Abstract Submitted
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Friction Effects in Atom-Surface Interactions[1] ULRICH D. JENTSCHURA, Missouri Univ of Sci & Tech — Atom-surface interactions both have a conservative as well as a dissipative component. A treatment of the dissipative terms requires the use of the fluctuation-dissipation theorem, and the calculation of the imaginary part of the polarizability of an atom is required. The paper will review the recent resolution of a long-standing question regarding the low-frequency asymptotics of the imaginary part, as summarized in [Phys. Rev. Lett. 114 (2015) 043001] and [Eur. Phys. J. D 69 (2015) 118], together with K. Pachucki, G. Lach and M. De Kieviet. The surprising conclusion is that the precise form of the imaginary part for low driving frequency is dominated by a so-called quantum electrodynamic loop correction, where "correction" here is not to be taken literally. The one-loop QED term dominates over the tree-level contribution! The findings drastically alter theoretical predictions for non-contact friction, and blackbody friction (due to the atom's interaction with a bath of thermal photons). The basic principle behind the calculation and the methods of nonrelativistic quantum electrodynamics will be discussed.

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