

October 30, 2018

Search Committee  
Department of Physics and Astronomy  
Texas Tech University  
Box 41051  
Lubbock, TX 79409-1051

Dear Search Committee members:

I am writing to express my interest in the advertised tenure-track assistant professor in the field of experimental condensed matter physics (Job # 15145BR) at Texas Tech University. I think my education and experience make me a good fit for this position. In particular, my research interests and expertise in quantum material and topological matter focused experimental research are not only aligned with some of the targets of your current search, but also highly complementary to those of current TTU Physics faculty, and align very well with the future research direction envisioned by DOE and NSF.

My research focuses on emergent phenomena in novel quantum materials, such as unconventional superconductors and quantum magnets, at low temperatures. The experimental techniques I use range from material synthesis and device fabrication, to transport and magnetization measurements, to X-ray and neutron scattering. In addition, my research methods include the use of extreme sample environments, such as ultra-low temperature, high magnetic field, and high pressure. My previous work on the  $H$ -tuned superconducting-to-normal phase transitions and the role of quantum criticality in underdoped cuprates has led to a series of significant results, including two manuscripts that are currently under review at Nature and Nature Communication, and several more in preparation. My recent studies on doped Shastry-Sutherland system have also resulted in one manuscript that has just been submitted to Nature Communication, and intrigued us to do a follow-up study at high pressures. I have also been studying the interplay of superconductivity with spin and charge orders in materials such as  $\text{Ca}_{0.73}\text{La}_{0.27}\text{FeAs}_2$  and  $\text{Ta}_4\text{Pd}_3\text{Te}_{16}$ , and the results will be reported soon.

I plan to build on my past research experience and study some of the most pressing problems in condensed matter physics, including High- $T_C$  superconductors, topological superconductors, and metallic quantum magnets, in which novel topological phases of matter play a significant role. My interests and expertise are, therefore, highly complementary to, as opposed to duplicative of, those of current TTU Physics faculty. I also expect to benefit greatly from the state-of-the-art device fabrication capabilities at the Nano Tech Center at TTU, which is essential for the study of topological superconductors.

I have four years of experience teaching college physics labs, and considerable mentoring experience while supervising research activities of several graduate and undergraduate students, as outlined in my statement of teaching philosophy.

Thank you for your consideration, and please don't hesitate to contact me if you have any questions.

Sincerely,

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