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[605] Twisted chiral superconductivity in photodoped frustrated Mott insulators

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We report how a new type of chiral superconducting phase can be stabilized in photodoped frustrated Mott insulators. The metastable phase features a spatially varying order parameter with a 120 degree phase twist which breaks both time-reversal and inversion symmetry. Under an external electric pulse, the 120 degree chiral superconducting state can exhibit a second-order supercurrent perpendicular to the field in addition to a first-order parallel response, similar to a nonlinear anomalous Hall effect. This phase can be tuned by artificial gauge fields when the system is dressed by high-frequency periodic driving. The mechanism revealed in this study can be realized in both cold-atom quantum simulators and correlated solids.

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