
Kelvin probe force microscopy of metallic surfaces used in Casimir force measurements

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Abstract

Kelvin probe force microscopy at normal pressure was performed on the Au-coated planar sample used to measure the Casimir interaction in a sphere-plane geometry. The obtained voltage distribution was used to calculate the electrostatic pressure $P(D)$ in the configuration of the Casimir experiments (D being the separation). In the calculation it was assumed that the potential on the sphere had the same statistical properties as that measured on the plane, and that there were no correlation effects on the potentials due to the presence of the other surface. Within this framework, and assuming that the potential distribution does not vary significantly at low pressure, the calculated $P(D)$ does not explain the magnitude or the separation dependence of the difference $\Delta P(D)$ between the measured Casimir pressure and the one calculated using a Drude model for the electromagnetic response of Au.

Référence:

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R.O. Behunin, D.A.R. Dalvit, R.S. Decca, C. Genet, I.W. Jung, A. Lambrecht, A. Liscio, D. Lopez, S. Reynaud, G. Schnoering, G. Voisin, and Y. Zeng
<http://arxiv.org/abs/1407.3741>

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