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Pavan Hosur

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Education:

B.Tech., Engg. Physics	Indian Institute of Technology, Bombay, India	2003 - 2007
Ph.D., Physics	University of California, Berkeley	2007 - 2012
(PhD Advisor	Ashvin Vishwanath)	
Post Doc	Stanford University	2012 - 2016

Employment History:

Assistant Professor, University of Houston	2016 - present

Honors and Awards:

- NSF CAREER award 2021
- Acknowledged in the Scientific Background for the 2016 Nobel Prize in Physics
- Sigma XI full member

Recent Research Highlights:

- We developed the theory that describes the response of an electron gas in solids to rotation. In chiral materials, we predict a current along the axis of rotation. Our result generalizes the well-known chiral vortical effect from relativistic high-energy physics to crystalline solids and to rotation that is non-uniform in space and time. It also resolves controversies surrounding the adaptation of the chiral vortical effect to condensed matter.
- We calculated the superconductor vortex spectrum in Weyl semimetals and showed that it is dominated by the Fermi arc states. We predicted that tilting the vortex axis produces periodic oscillations in the specific heat and changes the fundamental nature of the vortex between fermionic and fermionic. The critical points between the fermionic vortex-bosonic vortex transitions enjoy an exotic and elusive supersymmetry.
- We derived criteria for the existence of Majorana fermions on the surface of Weyl semimetals in the presence of a bulk superconductor vortex. The criteria depend only on the connectivity of the Fermi arcs and the positions of the bulk Weyl nodes; these data are easily available from band structure calculations or photoemission experiments.

Lab Facilities / Expertise:

Theory of

(1) strongly correlated and topological matter
(2) thermalization and chaos in quantum systems

Five Selected Publications (Link to full list via Google Scholar: https://scholar.google.com/citations?user=AQgLuSoAAAAJ&hl=en)

1. *Vortical effects in chiral band structures,* Swadeepan Nanda, Pavan Hosur, arxiv:2206.14194.

2. *Superconductor vortex spectrum from surface Fermi arcs in Weyl semimetals,* Rauf Giwa, Pavan Hosur, arxiv:2203.06893.

3. *Anomalous surface conductivity of Weyl Semimetals,* Hridis K. Pal, Osakpolor E. Obakpolor, Pavan Hosur, arxiv:2112.14170.

4. *Surface Luttinger arcs in Weyl semimetals,* Obakpolor Eki Osakpolor, Pavan Hosur, arxiv:2108.05380.

5. *Fermi arc criterion for surface Majorana modes in superconducting time-reversal symmetric Weyl semimetals,* Rauf Giwa, Pavan Hosur, Phys. Rev. Lett. 127, 187002 (2021).