Volpe *et al.* Reply: In our Letter [1] we have studied a Brownian particle diffusing in front of a horizontal wall, whose movement $z(t)$ is described by a stochastic differential equation (SDE) with multiplicative noise. This SDE can be solved according to various rules parametrized by α, e.g., $\alpha = 0$ (Ito), 0.5 (Stratonovich), and 1, with different properties. This leads, in particular, to different predictions for the equilibrium distributions $p(z)$ and drift fields $d(z) = \langle \frac{\Delta z(z)}{\Delta t} \rangle$ depending on α [2]. We can compare such predictions with our measurements in order to determine the correct value of α (which turns out to be $\alpha = 1$). We remark that this is only possible because we have *a priori* knowledge of the force $F(z)$ acting on the particle, which, in particular, amounts to gravity (buoyancy) for $z > 280$ nm [Fig. 1(a)], a fact overlooked by Mannella and McClintock in their Comment [3] because not clearly stated in our Letter [1]. The details follow.

$F(z)$ has two components: gravity (buoyancy) $-G_{\rm eff} = -5.9$ fN, which pushes the particle towards the wall and is constant for all z, and electrostatic interactions $F_{\rm el} = Be^{-\kappa z}$, which prevent the particle from sticking to the wall and decays away from the wall with $\kappa^{-1} = 18$ nm. For $z > 280$ nm, in particular, there is only effective gravity, which is known without any fitting parameter [black line in Fig. 1(a)]. We remark that these forces act on the particle independently of the presence of Brownian noise; i.e., they would also be present if the Brownian noise were switched off, for example, by decreasing the temperature of the system towards $T = 0$. The corresponding SDE is

$$dz = -\frac{F(z)}{\gamma(z)} dt + \sqrt{2D(z)} dW, \qquad (1)$$

where $D(z)$ is the position-dependent diffusion coefficient $D(z)$, $\gamma(z)$ the particle friction coefficient, and W a Wiener process. The corresponding α-dependent $p(z)$ and $d(z)$ can be related to force measurements as explained in Refs. [1,2]. In particular, the values of

$$F_p(z) = \frac{k_B T}{p(z)} \frac{dp(z)}{dz} \qquad (2)$$

(solid red line) and

$$F_d(z) = \gamma(z) d(z) \qquad (3)$$

(dashed blue line), which have units of force, are shown for $\alpha = 0$ in Figs. 1(b) and 1(c), $\alpha = 0.5$ in Fig. 1(d) and 1(e), and for $\alpha = 1$ in Fig. 1(f) and 1(g). We remark that, even though $F_p(z)$ and $F_d(z)$ are clearly different, $F_d(z) - F_p(z)$ is independent from α, as correctly pointed out by Mannella and McClintock [3].

In Ref. [1], we experimentally measured $F_p(z)$ (red squares) and $F_d(z)$ (blue circles) [Figs. 1(b)–1(e)]; there is agreement with the solution of the SDE (1) for $\alpha = 1$ [Figs. 1(f) and 1(g)], while the cases of $\alpha = 0$ and 0.5 show clear deviations [Figs. 1(b)–1(e)]. This has the consequence that the force $F(z) = F_p(z)$ and $F(z) = F_d(z) - \gamma(z)\frac{dD(z)}{dz}$, which is the main result of Refs. [1,2]. Finally, we remark that for other systems, which are not coupled to a heat bath [4], the relations between $F(z)$, $F_p(z)$, and $F_d(z)$ may be different.

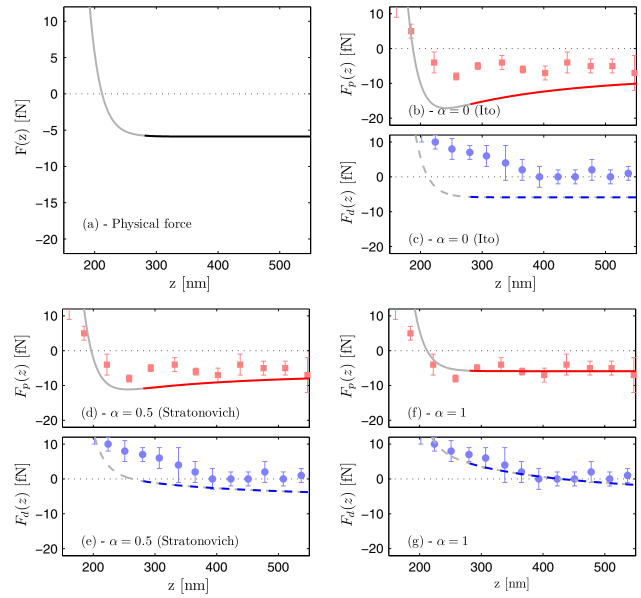

FIG. 1 (color online). (a) Force acting on the Brownian particle studied in Ref. [1]; the black line highlights the region where only gravity (buoyancy) acts. (b)–(g) Expected $F_p(z)$ (solid red line) and $F_d(z)$ (dashed blue line) for $\alpha = 0$, 0.5, and 1; the symbols represent the experimental measurement of $F_p(z)$ (red squares) and $F_d(z)$ (blue circles) (from Fig. 2 in Ref. [1]).

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[4] Some examples of such systems are given, e.g., in R. Kupferman, G. A. Pavliotis, and A. M. Stuart, Phys. Rev. E **70**, 036120 (2004); P. Ao *et al.*, Complexity **12**, 19 (2007), and references therein.

