Statement of Objectives

Sanket Chirame

I am applying to the Ph.D. program of the Department of Physics at the University of Minnesota. I intend to work in condensed matter theory with a focus on non-equilibrium physics and topological phases of quantum matter. I seek for a graduate program offering an opportunity to discover various facets of the field with focused research along with guidance from experienced faculty. I believe that the department of physics research program is well aligned with my research interests making it a perfect place for my PhD research.

During my PhD research, I intend to explore topics in phase transitions, many body localization, topological phases and superconductivity. I have undertaken several advanced courses like *Theoretical Condensed Matter Physics, Superconductivity, Advanced Statistical Mechanics* to develop the initial foundation to work on these topics. I would like to gather further essential theoretical skills by pursuing graduate level courses. Particularly, I would like to undertake courses in *Solid State Physics, Advanced Quantum Mechanics* and *Quantum Field Theory*. I am also interested in taking relevant mathematics courses in order to get a better understanding of topology in condensed matter systems.

Along with developing skills through coursework, I want to focus on research early on in my graduate studies. I am particularly interested in working with Prof. Fiona Burnell's group on phases of matter beyond Landau paradigm. My ongoing thesis work on phase transitions in Aubry-Andre model has sparked my interest in this area. I found their recent work on constrained localization very interesting and would like to explore similar ideas in driven and disordered systems. I am also curious about topological phases of quantum matter and would like to cater this interest by working with Prof. Burnell and Prof. Kamenev. I also intend to work on theoretical aspects of experimentally relevant condensed matter systems by working with Prof. Rafael Fernandes. I found his recent publication 'Laser-induced coherent control of an electronic nematic quantum phase transition' aligning with my interest in physics of out-of-equilibrium quantum systems. I think the interdisciplinary Center for Quantum Materials will offer opportunities for interesting collaborations in research on quantum materials.

I aspire to make a significant contribution to the field of condensed matter theory while gathering skills for a successful academic career in theoretical physics. I believe that the University of Minnesota, with its vibrant research environment, will be a perfect place for laying down the foundation of a successful career in academic research.

Personal Website: `https://sites.google.com/view/sanketchirame`