Abstract Submitted
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Nuclear Magnetic Resonance Study of 3D Dirac Semimetal, Na3Bi[1] AMELIA ESTRY, National High Magnetic Field Laboratory, NICK CURRO, KENT SHIRER, MATTHEW LAWSON, JOHN CROCKER, BLAINE BUSH, PETER KLAVINS, CHING (JIM) LIN, TANAT KISSIKOV, Department of Physics, University of California, Davis, ADAM DIOGUARDI, Los Alamos National Laboratory, ROBERT CAVA, Department of Chemistry, Princeton University
— Dirac semimetals (DS) are a hot topic of research in topological materials because their unique properties indicate a potential in electronic applications. The electron band structure of ordinary semimetals differ from insulators and conductors as the top of the valence band and bottom of the conduction band have a small overlap. In DS, this overlap occurs only at discrete points, known as Dirac points. At the Dirac points, the relationship of energy to momentum (dispersion relation) is linear, allowing electrons near the Dirac points to behave as massless particles. Of particular interest are the three-dimensional Dirac semimetals, where this interesting band structure is present along all three dimensions. We attempt to probe the local conditions of a three-dimensional DS, Na_3Bi, using nuclear magnetic resonance (NMR) to perturb the spin states of the nuclei. Studying each of the nuclei sites of Na3Bi using NMR can provide insight into the interactions among the nuclei and between the nuclei and the surrounding electrons. Na_3Bi has a complex NMR spectrum which requires further study to understand.

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