beta\gamma}(k,t)\left[\sum_{\delta=1}^{\nu}\sqrt{n_\delta}h_{\alpha\delta}E_{\delta\beta}\right]\left[\sum_{\eta=1}^{\nu}\sqrt{n_\eta}h_{\alpha\eta}E_{\gamma\eta}\right]. \quad (25)$$

This equation is one important element of the self-consistent generalized Langevin equation (SCGLE) theory for colloidal mixtures presented in that paper, which also illustrates the predictive power of this theory by means of its application to a model *binary* mixture. For this, a systematic quantitative comparison of the numerical results of the theory with Brownian dynamics simulations was performed, which is illustrated in Figs. 1-3. The results of the SCGLE reported in those figures were calculated using the mistaken expression. As it happens, however, in the particular case of *binary* mixtures, both expressions for $\Delta\zeta_\alpha^*(t)$ (Eq. (25) and the corrected equation above) coincide when either n_1 or n_2 vanish or when $n_1=n_2$; these were the conditions for which the specific illustrative calculations were presented in the paper, except for the first and third columns of Fig. 3. Thus, the reported mistake only propagated to the numerical results of the SCGLE theory reported in the this figure.

We have re-calculated all the results of the SCGLE theory employing the corrected expression above for $\Delta\zeta_\alpha^*(t)$ for the cases in which the correction applies, i.e., n_1 and n_2 different from 0 and different between them. We find that all the conclusions of the paper remain valid, and are even reinforced. As an illustration, here we present a modified version of Fig. 3, in which we have deleted the results of the SEXP approximation (dashed lines in the original Fig. 3), and have added the corrected SCGLE results (lines with black squares). For systems with low concentrations (left column) the changes are imperceptible, whereas for the more concentrated system in the third column, the corrected results are in much better agreement with the simulation data. Thus, the comment in the paper stating that "In contrast, in the right column of Fig. 3, we

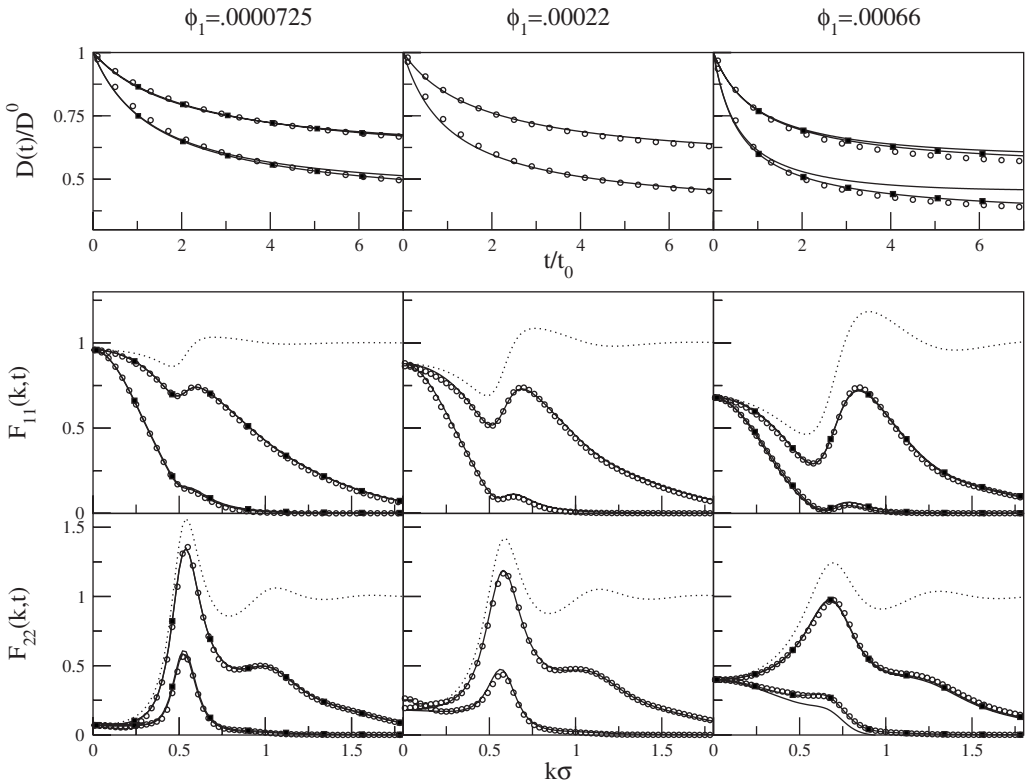

FIG. 3. Corrected version of Fig. 3, in which we have deleted the results of the SEXP approximation (dashed lines in the original Fig. 3), and have added the corrected SCGLE results (lines with black squares).

illustrate one regime in which the performance of the SCGLE is not impressive at the longest times for the dynamics of the more interacting species…This relative failure of the SCGLE approximation to predict accurately enough the long-time dynamics of the more interacting species is probably due to the high concentration of species 1" should be corrected: actually, the accuracy of the theoretical predictions does not deteriorate in this regime, as can be appreciated from the corrected figure. In Fig. 1 of the original paper, the labels at the vertical axis in the right-top panel should range from -1 to 1 instead of $-.05$ to 0.5.

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