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Lattice-induced nonadiabatic frequency shifts in optical lattice clocks KYLE BELOY, New Zealand Institute for Advanced Study, Massey Univ. — We consider the frequency shift in optical lattice clocks which arises from the coupling of the electronic motion to the atomic motion within the lattice. For the simplest of three-dimensional lattice geometries this coupling is shown to affect only clocks based on blue-detuned lattices. We have estimated the size of this shift for the prospective strontium lattice clock operating at the 390-nm blue-detuned magic wavelength. The resulting fractional frequency shift is found to be on the order of 10^{-18} and is largely overshadowed by the electric quadrupole shift. For lattice clocks based on more complex geometries or other atomic systems, this shift could potentially be a limiting factor in clock accuracy.

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