Ankit Kumar

akumar13@ncsu.edu, 919-345-8469
Raleigh, NC, USA

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*

Research Publications

In preparation

1. Kumar, A. & Kemper, A. F. (2019b). *Transient charge-charge fluctuations in metals and superconductors.*
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*. 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 $\alpha-rucl_3$*.

Journal Articles

1. **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
2. **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.

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.

Conferences and Schools (continued)

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.

Skills

Languages English (Second language), Hindi (Mother tongue), Punjabi (For fun).

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

Data Analysis SAS, Python - Panda, Numpy, R.

Machine Learning Neural networks and ML in condensed matter systems.

Admin LINUX, NETWORK PROTOCOLS, Apache Web Server, DokuWiki, Wordpress.

Misc. Origin, Phonix box, FPGA, HDL, Gnuplot.

Miscellaneous Experience

Teaching and Mentoring

2018 **Mentoring** I have been mentoring an undergrad student working on a project: Transient optical response of superconductors.

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.

Miscellaneous Experience (continued)

2009–2012
- Member & Co-founder, DRAMA club at IISER Mohali.
- Member & Co-founder, YATN (Youths Attempt To Nurture) at IISER Mohali: To teach under-privileged 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.

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