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Manipulation and control of a bichromatic lattice CLAIRE THOMAS, THOMAS BARTER, University of California, Berkeley, SEVERIN DAISS, University of Heidelberg, ZEPHY LEUNG, University of California, Berkeley, DAN STAMPER-KURN, University of California, Berkeley and LBNL — Recent experiments with ultracold atoms in optical lattices have had great success emulating the simple models of condensed matter systems. These experiments are typically performed with a single site per unit cell. We realize a lattice with up to four sites per unit cell by overlaying an attractive triangular lattice with a repulsive one at twice the wavelength. The relative displacement of the two lattices determines the particular structure. One available configuration is the kagome lattice, which has a flat energy band. In the flat band all kinetic energy states are degenerate, so we have the opportunity to explore a regime where interactions dominate. This bichromatic lattice requires careful stabilization, but offers an opportunity to manipulate the unit cell and band structure by perturbing the lattices relative to one another. I will discuss recent progress.

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