

Abstract Submitted  
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**Spectroscopic Probe of the van der Waals Interaction between Polar Molecules and a Curved Surface** THORSTEN EMIG, MIT, GIUSEPPE BIMONTE, Universita di Napoli Federico II, ROBERT JAFFE, MEHRAN KARDAR, MIT — Fluctuation induced interactions become most prominent in close to proximity to surfaces. Examples include van der Waals and Casimir forces. In this talk, we consider the shift of rotational levels of a diatomic polar molecule due to its van der Waals (vdW) interaction with a gently curved dielectric surface at sub-micron separations. The molecule is assumed to be in its electronic and vibrational ground state, and the rotational degrees are described by a rigid rotor model. We show that under these conditions retardation effects and surface dispersion can be neglected. The level shifts are found to be independent of temperature, and given by the quantum state averaged classical electrostatic interaction of the dipole with its image on the surface. We argue that the curvature induced line splitting is experimentally observable, and not obscured by natural line widths and thermal broadening.

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