

# Curriculum Vitae

Ashvin Vishwanath

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| <i>Address:</i> Harvard University<br>Department of Physics<br>17 Oxford Street<br>Cambridge, MA 02138 | <i>Tel:</i> 617 495 2873<br><i>Fax:</i> 617 495 0416<br><i>Email:</i> <a href="mailto:avishwanath@g.harvard.edu">avishwanath@g.harvard.edu</a> |
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**Research Area:** Theoretical condensed matter physics. Combination of formal theory and applications to specific materials. Body of work spans the areas of topological phases, quantum phase transitions, magnetism and superconductivity.

## Employment and Education:

1. Professor, 07/2016 – present. *Harvard University, Cambridge, MA.*
2. Professor, 06/2012 – 06/2016. *University of California, Berkeley.*
3. Associate Professor, 06/2008 – 06/2012. *University of California, Berkeley.*
4. Assistant Professor, 06/2004 – 05/2008. *University of California, Berkeley.*
5. Pappalardo Post-doctoral Fellow, 2001-2004. *MIT.* (Mentor: T. Senthil)
6. Ph.D., 1996-2001. *Princeton University.* (Advisor: F. D. M. Haldane)
7. M.Sc. (Physics) 1991-1996. *Indian Institute of Technology, Kanpur.*

## Awards and Fellowships:

- Europhysics Prize 2016 for “*Theory of Magnetic Skyrmions in MnSi*”
- Simons Investigator Award 2015
- Guggenheim Fellowship 2014.
- APS Fellowship 2014
- Distinguished Visiting Research Chair, Perimeter Institute 2012-2018
- Miller Professor 2009.
- NSF CAREER Award 2007.
- Hellman Foundation Fellowship, 2006.
- A. P. Sloan Fellowship, 2004.

## Mentorship:

- *Doctoral Students (current):* Dan Borgnia, Adrian Po, Charles Xiong, Yasaman Bahri.
- *Doctoral Students (Alumni):* Fa Wang, Itamar Kimchi and Haruki Watanabe (Pappalardo Fellow, MIT). Yi Zhang and Pavan Hosur (Postdoctoral Fellowship at Stanford) Philipp Dumitrescu (Postdoc at UTexas Austin)
- *Current Postdoctoral Researchers:* Snir Gazit, Yi Zhuang You and Yin Chen He (Moore Fellow).
- *Former Postdoctoral Researchers (including joint postdocs):*  
Pouyan Ghaemi (Assistant Prof., CUNY), Shinsei Ryu (Prof., UIUC), Ari Turner (Assistant Prof., Johns Hopkins), Ying Ran (Prof., Boston College), Daniel Podolsky (Prof., Technion), Benedikt Binz (U. of Cologne), Arun Paramakanti (Prof., U. Toronto), Sid Parameswaran, (Assistant Professor - UC Irvine), , HongChen Jiang (Research Scientist - SLAC), Xie Chen (Assistant Professor - Caltech), YuanMing Lu (Assistant Prof - Ohio State), Tarun Grover (Assistant Prof - UC San Diego), Andrew Potter (Assistant Professor - Texas Austin).

### **Synergistic Activities:**

- Contributor to online Journal Club for Condensed Matter Physics.
- Co-organizer for summer workshop in Aspen: “Gauge Theories and Fractionalization in Quantum Matter” 2005.
- Co-organizer for Boulder Summer School 2008.
- Co-organizer for KITP Workshops on Quantum spin Liquids and frustrated Magnetism, 2012 and Topological Phases 2016.

### **Selected Publications:**

1. X. Wan, Ari M. Turner, Ashvin Vishwanath, and Sergey Y. Savrasov, *Topological semimetal and Fermi-arc surface states in the electronic structure of pyrochlore iridates* Phys. Rev. B 83, 205101 (2011).
2. Tarun Grover, D. N. Sheng, Ashvin Vishwanath, *Emergent Space-time Supersymmetry at the Boundary of a Topological Phase* Science 344: 280-283 (2014).
3. Yuan-Ming Lu, Ashvin Vishwanath, *Theory and classification of interacting 'integer' topological phases in two dimensions: A Chern-Simons approach,* Phys. Rev. B 86, 125119 (2012).
4. A. Vishwanath and T Senthil, *Physics of Three-Dimensional Bosonic Topological Insulators: Surface- Deconfined Criticality and Quantized Magnetoelectric Effect.* Physical Review X, (2013).
5. Xie Chen, Lukasz Fidkowski and Ashvin Vishwanath, *Symmetry enforced non-Abelian topological order at the surface of a topological insulator.* Phys. Rev. B 89, 165132 (2014).
6. Lukasz Fidkowski, Xie Chen, and Ashvin Vishwanath, *Non-Abelian Topological Order on the Surface of a 3D Topological Superconductor from an Exactly Solved Model,* Phys. Rev. X 3, 041016 (2013).
7. Yi Zhang, Tarun Grover, Ari Turner, Masaki Oshikawa, and Ashvin Vishwanath, *Quasiparticle statistics and braiding from ground-state entanglement,* Phys. Rev. B 85, 235151 (2012).
8. Y. Ran, Y. Zhang, and A. Vishwanath. *One-dimensional topologically protected modes in topological insulators with lattice dislocations.* Nature Physics 5, 289-303 (2009).
9. F. Wang, H. Zhai, Y. Ran, A. Vishwanath, and D. H. Lee. *Functional renormalization-group study of the pairing symmetry and pairing mechanism of the FeAs-based high-temperature superconductor.* Phys. Rev. Lett. 102, 047005 (2009).
10. Y. Ran, F. Wang, H. Zhai, A. Vishwanath, and D.H. Lee. *Nodal spin density wave and band topology of the FeAs-based materials.* Phys. Rev. B 79, 014505 (2009).
11. B. Binz, A. Vishwanath, and V. Aji. *Theory of the helical spin crystal: a candidate for the partially ordered state of MnSi.* Phys. Rev. Lett. 97, 207202 (2006).

12. B. Binz and A. Vishwanath.  
*Topological Hall effect is helical spin crystals.*  
Physica B 403, 1336  
(2008).
13. PJW Moll, NL Nair, T Helm, AC Potter, I Kimchi, A Vishwanath, JG Analytis.  
*Transport evidence for Fermi-arc-mediated chirality transfer in the Dirac semimetal Cd<sub>3</sub>As<sub>2</sub>.*  
Nature (2016).
14. K. A. Modic, T. E. Smidt, I. Kimchi, N. P. Breznay, A. Biffin, S. Choi, R. D. Johnson, Radu Coldea, P. Watkins-Curry, G. T. McCandless, J. Y. Chan, F. Gandara, Z. Islam, Ashvin Vishwanath, Arkady Shekhter, R. D. McDonald & James G. Analytis.  
*Realization of a three-dimensional spin–anisotropic harmonic honeycomb iridate.*  
Nature Communications 5, Article number: 4203 (2014).
15. Max A. Metlitski and Ashvin Vishwanath ,  
*Particle-vortex duality of two-dimensional Dirac fermion from electric-magnetic duality of three-dimensional topological insulators.*  
Phys. Rev. B 93, 245151 (2016).
16. S. A. Parameswaran, Ari M. Turner, Daniel P. Arovas, Ashvin Vishwanath  
*Topological Order and Absence of Band Insulators at Integer Filling in Non-Symmorphic Crystals.*  
Nature Physics 9, 299 (2013).
17. Scott D Geraedts, Michael P Zaletel, Roger SK Mong, Max A Metlitski, Ashvin Vishwanath, Olexei I Motrunich.  
*The half-filled Landau level: The case for Dirac composite fermions.*  
Science 352, 197, (2016).
18. HC Po, H Watanabe, MP Zaletel, A Vishwanath  
*Filling-enforced quantum band insulators in spin-orbit coupled crystals.*  
Science Advances 2 (4), e1501782 (2016).
- 19 Y Bahri, R Vosk, E Altman, A Vishwanath .  
*Localization and topology protected quantum coherence at the edge of hot matter.*  
Nature Communications 6, (2015).
20. AC Potter, I Kimchi, A Vishwanath ,  
*Quantum oscillations from surface Fermi arcs in Weyl and Dirac semimetals.*  
Nature Communications 5 (2014)