Cavity QED of optical lattice clocks

DOMINIC MEISER, BRANDON PEDEN, MURRAY HOLLAND, JILA and Department of Physics, CU Boulder — Optical lattice clocks are fast approaching a regime where experimental limitations will be fundamental rather than technical. One approach to addressing these issues is to generate the optical lattice in a cavity, where the experimenter can take advantage of information imprinted on the lattice fields. Here, we present a theoretical framework for studying optical lattice clocks in cavities. In both linear and ring geometries, we use this cavity QED formalism to investigate fundamental phenomena such as cavity-assisted cooling, Bloch oscillations, and spin-squeezing.

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