

# Symmetry and Complexity in Condensed Matter: Two Nonsymmorphic Tales

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Nonsymmorphic symmetries have been in the spotlight in condensed matter physics since the advent of topological band theory and, most recently, have been highlighted in the context of altermagnetism. In this talk, I will introduce nonsymmorphic symmetries and show how these necessarily introduce complexity in condensed matter systems. I will also discuss two scenarios in which the presence of nonsymmorphic symmetries can lead to novel physical phenomena. The first example concerns superconductivity-induced odd-parity orders inspired by the phenomenology of the heavy-fermion  $\text{CeRh}_2\text{As}_2$ . The second example involves the protection of a ferromagnetic quantum critical point against its transmutation to a first-order phase transition. These examples highlight important consequences of this special type of symmetry also in correlated electronic matter.