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Atom Interferometry Experiments in Fundamental Physics PEICHEN KUAN, SHAU-YU LAN, BRIAN ESTEY, CHEONG CHAN, HOLGER MUELLER, Department of Physics, UC Berkeley — Light-pulse atom interferometers have already been used to measure gravity, the fine structure constant, gravity gradients, and Newtons gravitational constant with high precision and accuracy. Recent developments like large-momentum transfer (LMT) beam splitters for matter waves, e.g. using a combination of Bloch oscillations and Bragg diffraction, increase the space-time area enclosed between the interferometer arms. This promises to boost the sensitivity of atom interferometer by several orders of magnitude. Furthermore, the common mode noise of interferometers can be removed by running a pair of conjugated interferometers simultaneously. Here, we report our recent progress of atom interferometer experiments.

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