

Dr Joseph Paddison
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Application for the position of Assistant Professor of Physics at Texas Tech University

October 31, 2018

Dear Search Committee,

I am writing to apply for the position of tenure-track Assistant Professor of Physics at Texas Tech University. I am currently an independent Junior Research Fellow at the University of Cambridge (United Kingdom). Prior to this, I was a postdoctoral researcher at the Georgia Institute of Technology.

My research focuses on materials in which local structure – disorder of atoms and magnetic moments at the nanoscale – plays a key role, such as spin liquids and nanostructured crystals. During my PhD, my first key contribution was to show that spin arrangements of spin liquids can be solved using an atomistic refinement approach driven by powder diffuse-scattering data – a step-change in methodology that required neither prior knowledge of magnetic interactions nor access to single-crystal samples. My published software implementation is now used internationally. During my postdoctoral research, I have explored the role of disorder a wide range of quantum and disordered materials and have extensively used inelastic neutron scattering experiments to understand exotic magnetic states. I published these results in a paper (*Nature Physics* **13**, 117 (2017)) identified by Web of Science as a “*Highly Cited Paper (Top 1% in its academic field)*”.

I was awarded the European Physical Society’s Early Career Prize in 2017, in recognition of my “*extraordinary work to achieve understanding of the microscopic nature of complex magnetic states*”. The value of my research has been recognized by 17 publications in peer-reviewed journals, including first-author papers in high-impact journals including *Science* (2015), *Phys Rev Lett* (2012, 2013), *Nature Communications* (2016), and *Nature Physics* (2017), an invited article in the “*Emerging Leaders*” special issue of *J Phys: Condens Matter* (2017). I strongly believe in making my research accessible and have given 12 talks at universities, conferences, and teaching schools during the past 18 months, including invited presentations at prestigious international conferences such as the triennial congress of the International Union of Crystallography in 2017.

A tenure-track appointment in condensed-matter physics at Texas Tech University would allow me to pursue ground-breaking research into spin-liquid states, local magnetic structures of high-temperature superconductors, and the interplay between chemical and magnetic degrees of freedom in disordered systems. My research is highly interdisciplinary, lying at the interface of condensed-matter physics, crystallography, and materials science, and involving approximately equal components of experiment and computational modeling. A broad network of collaborations in the US and the UK plays a key role in my research. In addition, my research would both complement and benefit from the existing expertise in the Department of Physics and Astronomy at Texas Tech University, particularly in the fields of low-temperature physics, dual-space microscopy, and the computational physics of thermoelectric materials and entropically-driven phase transitions. I also work closely with international and national research facilities, at which I have been awarded over 60 days of experimental time over the past 24 months, and would make extensive use of the neutron-

scattering facilities at the Oak Ridge National Laboratory. I have mentored five graduate students at Georgia Tech and Cambridge, and supervise a 4th-year undergraduate student as part of an international collaboration with the Institut Laue-Langevin neutron-scattering facility (France). These experiences have crystallized my desire to build a leading research group in which both undergraduate and graduate students play key roles in my research program.

I include with my application my résumé, a statement of my research plans, and a statement of my teaching interests. Three references who may be contacted about my application are:

- **Prof Martin Mourigal**, School of Physics, Georgia Institute of Technology, Atlanta GA 30332, USA
Email: mourigal@gatech.edu
Relationship to me: Mentor at Georgia Tech
- **Prof Andrew Goodwin**, Inorganic Chemistry Laboratory, University of Oxford, Oxford OX1 3QR, UK
Email: andrew.goodwin@chem.ox.ac.uk
Relationship to me: PhD supervisor
- **Dr Ross Stewart**, STFC-ISIS Neutron and Muon Source, Rutherford Appleton Laboratory, Harwell Oxford, Didcot OX11 0QX, UK
Email: ross.stewart@stfc.ac.uk
Relationship to me: PhD co-supervisor

Thank you for considering my application; I look forward to hearing from you.

Yours truly,

Joseph Paddison