**Three-dimensional Dirac semimetal in a nonsymmorphic wallpaper multi-layer**

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Using an explicit tight-binding model and first-principles calculations, we show that a three-dimensional stack of two-dimensional layers in the *p4g* or *pgg* wallpaper group hosts fourfold-degenerate Dirac points at time-reversal invariant momenta of the Brillouin zone, realizing the three-dimensional Dirac semimetal phase. Our Chern number calculations support that the system hosts Dirac` points in momentum space. In addition, we show that Doubly-degenerate doubly-degenerate Weyl nodal lines coexist with the Dirac points in momentum space, giving rise to topological surface states. We establish topological phase diagrams accessible from the Dirac semimetal phase via symmetry-breaking strains. Our first-principles calculations show that the proposed 3D Dirac semimetal phase is realized in an existing set of materials, including BaLaCuBO5 and BaLaAuBO5.

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