Erratum: Casimir Force and *In Situ* Surface Potential Measurements on Nanomembranes [Phys. Rev. Lett. 109, 027202 (2012)]

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Equation (2) in our Letter [1] applies to the surface roughness (stochastic) effect but needs to be corrected for harmonic motion:

$$\Delta f = -\frac{f_m}{2k_{\mathrm{eff}}}\left[F'(z_0) + \frac{A_{\mathrm{rms}}^2}{4}F'''(z_0)\right] = -\frac{f_m}{2k_{\mathrm{eff}}}F_a'(z_0). \tag{1}$$

The overall effect of this modification (replacing $1/6$ with $1/4$ in the prefactor of the third derivative term) is not significant at separations where the thermal effect is important. The surface roughness and harmonic motion of the sensor can be treated together by an appropriate definition of A_{rms}.

This modification leads to a deviation between the Drude model and the experimental data at the smallest plate separations (0.12–0.3 μm), comprising a small fraction of our entire data set. In this range, the theoretical frequency shift strongly depends on the permittivity model, particularly at high frequencies where there is no consensus on the permittivity values [2,3]. This gives a theoretical uncertainty in this particular range. If we now limit our calculation of χ^2 to the range where the Drude model most certainly applies, which coincidentally corresponds to distances where the differences between the plasma and Drude models are large compared to experimental statistical errors, the discrimination between the models becomes slightly more significant. This analysis will be presented in a future longer publication.

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[1] D. Garcia-Sanchez, K. Y. Fong, H. Bhaskaran, S. Lamoreaux, and H. X. Tang, Phys. Rev. Lett. **109**, 027202 (2012).
[2] D. Beaglehole, M. De Crescenzi, M. L. Thèye, and G. Vuye, Phys. Rev. B **19**, 6303 (1979).
[3] E. D. Palik, *Handbook of Optical Constants of Solids* (Academic, New York, 1985).

