

Atomic gradiometer enhanced by multiphotonic transitions and Optimal Control Theory

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Atomic interferometry has led to the realization of a wide range of high-precision inertial sensors. My thesis focuses on the study of gravity and particularly its gradient through a common-noise rejecting differential measurement. Multi-photon Bragg transitions are implemented to increase separation of atomic wavepackets, resulting in a larger scale factor for the interferometer phase and therefore a higher measurement sensitivity. We also apply Optimal Control Theory (OCT) to enhance the fidelity of these light beamsplitters, minimize parasitic transitions and improve the interferometric contrast.

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