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Quantum walk of ultracold atoms in optical lattices with quadratic gradients LUSHUAI CAO, QIAN-RU ZHU, XIAO-CHUN DUAN, YAO-YAO XU, Huazhong University of Science and Technology — Quantum walk of ultracold atoms in optical lattices has become a powerful platform for various applications, such as in quantum metrology and quantum simulation. A paradigmatic example is the Bloch oscillations in optical lattices with a linear gradient, which has been used to measure the gravity acceleration. In this talk, I will present our numerical results on quantum walk of ultracold atoms in optical lattices with a linear plus quadratic gradient. A modulated Bloch oscillation is observed, of which the frequency spectrum of the local density oscillations present equidistant splitting. Such frequency splitting has a potential use in measure, *e.g.* the gravity gradients.

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