Lukas Weber

Flatiron Research Fellow, Center for Computation Quantum Physics, Flatiron Institute

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Title: Quantum Monte Carlo study of the cavity-coupled electron gas in a modulating potential

Abstract: While in the perfectly uniform electron gas, long-wavelength photons can only couple to the center of mass motion, introducing an external potential leads to fluctuations of the electron total momentum that couple to light in a many-body correlated way.
We consider a minimal continuum model for this scenario, the electron gas in a modulating cosine potential coupled to a cavity. In this model, we perform variational and auxiliary-field quantum Monte Carlo calculations of the precise electron-photon correlation energy. These results can inform the development of new quantum electrodynamical density functionals and other approximations.