Erratum: Two-Particle Distribution and Correlation Function for a 1D Dusty Plasma Experiment [Phys. Rev. Lett. 109, 165003 (2012)]

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An error in the analysis algorithm affected the original data in Figs. 1–4, which we replace here. Our conclusions remain the same, except for footnotes 30 and 31 that should now be disregarded. We also identified a minor problem in the experimental run that was originally reported—the two microparticles were mismatched in size, which we correct by using data from another run.

The most significant correction is in Fig. 2, which shows f_2 and g_2, which are the two-particle velocity distribution function and correlation function, respectively. The noncircular features in f_2 are less prominent than originally reported, and the correlations in g_2 are primarily in the range 0.5 mm/s to 1 mm/s, not >1.0 mm/s as originally reported. As before, the correlations are generally positive in quadrants I and III, and negative in quadrants II and IV. As before, Fig. 4 reveals that the correlation g_2 is different for low- and high-frequency bandpasses corresponding to the center-of-mass and breathing modes, respectively. Faint features in quadrants II and IV in Fig. 4(a) of the original data are no longer present, after correcting the analysis algorithm.

Compared to the experimental run used for the original data, the microparticles in the run used here are more nearly of the same size, as judged by root mean square velocities that now match within 2%. The experimental parameters are nearly the same; those that differ slightly are the following: the opening between the confining metal blocks is now 3 cm by 2 cm, the self-bias is -89 V, $\nu_E = 4.6\ \mathrm{s}^{-1}$, $Q/e = -(2280 \pm 80)$, $r_0 = 0.337 \pm 0.002$ mm, $\kappa = 2.650 \pm 0.002$, and $\lambda_D = 0.127 \pm 0.001$ mm. Figure 3(b) is slightly different from the originally reported data; the two peaks corresponding to the center-of-mass and breathing modes are at 2.142 ± 0.001 Hz and 4.245 ± 0.002 Hz, respectively.

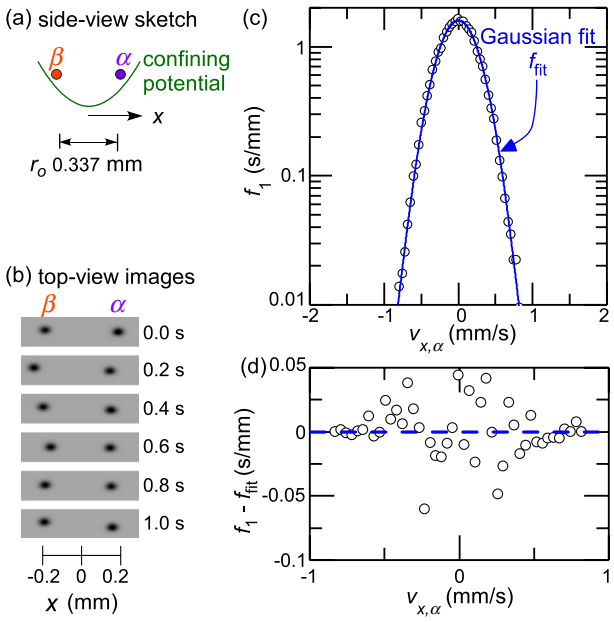

FIG. 1 (color online). Single particle distribution function. Compared to the originally reported data, f_1 is more nearly Gaussian, as shown by a small deviation from the Gaussian fit in (d).

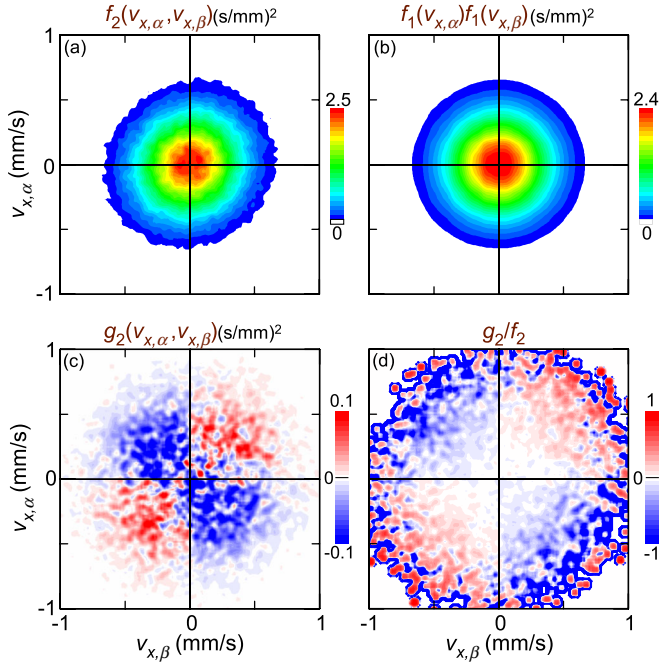

FIG. 2 (color online). (a) The two-particle velocity distribution f_2, (b) the product of one-particle velocity distributions $f_1(\alpha)f_1(\beta)$, (c) the correlation function g_2, and (d) the ratio g_2/f_2. Data in (a) and (b) have been smoothed with a Gaussian radius of 0.06 mm/s, and these smoothed data were used to calculate g_2 and g_2/f_2.

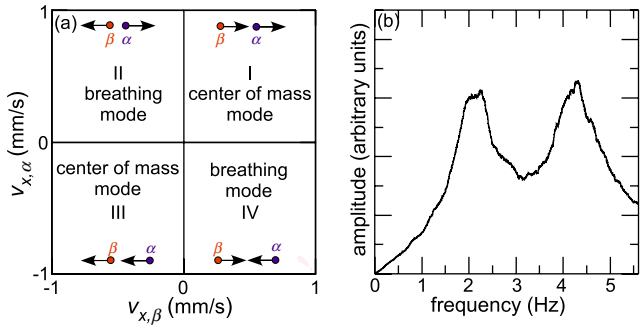

FIG. 3 (color online). Frequency spectrum.

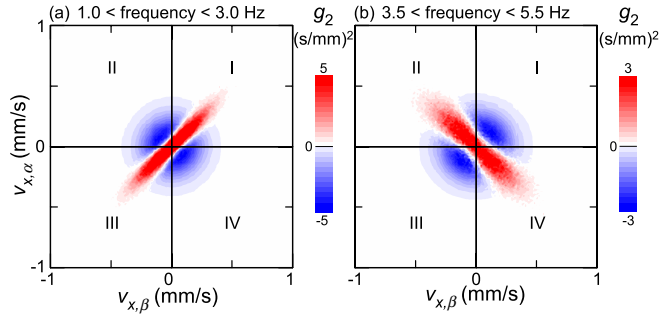

FIG. 4 (color online). Two-particle correlation function g_2, filtered in frequency. The frequency bandpasses, as indicated on the top of the panels, isolate the center-of-mass mode in (a) and the breathing mode in (b), respectively.