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New classes of three-dimensional topological crystalline insulators with unpinned surface Dirac cones[1] CHEN FANG, TIMOTHY HSIEH, LIANG FU, Massachusetts Institute of Technology — We theoretically predict two new classes of 3D topological crystalline insulators (TCI) that have protected, robust surface states. In first class, the surface states are protected by a *single* glide mirror symmetry. On a symmetry-preserving surface, a single Dirac point can appear at any position along either one of the two mirror symmetric lines inside the surface Brillouin zone (SBZ). In the second class, the surface Dirac point is protected by a combination of twofold rotation and time-reversal symmetry, and appears on the crystal surface perpendicular to the rotation axis. Its position in the SBZ is completely free to move by symmetry-preserving perturbations. In each class, we prove the existence of a Z_2 bulk invariant and find its explicit analytic expression. These new classes of TCI do not presume the presence or the absence of spin-orbital coupling.

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