

## COLLISIONAL SHIFTS IN OPTICAL-LATTICE ATOM CLOCKS

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We consider the effects of elastic collisions on the determination of frequency standards via Ramsey fringe spectroscopy in optical-lattice atom clocks. Interparticle interactions of bosonic atoms in multiply-occupied lattice sites can cause a linear frequency shift, as well as generate asymmetric Ramsey fringe patterns and reduce fringe visibility due to interparticle entanglement. We propose a method of reducing these collisional effects in an optical lattice by introducing a phase difference of  $\pi$  between the Ramsey driving fields in adjacent sites. This configuration suppresses site to site hopping due to interference of two tunneling pathways, without degrading fringe visibility. Consequently, the probability of double occupancy is reduced, leading to cancellation of collisional shifts.

This talk is based upon the following recently published paper: Y. B. Band and A. Vardi, Phys. Rev. A74, 033807 (06).