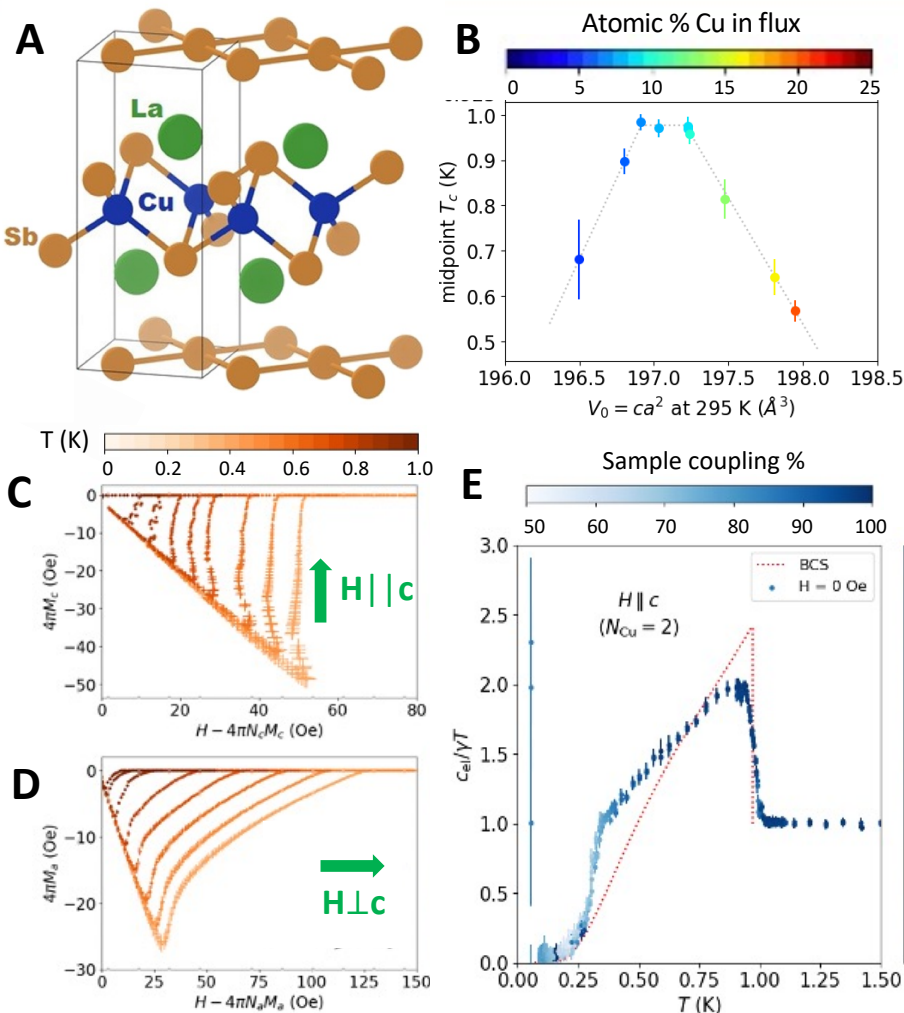


Bulk superconductivity in the Dirac semi-metal LaCuSb_2



Scientific Achievement

Following IQM evidence that LaCuSb_2 is a Dirac semi-metal, bulk superconductivity is documented and characterized in a single crystal of this material.

Significance and Impact

A qualitatively new quantum state of matter: the monopole superconductor has been proposed for magnetic Weyl semi-metals with inversion symmetry. Here we report an important step towards its possible materialization in the detailed characterization of superconductivity in a Dirac semi-metal that can accommodate magnetism.

Research Details

- Superconductivity in LaCuSb_2 is highly anisotropic: A type I response is found for fields along c and a type II response for fields perpendicular to c .
- A superconducting dome with $T_{C,\text{max}} = 1.0$ K is documented versus composition and pressure.
- Specific heat data shows this is multiband superconductivity with two distinct gaps

C. J. Lygouras, J. Chamorro, T. Berry, T. J. Halloran, J. Zhang, K. Mikuri, J. Gouchi, Y. Uwatoko, S. Nakatsuji, K. Livi, M. Siegler, Yi Li, C. L. Broholm, T. M. McQueen, unpublished (2022).



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