

Abstract Submitted
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Self-energy of a Cold Atom Interacting with an Elastic Membrane¹ SANGHITA SENGUPTA, University of Vermont, WEISHUANG XU, MIT, DENNIS CLOUGHERTY, University of Vermont — The interaction of an atom with an elastic membrane is studied using Feynman-Dyson perturbation theory. The self-energy $\Sigma(E)$ of an atom with incident energy E is calculated analytically to second-order in the atom-membrane interaction. We explicitly show that while the first-order contribution to the self-energy is well-behaved, the second-order contribution is divergent in the limit of infinite membrane size, and we identify the various divergent contributions. These results are discussed in the context of the “quantum sticking” and scattering of cold atoms from two dimensional materials such as graphene and monolayer transition metal dichalcogenides.

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