Spatial Dispersion in Atom-surface Interactions

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The interaction of a single microscopic object with its surrounding electromagnetic field is one of the oldest and still one of the most frequently considered problems in physics. One prominent type of interactions are the dispersion forces: Fluctuation-induced (quantum) forces determined by many electromagnetic modes supported by the system. Interestingly, in certain situations, the (dissipative) low-frequency contribution of the system's mode density has a large impact on the physics of the system. In these cases, dissipation prevails as the dominant mechanism and its exact form and origin can have important consequences on the expected behavior of the setup.

In the context of fluctuation-induced atom-surface interactions, we study the distinguished role that dissipation plays in the physics of open quantum systems by considering spatially local as well as nonlocal material models [1,2].

References

[1] D. Reiche, K. Busch and F. Intravaia, Submitted.

[2] D. Reiche, D.A.R. Dalvit, K. Busch and F. Intravaia, Spatial dispersion in atom-surface quantum friction, Phys. Rev. B **95**, 155448 (2017).