Response to "Comment on 'Influence of random roughness on cantilever curvature sensitivity' " [Appl. Phys. Lett. 96, 226101 (2010)]

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(Received 26 April 2010; accepted 11 May 2010; published online 1 June 2010)

[doi:10.1063/1.3442494]

In our paper, we state after Eq. (5), page 041912-2 (Ref. 1) that "Fig. 1 shows the cantilever sensitivity T/T_o as a function of the local slope ρ_{rms}. In fact, Eq. (5) defines a limiting value of the local slope ρ_{rms} for which $T=0$, yielding $\rho_{rms}|_{max}=\sqrt{(1-v^L)/v^L}$. For Poisson ratios $v^L=0.18$ [Si(111)] (Ref. 30) and $v^L=0.28$ [Si(100)] (Ref. 30) we obtain, respectively, $\rho_{rms/max}=2.13$ and $\rho_{rms/max}=1.6$. For a metallic overlayer as gold (widely used to coat cantilevers) with $v^L=0.44$ (Ref. 30) we obtain $\rho_{rms/max}=1.12$. These are relatively significant values for ρ_{rms} and the perturbative expansion of Eq. (5) is valid only for local slopes $\rho_{rms}<1$....."

Therefore as we explain in our paper the validity of the approximate formula is for roughness parameters that lead to local slopes $\rho_{rms}<1$. Although in a strict sense we must have $\rho_{rms}\ll 1$, the expansion in powers of ρ_{rms}^2 multiplied by $v^L/(1-v^L)<1$ limits the contribution of higher order terms $\rho_{rms}^{2n}(n>1)$ significantly. Around the regime $\rho_{rms}\sim 1$ (or effectively $\theta\sim 45°$) one has to consider higher order terms in $\langle\theta^2\rangle$ in the expansion of the generic Eq. (1) in the comment [or Eq. (2) in Ref. 1]. In any case as stated in our paper, our calculations were performed for local slopes $0\leq\rho_{rms}<1$ corresponding effectively to inclinations $\theta(\approx\tan^{-1}\rho_{rms})<45°$. Moreover, as one can observe from Fig. 1 made from the commenting authors,[2] for inclinations below $\theta<45°$ the agreement between Eq. (5) in Ref. 1 and the full calculation shown by the commenting authors[2] is reasonably good for both Au and Si. Therefore, for inclinations $\theta<45°$ our analytic formula, as it is shown also by the commenting authors,[2] is having the correct behavior, while any discussion for angles $\theta>45°$ is not relevant to our paper since we do not consider this regime. In any case, it came to our attention that due to error in our original publication,[1] Figs. 2 and 3 are not the correct ones and for this reason we have submitted an erratum.

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[1]O. Ergincan, G. Palasantzas, and B. J. Kooi, Appl. Phys. Lett. **96**, 041912 (2010).
[2]Y. Wang, J. Weissmuller, and H. Duan, Appl. Phys. Lett. **96**, 226101 (2010).

