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Fermi surface of an important nano-sized metastable phase: Al_3Li STEPHEN DUGDALE, University of Bristol, UK, JUDE LAVEROCK, Boston University, USA, ASHRAF ALAM, MINA ROUSSENOVA, University of Bristol, UK, JOANNE WENSLEY, University of Cambridge, UK, JADWIGA KWIATKOWSKA, Polish Academy of Sciences, NOBU SHIOTANI, KEK-PF, Japan — Nanoscale particles embedded in a metallic matrix are of considerable interest as a route towards identifying and tailoring material properties. In particular, Al-Li alloys, which form ordered nanoscale precipitates of $L1_2$ Al_3Li for a range of Li concentrations, have been deployed successfully in the aerospace industry owing principally to their superior strength-to-weight ratio. These precipitates, however, are metastable and only form within the surrounding Al matrix, meaning their electronic structure, thought to be important in contributing to the enhanced material properties through its Young's modulus, has so far been inaccessible through conventional techniques. Here, we take advantage of the strong positron affinity of Li to directly probe the Fermi surface of metastable Al_3Li nanoscale precipitates of Al-Li.

Stephen Dugdale
University of Bristol, UK

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