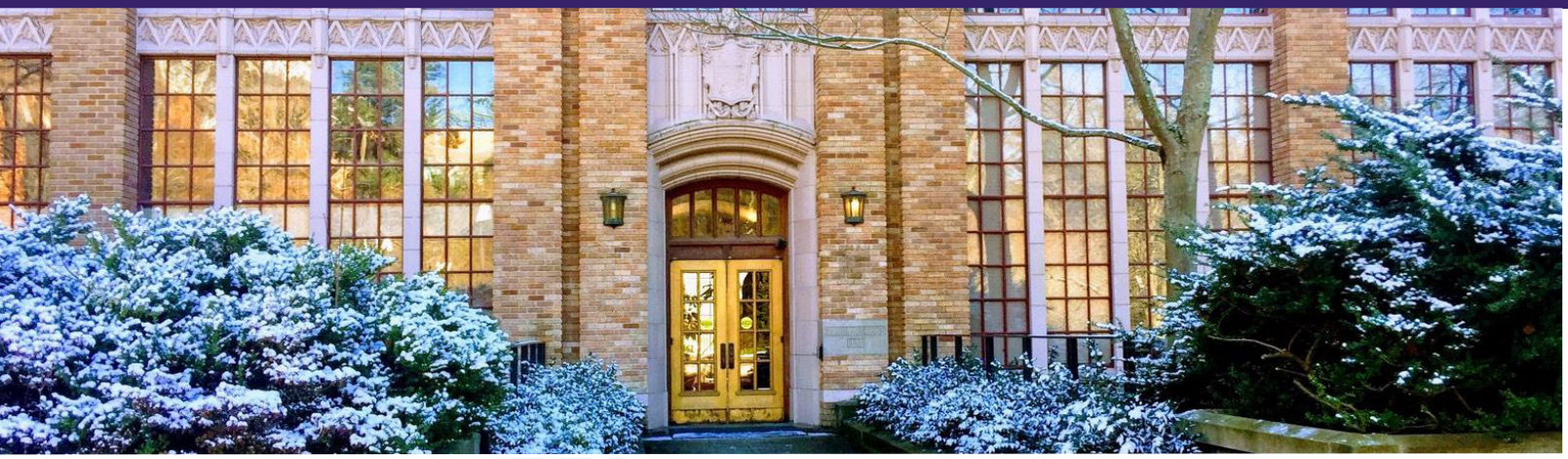
MSE SPECIAL SEMINAR

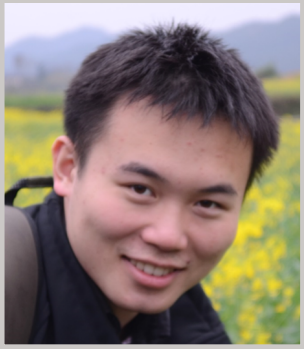
MATERIALS SCIENCE & ENGINEERING | SPRING 2018

APRIL 25, 2018 | 243 WILCOX HALL | 3:30 PM



Quantum Excited-States Phenomena and Topological Effects in Two-Dimensional Materials

Recent advances in the experimental and theoretical studies of two-dimensional materials have opened up opportunities in exploring materials physics and related applications absent in conventional bulk materials. In the first part of my talk, I will present our theoretical studies on the quantum excited-state phenomena in monolayer transition metal dichalcogenides and gapped few-layer graphene. By using the GW-BSE calculations, we discover tightly-bound excitons due to the reduced dielectric screening and unusual optical selection rules from a non-trivial winding pattern. In the second part, I will introduce and demonstrate the topological phases of graphene nanoribbons. The topological phases enable us to rationally design a prototype graphene nanoribbon superlattice that hosts a coupled array of non-trivial junction states. I further connect our theoretical predictions to experimental discoveries and demonstrate the potential applications in nanoelectronics.



Ting Cao

Doctoral Candidate
Department of Physics
University of California at Berkeley

Ting Cao is a doctoral candidate at the University of California, Berkeley. His dissertation research has focused on the excited-state phenomena and light-matter interactions in two-dimensional materials, advised by Prof. Steven G. Louie. His current research employs high-performance computing, advanced materials modelling techniques, and quantum physics to explore the distinct physical properties of one- and two-dimensional material systems which are potentially useful for future applications. He received a GLAM postdoctoral fellowship at the Stanford University.

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UNIVERSITY of WASHINGTON