

Abstract Submitted
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Crystal Symmetry and Surface States HUIPING WANG, RUIBAO TAO, State Key Laboratory of Surface Physics and Department of Physics, Fudan University, Shanghai 200433, China — This work reports a rigorous criterion for the non-existence of surface states in a semi-infinite crystal with the (hkl) cut surface. We have proved that a (hkl) cut crystal will not induce any surface state if any (hkl) plane has the reflection symmetry in an infinite crystal constructed by an infinite number of parallel (hkl) crystal planes which are periodically arranged one by one by coupling. The conclusion is valid for any 3D and 2D structure crystal and any multiple neighbor hopping among crystal planes. The spin-orbit coupling breaks the chiral symmetry, resulting in the reflection symmetry breaking, surface states will emerge in the crystal.

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