Topological Transition Of Dirac Points In A Microwave

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~~Topological magnon Dirac points in a 3D antiferromagnet by Yuan Li~~

David Kaplan-Domain Wall Fermions\u0026Chiral Gauge theories:Topological Insulators@Harvard CMSA12/3/2020 Ashvin Vishwanath (Harvard): \"From Dirac-Weyl fermions to band topology\" (1st talk) *Surprises in the search of topological states in non-hermitian systems - non-hermitian skin effect Evolution of Dirac Points in Kitaev Hubbard model* **Prof. Zahid Hasan, \"Topological Insulators, Berry Phase and Helical Dirac Fermions\", Part 1 of 4 Deriving The Dirac Equation Dirac Fermions at interfaces (Confirmation Seminar)** *Topological insulators: mind the gap! | Gene Mele | TEDxPenn* **Quaternions and Fundamental Physics** *Topological quantum phases - Alexei Kitaev Adventures in Gapless Topological Phases - Ryan Thorngren Philip Kim, \"Relativity, Quantum Physics, and Graphene\"* ~~Quantum Mechanics 12a - Dirac Equation I~~

Topological insulators and how they might change the world | Professor Michael Fuhrer

Electron Band Structures*Calculation of Graphene Band structure* ~~Prof. Charles Kane, \"Topological Band Theory I\", Part 1 of 6~~ **Graphene: Band Structure** ~~Haldane model and Berry curvature intro (by Duncan Haldane)~~ ~~Parity-Time and Other Symmetries in Optics and Photonics~~ **Weyl semimetals \u0026 SPT phases I -- A. Vishwanath** *Graphene and Dirac Cones Topology in quantum matter: New phases with fascinating properties ? by Frank Pollmann* **Nordita Seminar - Symmetry- and Geometry-Based Framework for Nodal Fermions and Topological Phases** ~~Michael Fuhrer's 'Science Snippet': Secret Lives of Electrons in Atomically-thin Materials~~ ~~Nigel Hitchin | Michael Atiyah: Geometry and Physics~~ *Chemical Sciences | D4S8 18/35 Topological photonics - Moti Segev Michael Kosterlitz, Nobel Laureate: \"Topological excitations in two dimensions\" 18 Oct 2016* ~~The Physics of Exceptional Points~~ *Topological Transition Of Dirac Points*

Dirac point movement can lead to a topological transition from semimetal to semiconductor when two inequivalent Dirac points merge, an idea that has attracted significant research interest. However, such movement normally requires unrealistically high lattice anisotropy.

Dirac point movement and topological phase transition in ...

a topological transition b etween a phase with a point-like band gap characteristic of massless Dirac fermions and a gapped phase. By applying a controlled anisotropy on the structure, we in...

(PDF) Topological Transition of Dirac Points in a ...

hoppings. With increasing asymmetry between the hoppings the Dirac points approach each other. At a critical asymmetry the Dirac points merge to open an energy gap, thus changing the topology of the eigenspectrum. We analyze the trajectory of the Dirac points and study the density of states in the different phases.

Dirac-point engineering and topological phase transitions ...

We study quantum phase transitions in graphene superlattices in external magnetic fields, where a framework is presented to classify multiflavor Dirac fermion critical points describing hopping-tuned topological phase transitions of integer and fractional Hofstadter-Chern insulators.

Classification of Topological Phase Transitions and van ...

Recently, 3D Dirac points have been found in symmetry-protected crystals such as Na 3 Bi2, 3,4Cd 3 As 2 5and PtTe 2. As a fundamental topological band structure, a 3D Dirac point can transit into...

Dirac points and the transition towards Weyl points in ...

ers, the location of these Dirac points can be moved up or down in energy by tuning the electric eld, resulting in non-trivial topological transitions. At low and inter-mediate twist angles (<2:8), these points are sepa-rated in energy. As a function of increasing electric eld, the gap rst closes at the satellite Dirac points, leading

Trigonal Warping, Satellite Dirac Points and Multiple ...
The topological feature of the Dirac points is manifested by considering the magneto-optical effect. A photonic Chern “insulator” with two helical edge states is realized due to the breaking of time reversal symmetry (here photonic “insulator” means the propagation of light at a certain frequency range is forbidden by an absolute photonic band gap).

The Emergence of Dirac points in Photonic Crystals with ...
There are 6 cones corresponding to the six vertices of the hexagonal first Brillouin zone. Dirac cones, named after Paul Dirac, are features that occur in some electronic band structures that describe unusual electron transport properties of materials like graphene and topological insulators. In these materials, at energies near the Fermi level, the valence band and conduction band take the shape of the upper and lower halves of a conical surface, meeting at what are called Dirac points.

Dirac cone - Wikipedia
By direct calculation of the invariant, we confirm that an electronic phase transition from a topological insulator to a band insulator occurs when the electric field passes a critical value. In a device setting with asymmetric gate voltages, this field-tunable Berry curvature generates a large spin current transverse to the charge current.

Field-Tunable Topological Phase Transitions and Spin-Hall ...
A simple core-shell two-dimensional photonic crystal is studied where the triangular lattice symmetry and the C6 point group symmetry give rich physics in accidental touching points of photonic bands. We systematically evaluate different types of accidental nodal points at the Brillouin zone center for transverse-magnetic harmonic modes when the geometry and permittivity of the core-shell ...

Accidental degeneracy in photonic bands and topological ...
The positions of the Dirac points are related to each other by the inversion symmetry around the symmetry points ? and M 1, M 2 and M 3. Finally, at t 3 = t 1 + t 2 , where the lines leave the pink triangle in order to enter region A 3 , the Dirac points merge at M 3 and the system undergoes a phase transition from a semimetal to an insulator.

Dirac-point engineering and topological phase transitions ...
Topological phase transitions happen when the band gap closes. It is not true that all band crossings are topological. There are Dirac (linear) band crossings, quadratic band crossings, Dirac-like triply degenerate band crossings, double Dirac cone crossings, semi-Dirac transitions (linear in one direction and quadratic in another) etc.

Do topological transitions only occur at Dirac points?
The Dirac Hamiltonian plays a central role in the theory of topological materials. Its signicance follows from the fact that in the presence of Tand Psymmetry a three-dimensional Dirac fermion appears at the topological phase boundary between a normal insulator and a topological insula- www.annualreviews.orgShort title 3 tor (50).

Topological Semimetals from rst-principles
By means of a microwave tight-binding analogue experiment of a graphenelike lattice, we observe a topological transition between a phase with a pointlike band gap characteristic of massless Dirac fermions and a gapped phase.

Topological transition of Dirac points in a microwave ...
Topological semimetals (TSMs) host relativistic electrons near band-crossing points in their electronic structures (1 ? – 3). These electrons’ low-energy excitation obeys the representations of Dirac equation in particle physics, and, therefore, they are dubbed as Weyl and Dirac fermions.

Bond-breaking induced Lifshitz transition in robust Dirac ...
The valley Hall transition can be generated by simply rotating the chiral scatterers, where the topological phase transition is triggered by reopening the Dirac degeneracies beyond high-symmetry points and boundaries in the Brillouin zones. We numerically and experimentally demonstrate robust transport against different defects in chiral VTIs.

Phys. Rev. Applied 14, 024091 (2020) - Valleylike Edge ...

Different types of Lifshitz transitions are governed by topology in momentum space. They involve the topological transitions with the change of topology of Fermi surfaces, Weyl and Dirac points, nodal lines, and also the transitions between the fully gapped states.