Nondispersive wave packets in Dirac materials

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We show that a wide class of quantum systems with translation al invariance can host disper-sionless, soliton-like, wave packets. We focus on the settings where the effective, two-dimensional Hamiltonian acquires the form of Dirac operator. The proposed framework for construction of the dispersionless wave packets is illustrated on systems with topologically nontrivial effective mass. Our analytical predictions are accompanied by a numerical analysis and possible experimental realizations are discussed.