

Dr. Wencan Jin
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Dear Members of the Faculty Search Committee,

I am writing to apply for the tenure-track position of Assistant Professor in Physics (Requisition 15145BR). I received my Ph.D. in applied physics in 2016 with Prof. Richard Osgood at Columbia University. I am currently a postdoctoral researcher in Prof. Liuyan Zhao's group in the Department of Physics at University of Michigan.

The research program that I propose to build focuses on studying emergent orders in low dimensional quantum materials. In particular, I will study the interplay between lattice, charge, spin and orbital degrees of freedom in the two dimensional (2D) limit and at the interfaces of heterostructures, using linear/nonlinear optical spectroscopy techniques with symmetry, spatial and temporal resolutions, in conjunction with synchrotron-based micro-probe angle-resolved photoemission spectroscopy with energy and momentum resolutions. My expertise in both low dimensional quantum materials and strongly correlated electron systems, together with my extensive experimental skills covering both optical spectroscopy techniques and synchrotron-based photoemission spectroscopy/microscopy, make me uniquely suited for studying the proposed physics above.

During my doctoral studies at Columbia, I, in close collaboration with synchrotron facilities in the U.S. and abroad, studied the surface and the electronic structures of low dimensional systems including transition metal dichalcogenides, van der Waals heterostructures and molecular-beam-epitaxy thin films, with a particular focus on how the dimensionality and the local geometry affect electronic structures of 2D materials. During my postdoctoral period, I further expanded my experimental tool set to cover individual laboratory-based optical techniques. Using Raman spectroscopy, I have studied the unidirectional charge order and the unconventional magnetic excitations in the spin-orbit coupled perovskite iridate $\text{Sr}_3\text{Ir}_2\text{O}_7$. Also, in collaboration with TTU (Rui He's group), I have probed spin waves and polarons in a 2D honeycomb ferromagnet CrI_3 . Using second order nonlinear optical spectroscopy, I have investigated for the first time a spatial-inversion and time-reversal invariant order, a ferro-rotational order, in a type-II multiferroic compound $\text{RbFe}(\text{MoO}_4)_2$, and revealed a net polarization present in the tetragonal phase of the perovskite solar cell $\text{CH}_3\text{NH}_3\text{PbI}_3$. More recently, I have developed a time-resolved magneto-optical Kerr effect setup and will use it to study magnetic dynamics of CrI_3 in the time domain.

As a faculty member at TTU, I will leverage my expertise in both techniques and science to set up a research program studying emergent orders at interfaces of heterostructures. Enclosed please find my curriculum vitae with publications list, research statement and teaching statement. Should you have any questions, please feel free to contact me by email (wencanj@umich.edu) or phone (718-772-4675). Thank you very much for consideration.

Sincerely,

Wencan Jin