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Floquet semi-metals protected by "space-time" nonsymmorphic symmetry SHENGLONG XU, CONGJUN WU, Univ of California - San Diego — Floquet systems have attracted considerable research interests during the past decade. Periodic driving may lead to exotic topological properties that are absent in static systems. We investigate the general symmetry structures and their physical consequences in Floquet systems. Because of the periodicity in both spatial and temporal directions, the symmetry is described by a discrete subgroup of the Galilean group, dubbed as "space-time" group. As an extension of the magnetic groups, the "space-time" groups contain additional elements such as time-screw rotations and time-glide reflections, which are composed of the point group operations with fractional translations in the time direction. We prove that, similar to their counterparts in static systems, these temporal nonsymmorphic operations can enforce Floquet band degeneracies and crossing, leading to Floquet semi-metals. We discuss their topological properties and provide general principles to design topological band structures in Floquet systems.

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