

DEPARTMENT OF PHYSICS & ASTRONOMY

Physics & Astronomy Colloquium

Dr. Alex Eaton

University of Cambridge

(Host: Yun Suk Eo)

3:30 - 4:30 p.m. | Tuesday, April 14, 2026

(Online: <https://texastech.zoom.us/my/yunsukeo>)

(passcode: 621827)



Title: Unconventional superconductivity and unconventional magnetism

Abstract: Electronic phases of matter, such as magnetism and superconductivity, are defined and distinguished by their order parameters that quantify the spontaneous symmetry breaking underlying each phase. The simplest cases are the uniform magnetization of ferromagnets and isotropic gap function of conventional superconductors. Unconventional superconductors often have a nodal gap function, where the gap changes sign at nodes on the Fermi surface. This concept of unconventional or nodal order parameter symmetry has recently been extended to numerous magnetic systems, including altermagnets, in which up- and down-spin species are non-degenerate around the Fermi surface. This talk will introduce these concepts, and give an overview of our recent work on the putatively p-wave superconductor UTe_2 . I will also explain why quantum oscillations are an ideal diagnostic tool for identifying new altermagnets, and introduce our recent quantum oscillation experiments that empirically confirmed g-wave altermagnetism in CrSb [arXiv:2601.14526]. We believe this study constitutes the first time a sign-changing order parameter has been conclusively determined - mapped in 3D by a bulk-sensitive thermodynamic probe - in any materials class: magnetic, superconducting, or otherwise.

