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Time-reversal invariant bilayer 2D synthetic lattices YICHAO ZHANG, XIWANG LUO, KUEI SUN, CHUANWEI ZHANG, Univ of Texas, Dallas, UNIV OF TEXAS, DALLAS TEAM — Recently it has been theoretically proposed and experimentally demonstrated that a 1D spin-orbit coupled optical lattice can emulate a 2D synthetic lattice with a uniform magnetic field, where atomic spins represent the synthetic dimension. The time-reversal symmetry in this system is broken by the magnetic flux. Here we propose the time-reversal symmetry may be restored by considering a bilayer spin-orbit coupled optical lattice with opposite Raman coupling between layers. We show how such layer-spin coupling modifies chiral edge states, fractal Hofstadter butterfly, and layer-spin correlation.

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