

Abstract Submitted
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Investigation of the range of validity of the pairwise summation method applied to the calculation of the surface roughness correction to the van der Waals force NANCY BURNHAM, Worcester Polytechnic Institute, ANDRE GUSSO, Universidade Federal Fluminense, Brazil — Surface roughness is known to modify the van der Waals interaction between two surfaces. Here we use a nonperturbative approach of pairwise summation, the effective density method, in order to simplify such calculations. Our approach is compared with the multilayer effective medium model, whose range of validity is more understood. We find that pairwise summation can be used for roughness characterized by a correlation length of the order of an RMS amplitude when the amplitude is of the order of a few nanometers and only for insulating materials. The calculations can be applied to the stiction of micro- and nano-devices, the adherence of atomic-force microscope tips to surfaces, and in general, to the adhesion of insulators [1]. [1] A. Gusso and N.A. Burnham, Surface Science 651 (2016) 28-40

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