191 W Woodruff Ave
Columbus, OH 43210

October 8, 2018

Texas Tech University
Department of Physics and Astronomy
Lubbock, TX 79409

Dear Members of the Search Committee,

I am writing to apply for the tenure-track faculty position in Condensed Matter experimental physics at the Assistant Professor level (Req. #15145BR). The prospect of joining the research program at Texas Tech is exciting, and I feel that my proposed work would expand the scope and capabilities of the department while contributing to its existing priorities in ultrafast materials science. The work I am proposing involves the combination of AMOP physics, surface science, and ultrafast spectroscopy to study attosecond electronic and femtosecond atomic structural dynamics on surfaces. Additionally, surface damage and structure formation will be investigated.

I am presently a postdoctoral researcher in Prof. Lou DiMauro's group at the Ohio State University. My current project is based on femtosecond- and attosecond-scale molecular dynamics, in particular the experimental detection of molecular charge migration. My task has included development of the program in collaboration with experimentalists at the University of Virginia and theorists at Louisiana State University, which has been excellent preparation for building a program of my own. Before joining Prof. DiMauro's group, I spent three years as a postdoctoral researcher with Prof. Ahmed Zewail at Caltech after completing my Ph.D. with Prof. Cornelis Uiterwaal at the University of Nebraska.

I intend to expand on my previous work in the proposed research by studying transient absorption spectroscopy dynamics on surfaces and in thin films using high harmonic generation. I will extend the current capabilities of this line of study into measurements of phase, and have demonstrated the first proof-of-principle measurements of transient absorption phases. This work will be supplemented by studies of laser-induced periodic surface structures, which are capable of producing surfaces with unique properties, tailored by the laser fields.

While my prior training is in AMOP physics, my time at Caltech was spent studying surface science in a chemistry department, and my addition to the department at Texas Tech would add a unique perspective while providing immediate opportunities for collaboration through multiple fields. I submit this cover letter, my curriculum vitae, a research plan, and letters of recommendation from three colleagues: Prof. DiMauro and Prof. Pierre Agostini from Ohio State, and Prof. Uiterwaal from the University of Nebraska. Due to Prof. Zewail's unfortunate passing, I am not able to include a reference from a supervisor from Caltech, but if desired, I can arrange for a colleague to attest to my good standing in the group. I will happily provide any other materials upon request. I look forward to your consideration and thank you for your time.

Kind regards,

Timothy D. Scarborough