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Spin dynamics in the antiferromagnetic phases of the Dirac metals AMnBi(A = Sr, Ca)[1] MAREIN RAHN, ANDREW PRINCEP, Clarendon Laboratory, University of Oxford, Oxford, OX1 3PU, United Kingdom, ANDREA PIOVANO, JIRI KULDA, Institut Laue-Langevin, 38042 Grenoble Cedex 9, France, YAN FENG GUO, ShanghaiTech University, 319 Yueyang Road, Shanghai 200031, China, YOU GUO SHI, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, ANDREW BOOTHROYD, Clarendon Laboratory, University of Oxford, Oxford, OX1 3PU, United Kingdom — The square Bi layers in AMnBi(A = Sr, Ca) host strongly spin-orbit coupled bands that form highly anisotropic Dirac points. We have mapped the dispersion of Mn spin fluctuations in these materials by triple-axis neutron spectroscopy. The spectra show pronounced spin gaps of 10.(2) meV (Sr) and 8.(8) meV (Ca) and extend to maximum energy transfers of 61-63 meV. For each material, reciprocal space maps of the magnon spectral weight were recorded for both in-plane and out-of-plane momentum transfer. The observed spectra can be accurately reproduced by a simple linear spin-wave model. Detailed global '?fits of the full magnon dispersion allow tight constraints on the magnitude of in-plane and inter-layer exchange parameters as well as on the magnetocrystalline anisotropy constant. We '?find no evidence that the magnetic ground state of these materials is coupled to the topology of the Bi $6p_{x,y}$bands.

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