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Multiaxis atom interferometry with a single-diode laser and a pyramidal magneto-optical trap XUEJIAN WU, ZACHARY PAGEL, BOLA MALEK, JORDAN DUDLEY, Univ of California - Berkeley, FEI ZI, Zhejiang University, PHILIP CANOZA, HOLGER MLLER, Univ of California - Berkeley — Atom interferometry has become one of the most powerful technologies for precision measurements. In order to develop a simple, precise, and versatile atom interferometer for inertial sensing, we demonstrate a scheme for atom interferometry to measure multiple axes of accelerations and rotations based on a single-diode laser and a pyramidal magneto-optical trap. Three-axis of accelerations, three-axis of rotations and two-axis of inclinations can be measured by pointing Raman beams toward individual faces of a pyramidal mirror. Only a single-diode laser is used for all functions, including atom trapping, interferometry, and detection. Efficient Doppler-sensitive Raman transitions are achieved without velocity selecting the atom sample, and with zero differential AC Stark shift between the cesium hyperfine ground states, increasing signal-to-noise and suppressing systematic effects. As a demonstration, we measure gravity along two axes, rotation, and inclination with sensitivities of 6 μm/s^2, 300 μrad/s, and 4 μrad at one second, respectively. This work paves the way toward deployable multiaxis atom interferometers for geodesy, geology, or inertial navigation.

Xuejian Wu
Univ of California - Berkeley

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