Ankit Kumar

akumar13@ncsu.edu, 919-345-8469, Raleigh, NC, USA
https://mail02ankit.github.io/
https://www.linkedin.com/in/mail02ankit/

Research

- Many body physics using time-dependent many-body perturbation theory, non-equilibrium Green's functions and Kadanoff-Baym equations.
- Theoretical analysis of time- and momentum-resolved pump-probe spectroscopy.
- Study of light-matter interaction in low dimensional systems.
- Dynamical mean field theory.
- Band structure calculation using Density Functional Theory.

Employment History

2018 – ···· **Research Assistant** Department of Physics, NCSU, Raleigh, NC.

2017 – 2018 **Course Teaching Assistant** Department of Physics, NCSU, Raleigh, NC.

2016 – 2017 **Research Assistant** Department of Physics, NCSU, Raleigh, NC.

2015 – 2016 **Undergrad Lead Lab Instructor** Department of Physics, NCSU, Raleigh, NC.

2014 – 2015 **Undergrad Lab Instructor** Department of Physics, NCSU, Raleigh, NC.

2013 – 2014 **Undergrad Lab Instructor** Department of Physics, IISER, Mohali, India.

Education

2014 – Oct 2019 **PhD, North Carolina State University, Raleigh NC, USA.**
Thesis title: *Dynamics of Correlated Electrons out of Equilibrium*
Supervisor: *Professor Alexander F. Kemper*

2008 – 2013 **BS-MS, Five years Interdisciplinary Course in Physics, Indian Institute Of Science Education and Research, Mohali India.** Specialization in non-linear dynamics, network of coupled complex dynamical systems.
Thesis title: *Complex Dynamical Networks.*
Supervisor: *Professor Sudeshna Sinha*

Skills

Programming Languages — C++, C - Advanced user (Parallelization using OpenMP, OpenMPI), Massive parallel computation on cluster SLRUM, Quantum Espresso, Python, Julia, Matlab, Octave, Mathematica, LabView - Programming and Data acquisition, Markdown, SHELL,AWK, LUA SCRIPTING, LaTeX, Vim, Emacs.

Data Analysis — SAS, Python - Pandas, Numpy.

Machine Learning — Supervised and unsupervised machine learning in condensed matter systems.

Admin — ARCH-LINUX, NETWORK PROTOCOLS, Apache Web Server, DokuWiki, Wordpress.

Spoken Languages — English (Second language), Hindi (Mother tongue).

Research Publications

In preparation

1. Kumar, A. & Kemper, A. F. (2019b). *Higgs mode in the presence of supercurrent.*
2. Kumar, A. & Kemper, A. F. (2019c). *Transient optical conductivity of metals.*

Under Review

1. Kumar, A. & Kemper, A. F. (2019a). *Higgs Oscillations in time-resolved Optical Conductivity [Submitted to PRL]*. arXiv: 1902.09549. February 27, 2019, http://arxiv.org/abs/1902.09549
2. Dan, N., Alex, B., **Kumar**, **A.**, Samanvitha, S., Jordan, F., Shaun, O., … Daniel, B. D. (2018). *Ultrafast thermalization and decay in the upper hubbard band of $\alpha-rucl_3$ [Submitted to PRL].*

Journal Articles

1. Revelle, J. P., **Kumar**, **A.** & Kemper, A. F. (2019). Theory of Time-Resolved Optical Conductivity of Superconductors: Comparing Two Methods for Its Evaluation. *Condensed Matter*, *4*(3), 79. doi:10.3390/condmat4030079
2. **Kumar**, **A.**, Johnston, S. & Kemper, A. F. (2019). Identifying a forward-scattering superconductor through pump-probe spectroscopy. *EPL (Europhysics Letters)*, *124*(6), 67002. doi:10.1209/0295-5075/124/67002
3. **Kumar**, **A.**, Agrawal, V. & Sinha, S. (2015). Spatiotemporal regularity in networks with stochastically varying links. *The European Physical Journal B*, *88*(6), 138. doi:10.1140/epjb/e2015-50338-9

Other

1. **Kumar**, **A.** (2013). Effects of Nonlinear Coupling on Spatiotemporal Regularity. (p. 14). http://arxiv.org/abs/1309.4555

Conferences and Schools

2019 ▶ **Contributed talk** APS March Meeting 2019, Boston, MA, USA.

2018 ▶ **Poster presentation** Gordon Research Conference on Ultrafast Phenomena in Co-operative Systems, Galveston, TX, USA.

▶ **Contributed talk** 2^{nd} Future of Materials Workshop, Raleigh, NC, USA.

2017 ▶ **Contributed talk** 84^{th} Annual Meeting of the APS Southeastern Section, Milledgeville, GA, USA.

2016 ▶ **Poster presentation** MRS/ASM/AVS Meeting, Raleigh, NC, USA.

2014 ▶ **Participated** Bangalore School on Statistical Physics, RRI, Bangalore, India.

▶ **Poster presentation** Accepted, XXXIII Dynamics Days 2014, Georgia, USA.

2013 ▶ **Poster presentation** CNSD, International Conference on Nonlinear sciences, Indore, India.

2011 ▶ **Participated** Indian Conference on Cosmology and Galaxy formation, IISER mohali, INDIA.

2010 ▶ **Participated** School in Radio Astronomy, NCRA Pune, India.

Conferences and Schools (continued)

- **Participated** International Conference on NMR at the Interface of Physics, Chemistry and Biology, IISER Mohali, INDIA.

Awards and Achievements

2019 ▶ **Travel Award** GERA at APS March Meeting 2019, Boston, MA, USA.

2018 ▶ **Travel Award** Gordon Research Conference on Ultrafast Phenomena in Cooperative Systems, Galveston, TX, USA.

2016 ▶ **Teaching Award** Graduate Teaching Award, NCSU, Raleigh, NC, USA.

2013–2014 ▶ **Research Fund** Indian Government - CSIR Junior Research Fellowship.

2013 ▶ **National-level Competition** GATE (rank 107), NET (rank 159), JEST (rank 46).

2008–2013 ▶ **Research Fund** Indian Government - INSPIRE Fellowship.

▶ **Research Fund** Indian Government - KVPY Fellowship.

2011 ▶ **Research Fund** India Academy of Science - Summer Research Fellowship.

2009 ▶ **Physics Olympiad** 2^{nd} Stage State Level

2008 ▶ **National-level Competition** IIT-JEE, AIEEE.

Miscellaneous Experience

Teaching and Mentoring

2018 ▶ **Mentoring** I have been mentoring two undergrad students working on transient-optical response of superconductors and higher-order harmonics generation in solids.

▶ **Teaching** I have worked as a substitute teacher for Prof. Lex Kemper and taught a few lectures to undergrads.

▶ **Teaching** I have worked as a teaching assistant for graduate course QFT I, II.

2016 ▶ **Teaching** I have worked as the lead lab instructor for physics labs for undergrads and engineers.

2015 ▶ **Teaching** I have worked as a lab instructor for physics labs for undergrads and engineers.

Outreach

2018 ▶ **Physics Demonstrations for High School Students** Raleigh Charter School, Raleigh, NC.

Services

2015–2018 ▶ Member of Food Bank, Raleigh, NC.

2009–2012 ▶ Member & Co-founder, DRAMA club at IISER Mohali.

▶ Member & Co-founder, YATN (Youths Attempt To Nurture) at IISER Mohali: To teach underprivileged kids.

Other

2016–···· ▶ Active member of badminton and running groups at NCSU.

2012–2013 ▶ **Table Tennis** Bronze medal two times at IISER Mohali annual sports event.

▶ **Badminton** Gold and Silver medal at IISER Mohali annual sports event.

Miscellaneous Experience (continued)

2012 ▶ **Chess** Gold medal at IISER Mohali annual sports event.

References

Dr. Alexander F. Kemper
Assistant Professor
Department of Physics,
NCSU, Raleigh NC, USA,
akemper@ncsu.edu

Dr. Lubos Mitas
Distinguished University Professor
Department of Physics,
NCSU, Raleigh NC, USA,
lmitas@ncsu.edu

Dr. Daniel Dougherty
Associate Professor
Department of Physics,
NCSU, Raleigh NC, USA,
dbdoughe@ncsu.edu