Quantum Physics

Casimir interaction between plane and spherical metallic surfaces

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We give an exact series expansion of the Casimir force between plane and spherical metallic surfaces in the non trivial situation where the sphere radius R, the plane-sphere distance L and the plasma wavelength $\lambda_\P$ have arbitrary relative values. We then present numerical evaluation of this expansion for not too small values of L/R. For metallic nanospheres where R, L and $\lambda_\P$ have comparable values, we interpret our results in terms of a correlation between the effects of geometry beyond the proximity force approximation (PFA) and of finite reflectivity due to material properties. We also discuss the interest of our results for the current Casimir experiments performed with spheres of large radius $R\gg L$.

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References & Citations

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