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Atom Interferometry Techniques for Improved Sensitivity, Stability and Dynamic Range DIMITRY YANKELEV, CHEN AVINADAV, NIR DAVIDSON, OFER FIRSTENBERG, Weizmann Institute of Science — Cold-atom interferometers have demonstrated extremely high sensitivity as inertial sensors measuring gravity, gravity gradients, and accelerations and rotations. However, high performance operation outside the lab is generally challenging due to limited dynamic range and systematic effects. We will present new approaches to atom interferometry that tackle these limitations, including simultaneous quadrature-phase detection, extension of dynamic range by orders of magnitude using new, composite, interferometric fringes in a Moiré-like effect, and scale-factor stabilization in point-source interferometry using correlation with fringe contrast. We study all these schemes and demonstrate them experimentally in static and dynamic conditions.

Dimitry Yankelev
Weizmann Institute of Science

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