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Tunable Casimir-Polder Forces and Spontaneous Emission Rates
FELIPE ROSA, WILTON KORT-KAMP, FELIPE PINHEIRO, TARIK CYSNE, DIEGO OLIVER, CARLOS FARINA, Universidade Federal do Rio de Janeiro —
We investigate the dispersive Casimir-Polder interaction between a Rubidium atom and a graphene sheet subjected to an external magnetic field **B**. We demonstrate that this concrete physical system allows for a high degree of control of dispersive interactions at micro and nanoscales. Indeed, we show that the application of an external magnetic field can induce a 80% reduction of the Casimir-Polder energy relative to its value without the field. We also show that sharp discontinuities emerge in the Casimir-Polder interaction energy for certain values of the applied magnetic field at low temperatures. In addition, we also show that atomic spontaneous emission rates can be greatly modified by the action of the magnetic field, with an order of magnitude enhancement or suppression depending on the dipole's moment orientation.

Felipe Rosa
Universidade Federal do Rio de Janeiro

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