

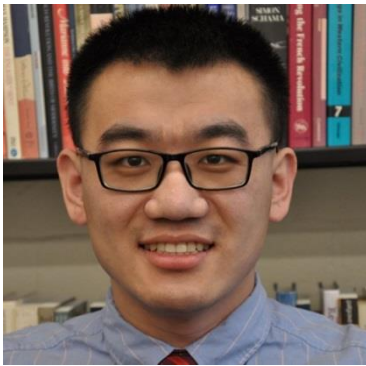


Seminar

Ultrafast Control of Entanglement Enabled by the Time-Resolved Resonant Inelastic X-Ray Scattering

Yao Wang

Emory University, USA



Time: 3:00 pm, Sept. 11, 2023 (Monday)

时间: 2023年9月11日 (周一) 下午3:00

Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

The rapidly evolving quantum material science calls for precise and predictive control of collective electronic properties beyond the classical realm. In this talk, I will discuss the application of time-resolved resonant inelastic x-ray scattering (trRIXS) in the characterization and ultrafast control of entangled quantum states. I will first discuss many-body entanglement in correlated materials. By trRIXS, we find that the instantaneous short-range paramagnon excitations can be manipulated by pulsed laser in a predictive manner, following the Floquet theory in the center of the pulse. These light-engineered spin fluctuations exhibit many-body entanglement. The entanglement depth of the transient state can be witnessed by the quantum Fisher information and quantified by trRIXS snapshots via a self-consistent iteration. Here, we use a cuprate chain as an example to show the possibility of enhancing many-body entanglement using an ultrafast laser pulse. I will then introduce the potential application of trRIXS in detecting Floquet topological states. As a nonlinear pump-probe technique, its intermediate state selectivity provides a clean characterization of chiral edge states without impact from the bulk ones. We employ the Floquet edge states in graphene nanoribbons induced by a chiral pulsed pump and demonstrate the advantage of using trRIXS as a characterization approach.

About the speaker

Yao Wang is an assistant professor at the Department of Chemistry of Emory University. He received bachelor degree from University of Science and Technology of China in 2011 and Ph.D. degree from Stanford University in 2017. After that, he worked at Harvard University as an MPHQ postdoctoral fellow. In 2020, he started his independent career as an assistant professor at Clemson and then the College of Science Dean's professor. He moved his group to Emory University in 2023. His research interests lie in the theoretical and computational study of quantum many-body problems and their experimental correspondence in solid-state materials and quantum science. He was the recipient of the DOE early career award of 2022 and AFOSR young investigator award of 2023.