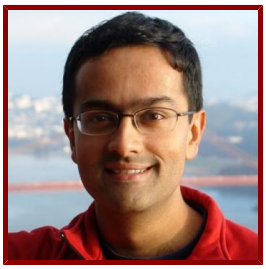
Stanford



# Srinivas Raghu

Professor of Physics

Curriculum Vitae available Online

### CONTACT INFORMATION

- **Administrative Contact**

  Denise Jones

  **Email** dejones@stanford.edu

## Bio

### BIO

I am interested in the emergent behavior of quantum condensed matter systems. Some recent research topics include non-Fermi liquids, quantum criticality, statistical mechanics of strongly interacting and disordered quantum systems, physics of the half-filled Landau level, quantum Hall to insulator transitions, superconductor-metal-insulator transitions, and the phenomenology of quantum materials.

Past contributions that I'm particularly proud of include the co-founding of the subject of topological photonics (with Duncan Haldane), scaling theories of non-Fermi liquid metals (with Shamit Kachru and Gonzalo Torroba), Euclidean lattice descriptions of Chern-Simons matter theories and their dualities in 2+1 dimensions (with Jing-Yuan Chen and Jun Ho Son), and 'dual' perspectives of quantum Hall transitions (with Prashant Kumar and Michael Mulligan).

### ACADEMIC APPOINTMENTS

- Professor, Physics
- Principal Investigator, Stanford Institute for Materials and Energy Sciences

### ADMINISTRATIVE APPOINTMENTS

- Postdoctoral Scholar, Stanford University, (2006-2010)
- Assistant Professor, Rice University, (2010-2011)
- Assistant Professor, Department of Physics, Stanford University, (2011-2017)
- Associate Professor, Department of Physics, Stanford, (2017- present)

### HONORS AND AWARDS

- Elected Fellow, American Physical Society
- Terman Fellowship, Stanford University (2012)
- Sloan Research Fellowship, Alfred P. Sloan Foundation (2012)
- Young Investigator Award, U.S. Departrment of Energy (2012)

### PROFESSIONAL EDUCATION

- Ph.D., Princeton University , Physics (2006)

### LINKS

- "SITP Webpage": https://sitp.stanford.edu/people/srinivas-raghu

## Teaching

### COURSES

**2026-27**

- Condensed Matter Seminar: APPPHYS 470 (Spr)
- Condensed Matter Theory I: PHYSICS 372 (Spr)
- Topics in Non-Equilibrium Statistical Mechanics: PHYSICS 375 (Win)

**2025-26**

- Condensed Matter Seminar: APPPHYS 470 (Aut, Win, Spr)
- Mechanics and Fluids: PHYSICS 21 (Aut)

**2023-24**

- Classical Electrodynamics: PHYSICS 220 (Win)
- Quantum Field Theory I: PHYSICS 330 (Aut)

### STANFORD ADVISEES

**Doctoral Dissertation Reader (AC)**

Yidi Liu, Tixuan Tan

**Postdoctoral Faculty Sponsor**

Tobias Helbig, Julian May-Mann, Zhengyan Shi

**Doctoral Dissertation Advisor (AC)**

Sayak Bhattacharjee, Nicole Ticea

## Publications

### PUBLICATIONS

- **Quantum turbulence in the many-body regime.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*
  Bhattacharjee, S., Verma, M. K., Balatsky, A. V., Raghu, S.
  2026; 384 (2325)
- **Quantum printing and induced vorticity in superconductors II: Laguerre-Gaussian beam** *PHYSICAL REVIEW RESEARCH*
  Yeh, T., Yerzhakov, H., Bishop-Van Horn, L., Raghu, S., Balatsky, A.
  2025; 7 (4)
- **Quantum printing and induced vorticity in superconductors I: Linearly polarized light** *PHYSICAL REVIEW RESEARCH*
  Yeh, T., Yerzhakov, H., Horn, L., Raghu, S., Balatsky, A.
  2025; 7 (4)
- **Author Correction: Superconductivity and normal-state transport in compressively strained La2PrNi2O7 thin films.** *Nature materials*
  Liu, Y., Ko, E. K., Tarn, Y., Bhatt, L., Li, J., Thampy, V., Goodge, B. H., Muller, D. A., Raghu, S., Yu, Y., Hwang, H. Y.
  2025

- **Superconductivity and normal-state transport in compressively strained La2PrNi2O7 thin films.** *Nature materials*
  Liu, Y., Ko, E. K., Tarn, Y., Bhatt, L., Li, J., Thampy, V., Goodge, B. H., Muller, D. A., Raghu, S., Yu, Y., Hwang, H. Y.
  2025
- **Synthesis of superconducting freestanding infinite-layer nickelate heterostructures on the millimetre scale** *NATURE SYNTHESIS*
  Lee, Y., Wei, X., Yu, Y., Bhatt, L., Lee, K., Goodge, B. H., Harvey, S. P., Wang, B., Muller, D. A., Kourkoutis, L. F., Lee, W., Raghu, S., Hwang, et al
  2025
- **Sublattice modulated superconductivity in the kagome Hubbard model** *PHYSICAL REVIEW B*
  Schwemmer, T., Hohmann, H., Duerrnagel, M., Potten, J., Beyer, J., Rachel, S., Wu, Y., Raghu, S., Mueller, T., Hanke, W., Thomale, R.
  2024; 110 (2)
- **Linear-in-temperature resistivity for optimally superconducting (Nd,Sr)NiO2.** *Nature*
  Lee, K., Wang, B. Y., Osada, M., Goodge, B. H., Wang, T. C., Lee, Y., Harvey, S., Kim, W. J., Yu, Y., Murthy, C., Raghu, S., Kourkoutis, L. F., Hwang, et al
  2023; 619 (7969): 288-292
- **The Hubbard Model** *ANNUAL REVIEW OF CONDENSED MATTER PHYSICS*
  Arovas, D. P., Berg, E., Kivelson, S. A., Raghu, S.
  2022; 13: 239-274
- **Universal behavior of the bosonic metallic ground state in a two-dimensional superconductor** *NPJ QUANTUM MATERIALS*
  Chen, Z., Wang, B., Swartz, A. G., Yoon, H., Hikita, Y., Raghu, S., Hwang, H. Y.
  2021; 6 (1)
- **Robust dx2-y2-wave superconductivity of infinite-layer nickelates** *PHYSICAL REVIEW B*
  Wu, X., Di Sante, D., Schwemmer, T., Hanke, W., Hwang, H. Y., Raghu, S., Thomale, R.
  2020; 101 (6)
- **Two-Dimensional Non-Fermi-Liquid Metals: A Solvable Large-N Limit.** *Physical review letters*
  Damia, J. A., Kachru, S., Raghu, S., Torroba, G.
  2019; 123 (9): 096402
- **Two-Dimensional Non-Fermi-Liquid Metals: A Solvable Large-N Limit** *PHYSICAL REVIEW LETTERS*
  Aguilera Damia, J., Kachru, S., Raghu, S., Torroba, G.
  2019; 123 (9)
- **Publisher Correction: Carrier density and disorder tuned superconductor-metal transition in a two-dimensional electron system.** *Nature communications*
  Chen, Z., Swartz, A. G., Yoon, H., Inoue, H., Merz, T. A., Lu, D., Xie, Y., Yuan, H., Hikita, Y., Raghu, S., Hwang, H. Y.
  2018; 9 (1): 4570
- **Superconducting Tunneling Spectroscopy of Spin-Orbit Coupling and Orbital Depairing in Nb :SrTiO3** *PHYSICAL REVIEW LETTERS*
  Swartz, A. G., Cheung, A. K. C., Yoon, H., Chen, Z., Hikita, Y., Raghu, S., Hwang, H. Y.
  2018; 121 (16): 167003
- **Carrier density and disorder tuned superconductor-metal transition in a two-dimensional electron system** *NATURE COMMUNICATIONS*
  Chen, Z., Swartz, A. G., Yoon, H., Inoue, H., Merz, T. A., Lu, D., Xie, Y., Yuan, H., Hikita, Y., Raghu, S., Hwang, H. Y.
  2018; 9
- **Carrier density and disorder tuned superconductor-metal transition in a two-dimensional electron system.** *Nature communications*
  Chen, Z., Swartz, A. G., Yoon, H., Inoue, H., Merz, T. A., Lu, D., Xie, Y., Yuan, H., Hikita, Y., Raghu, S., Hwang, H. Y.
  2018; 9 (1): 4008
- **Polaronic behavior in a weak-coupling superconductor** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Swartz, A. G., Inoue, H., Merz, T. A., Hikita, Y., Raghu, S., Devereaux, T. P., Johnston, S., Hwang, H. Y.
  2018; 115 (7): 1475–80
- **Non-Fermi-liquid superconductivity: Eliashberg approach versus the renormalization group** *PHYSICAL REVIEW B*

Wang, H., Raghu, S., Torroba, G.
2017; 95 (16)

- **Emergent particle-hole symmetry in the half-filled Landau level** *PHYSICAL REVIEW B*
  Mulligan, M., Raghu, S., Fisher, M. P.
  2016; 94 (7)
- **Spin-orbit coupling and odd-parity superconductivity in the quasi-one-dimensional compound Li0.9Mo6O17** *PHYSICAL REVIEW B*
  Platt, C., Cho, W., McKenzie, R. H., Thomale, R., Raghu, S.
  2016; 93 (21)
- **Composite fermions and the field-tuned superconductor-insulator transition** *PHYSICAL REVIEW B*
  Mulligan, M., Raghu, S.
  2016; 93 (20)
- **Topological properties of ferromagnetic superconductors** *PHYSICAL REVIEW B*
  Cheung, A. K., Raghu, S.
  2016; 93 (13)
- **Metallic quantum critical points with finite BCS couplings** *PHYSICAL REVIEW B*
  Raghu, S., Torroba, G., Wang, H.
  2015; 92 (20)
- **Spin-triplet superconductivity in a weak-coupling Hubbard model for the quasi-one-dimensional compound Li0.9Mo6O17** *PHYSICAL REVIEW B*
  Cho, W., Platt, C., McKenzie, R. H., Raghu, S.
  2015; 92 (13)
- **Elastoconductivity as a probe of broken mirror symmetries** *PHYSICAL REVIEW B*
  Hlobil, P., Maharaj, A. V., Hosur, P., SHAPIRO, M. C., Fisher, I. R., Raghu, S.
  2015; 92 (3)
- **Enhanced pairing of quantum critical metals near d=3+1** *PHYSICAL REVIEW B*
  Fitzpatrick, A. L., Kachru, S., Kaplan, J., Raghu, S., Torroba, G., Wang, H.
  2015; 92 (4)
- **Evidence for a nematic component to the hidden-order parameter in URu2Si2 from differential elastoresistance measurements** *NATURE COMMUNICATIONS*
  Riggs, S. C., SHAPIRO, M. C., Maharaj, A. V., Raghu, S., Bauer, E. D., Baumbach, R. E., Giraldo-Gallo, P., Wartenbe, M., Fisher, I. R.
  2015; 6
- **Evidence for a nematic component to the hidden-order parameter in URu2Si2 from differential elastoresistance measurements.** *Nature communications*
  Riggs, S. C., SHAPIRO, M. C., Maharaj, A. V., Raghu, S., Bauer, E. D., Baumbach, R. E., Giraldo-Gallo, P., Wartenbe, M., Fisher, I. R.
  2015; 6: 6425-?
- **Suppression of spontaneous currents in Sr2RuO4 by surface disorder** *PHYSICAL REVIEW B*
  Lederer, S., Huang, W., Taylor, E., Raghu, S., Kallin, C.
  2014; 90 (13)
- **Crisscrossed stripe order from interlayer tunneling in hole-doped cuprates** *PHYSICAL REVIEW B*
  Maharaj, A. V., Hosur, P., Raghu, S.
  2014; 90 (12)
- **Anomalous Fermi-liquid phase in metallic skyrmion crystals** *PHYSICAL REVIEW B*
  Watanabe, H., Parameswaran, S. A., Raghu, S., Vishwanath, A.
  2014; 90 (4)
- **Non-Fermi-liquid behavior of large-N-B quantum critical metals** *PHYSICAL REVIEW B*
  Fitzpatrick, A. L., Kachru, S., Kaplan, J., Raghu, S.
  2014; 89 (16)

- **Tunable coupling of two-dimensional superconductors in bilayer SrTiO3 heterostructures** *PHYSICAL REVIEW B*
  Inoue, H., Kim, M., Bell, C., Hikita, Y., Raghu, S., Hwang, H. Y.
  2013; 88 (24)
- **Particle-hole condensates of higher angular momentum in hexagonal systems** *PHYSICAL REVIEW B*
  Maharaj, A. V., Thomale, R., Raghu, S.
  2013; 88 (20)
- **Non-Fermi-liquid fixed point in a Wilsonian theory of quantum critical metals** *PHYSICAL REVIEW B*
  Fitzpatrick, A. L., Kachru, S., Kaplan, J., Raghu, S.
  2013; 88 (12)
- **Quantum critical metals in d=3+1 dimensions** *PHYSICAL REVIEW B*
  Mahajan, R., Ramirez, D. M., Kachru, S., Raghu, S.
  2013; 88 (11)
- **Band structure effects on the superconductivity in Hubbard models** *PHYSICAL REVIEW B*
  Cho, W., Thomale, R., Raghu, S., Kivelson, S. A.
  2013; 88 (6)
- **Higher angular momentum pairing from transverse gauge interactions** *PHYSICAL REVIEW B*
  Chung, S. B., Mandal, I., Raghu, S., Chakravarty, S.
  2013; 88 (4)
- **Kerr effect as evidence of gyrotropic order in the cuprates** *PHYSICAL REVIEW B*
  Hosur, P., Kapitulnik, A., Kivelson, S. A., Orenstein, J., Raghu, S.
  2013; 87 (11)
- **Spin-orbit coupling in LaAlO3/SrTiO3 interfaces: magnetism and orbital ordering** *NEW JOURNAL OF PHYSICS*
  Fischer, M. H., Raghu, S., Kim, E.
  2013; 15
- **Theory of 'hidden' quasi-1D superconductivity in Sr2RuO4** *10th International Conference on Materials and Mechanisms of Superconductivity (M2S)*
  Raghu, S., Chung, S. B., Lederer, S.
  IOP PUBLISHING LTD.2013
- **Optimal T-c of cuprates: The role of screening and reservoir layers** *PHYSICAL REVIEW B*
  Raghu, S., Thomale, R., Geballe, T. H.
  2012; 86 (9)
- **Charge and spin collective modes in a quasi-one-dimensional model of Sr2RuO4** *PHYSICAL REVIEW B*
  Chung, S. B., Raghu, S., Kapitulnik, A., Kivelson, S. A.
  2012; 86 (6)
- **Field-Induced p-Wave Superconducting State of Mesoscopic Systems** *PHYSICAL REVIEW LETTERS*
  Huo, J., Chen, W., Raghu, S., Zhang, F.
  2012; 108 (25)
- **Majorana zero modes in a quantum Ising chain with longer-ranged interactions** *PHYSICAL REVIEW B*
  Niu, Y., Chung, S. B., Hsu, C., Mandal, I., Raghu, S., Chakravarty, S.
  2012; 85 (3)
- **Effects of longer-range interactions on unconventional superconductivity** *PHYSICAL REVIEW B*
  Raghu, S., Berg, E., Chubukov, A. V., Kivelson, S. A.
  2012; 85 (2)
- **Thermodynamics of phase formation in the quantum critical metal Sr3Ru2O7** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Rost, A. W., Grigera, S. A., Bruin, J. A., Perry, R. S., Tian, D., Raghu, S., Kivelson, S. A., Mackenzie, A. P.

2011; 108 (40): 16549-16553

- **Superconductivity from repulsive interactions in the two-dimensional electron gas** *PHYSICAL REVIEW B*
  Raghu, S., Kivelson, S. A.
  2011; 83 (9)
- **Hidden Quasi-One-Dimensional Superconductivity in Sr2RuO4** *PHYSICAL REVIEW LETTERS*
  Raghu, S., Kapitulnik, A., Kivelson, S. A.
  2010; 105 (13)
- **Superconductivity in the repulsive Hubbard model: An asymptotically exact weak-coupling solution** *PHYSICAL REVIEW B*
  Raghu, S., Kivelson, S. A., Scalapino, D. J.
  2010; 81 (22)
- **Collective Modes of a Helical Liquid** *PHYSICAL REVIEW LETTERS*
  Raghu, S., Chung, S. B., Qi, X., Zhang, S.
  2010; 104 (11)
- **Microscopic theory of the nematic phase in Sr3Ru2O7** *PHYSICAL REVIEW B*
  Raghu, S., Paramekanti, A., Kim, E. A., Borzi, R. A., Grigera, S. A., Mackenzie, A. P., Kivelson, S. A.
  2009; 79 (21)
- **Time-Reversal-Invariant Topological Superconductors and Superfluids in Two and Three Dimensions** *PHYSICAL REVIEW LETTERS*
  Qi, X., Hughes, T. L., Raghu, S., Zhang, S.
  2009; 102 (18)
- **Vortex-dynamics approach to the Nernst effect in extreme type-II superconductors dominated by phase fluctuations** *PHYSICAL REVIEW B*
  Raghu, S., Podolsky, D., Vishwanath, A., Huse, D. A.
  2008; 78 (18)
- **Analogs of quantum-Hall-effect edge states in photonic crystals** *PHYSICAL REVIEW A*
  Raghu, S., Haldane, F. D.
  2008; 78 (3)
- **Minimal two-band model of the superconducting iron oxypnictides** *PHYSICAL REVIEW B*
  Raghu, S., Qi, X., Liu, C., Scalapino, D. J., Zhang, S.
  2008; 77 (22)
- **Topological Mott insulators** *PHYSICAL REVIEW LETTERS*
  Raghu, S., Qi, X., Honerkamp, C., Zhang, S.
  2008; 100 (15)
- **Theory of the three-dimensional quantum hall effect in graphite** *PHYSICAL REVIEW LETTERS*
  Bernevig, B. A., Hughes, T. L., Raghu, S., Arovas, D. P.
  2007; 99 (14)
- **Nernst effect and diamagnetism in phase fluctuating superconductors** *PHYSICAL REVIEW LETTERS*
  Podolsky, D., Raghu, S., Vishwanath, A.
  2007; 99 (11)