

Incommensurate magnetism mediated by Weyl fermions

Scientific Achievement

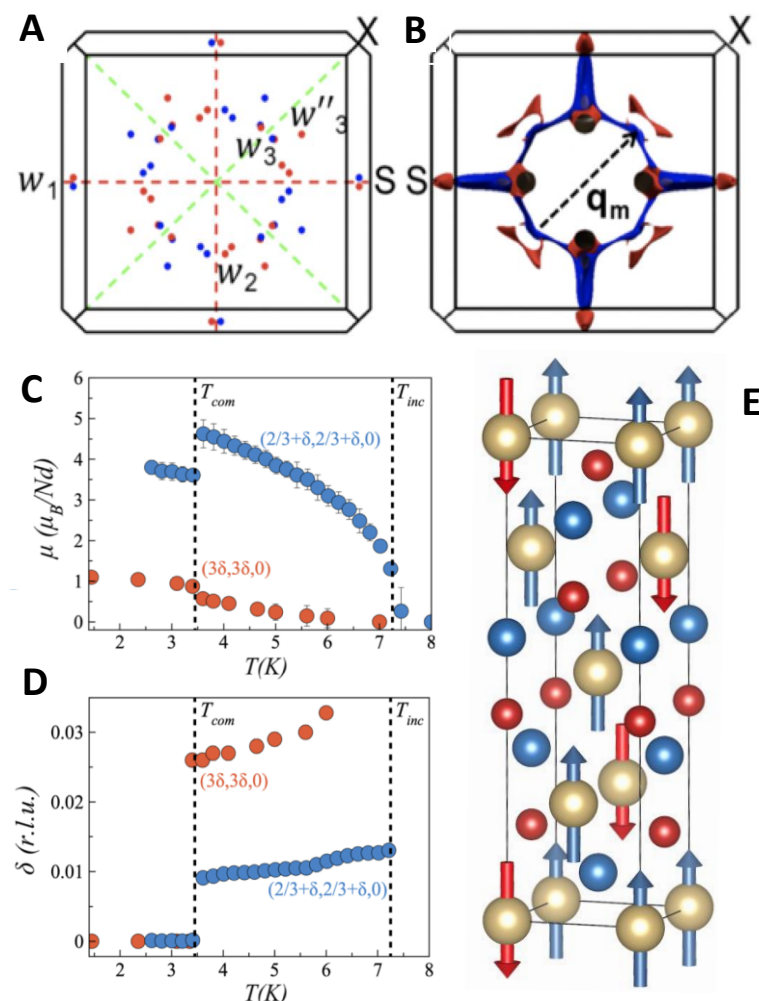
A detailed example of rare earth magnetism mediated by topologically protected Weyl fermions is provided. Introducing NdAlSi, which lacks inversion symmetry, the unique physical properties that may arise from the interplay between electronic interactions and topology are identified.

Significance and Impact

Relativistic quasiparticles in Weyl semimetals are the source of exotic transport properties. This work indicates they can produce ferrimagnetism and modulated magnetism with a wavelength given by the spacing between Weyl nodes.

Research Details

- Non-centrosymmetric NdAlSi has Weyl nodes for $T > T_C$
- Quantum oscillations and density functional theory are combined to determine the Fermi surface
- Neutron diffraction exposes a spin density wave and ferrimagnetism linked to Fermi surface nesting



J. Gaudet, H.-Y. Yang, S. Baidya, B. Lu, G. Xu, Y. Zhao, J. A. Rodriguez, C. Hoffmann, D. Graf, D. Torchinsky, P. Nikolić, D. Vanderbilt, F. Tafti, and C. Broholm, ArXiv:2012.12970.



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