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【156】 Weyl Orbits Without an External Magnetic Field

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We show that non-local orbits can arise in the presence of time-reversal symmetry (TRS), via full-lattice simulations of a system with four Weyl points subjected to an axial field [1,2]. Magnetic field, applied to a system with Weyl points, results in pseudo-Landau levels that disperse only along the field direction [3]. An appealing idea is to avoid breaking TRS, and rely on an axial field. We elucidate the interpretation of the orbit surface motion in the absence of an external magnetic field, and verify the semiclassical energy quantization by an effective surface theory approach.

[1] Grushin et al., PRX 6, 1 (2016).

[2] Peri et al., Nat. Phys. 15, 357 (2019).

[3] Potter et al., Nat. Commun. 5, 5161 (2014).

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