

Abstract Submitted
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Measurements of Collective Mode Frequencies in a Multicomponent Quantum Gas JOSHUA HILL, JAMES AMAN, THOMAS KILLIAN, Rice Univ — The frequencies of collective modes provide a powerful probe of many-body physics in ultracold atom gases. We will describe our characterization of the collective modes in mixtures of atomic species using ultracold strontium, which has a wide assortment of isotopes to work with. A cold thermal-gas of Strontium atoms is prepared in a succession of magneto-optical trap (MOT) stages before being evaporatively cooled in an optical dipole trap (ODT). Additional confinement is then introduced by ramping on a second laser beam, the potential minimum of which is overlapped with the ODT. While maintaining the ODT, the second beam is rapidly turned off, and the gas undergoes collective-mode oscillations. These oscillations are clearly visible in the calculated temperature of the gas after time-of-flight absorption imaging. We identify both center of mass (sloshing) and quadrupole modes.

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