

January 30, 2023 – Speaker: Xue-Yang Song

Time: 3:30-4:30

Location: Marcus Nanotechnology 1116-1118

Title: Chiral superconductivity in twisted Cuprates

Abstract: Cuprates — superconductors (SC) with high critical temperature (T_c) — are prominent examples of strongly correlated systems. The emerging fields of Moire systems, where 2 crystalline patterns interfere to form a long period modulation, meanwhile shed new light on strong correlation physics. In this colloquium I will describe a gapless chiral superconductor, arising from symmetry constraints, in Moire cuprate systems.

Twisted cuprates hold promise for high T_c topological SC, with potential implications for quantum computing. While previous predictions are based on simple weakly interacting models, here we examine the vital role played by realistic aspects and strong correlations and report a gapless chiral SC. We discuss signatures which are being studied in ongoing experiments. Alternate routes towards topological SC and other directions in Moire systems will be discussed.

Bio: Xue-Yang Song obtained her PhD in theoretical condensed matter in 2021, working with Ashvin Vishwanath and is currently a Moore postdoctoral fellow at MIT. She studies strongly correlated matter that shows emergent quantum phenomena like fractionally charged excitations and high-temperature superconductivity. She is interested in both developing formal theories and making concrete connections to realistic solid state or synthetic systems. Besides physics, she enjoys cycling and playing with her cat.



A dark-themed event poster for a colloquium. At the top left is the Georgia Tech logo with the text "Georgia Tech College of Arts and Sciences School of Physics". Below it, in yellow, is "SCHOOL OF PHYSICS COLLOQUIUM". The main title "CHIRAL SUPERCONDUCTIVITY IN TWISTED CUPRATES" is in large yellow letters. Below that, in white, are the details: "MONDAY, JANUARY 30, 2023", "3:30 TO 4:30 PM", and "MARCUS NANOTECHNOLOGY 1116-1118". At the bottom left, a yellow pill-shaped button says "COFFEE AND PASTRIES SERVED". On the right, there is a circular portrait of Dr. Xue-Yang Song, with a yellow pill-shaped button below it that says "DR. XUE-YANG SONG" and "MASSACHUSETTS INSTITUTE OF TECHNOLOGY". The poster features decorative yellow and white patterns in the corners.