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Nonsymmorphic crystalline Kondo semimetals[1] PO-YAO CHANG, ONUR ERTEN, PIERS COLEMAN, Center for Materials Theory, Rutgers University — Kondo semimetals, such as CeNiSn and CeRhSb are a class of "failed" heavy fermion insulator that appear to develop line-nodes in the hybridization between the localized f-states and mobile conduction electrons. The classic theory[1,2] for node formation depends on angular momentum blocking in a continuum, and provides no insight into why the node should be stable in a crystalline environment. Here we examine how the semimetallic phase emerges in orthorhombic Kondo systems with nonsymmorphic symmetries. Using a periodic Anderson model that incorporates the key crystallographic symmetries of CeNiSn, we show that hybridization nodal lines are naturally protected within mirror symmetry planes. The shape of the Fermi surface around the nodes in our model agrees with observations in Shubnikov-de Haas oscillations.

[1] H. Ikeda and K. Miyake, J. Phys. Soc. Jpn. 65, 1769 (1996).
[2] J. Moreno and P. Coleman, Phys. Rev. Lett. 84, 342 (2000).

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