Classification of topological phases with reflection symmetry
TSUNEYA YOSHIDA, TAKAHIRO MORIMOTO, AKIRA FURUSAKI, RIKEN
— In Z_2 topological band insulators, the time-reversal symmetry protects their
topological structure. In these years such a notion is extended to correlated systems
including bosonic systems, and these nontrivial phases are referred to as symmetry
protected topological (SPT) phases. Parallel to this progress, a topological crys-
talline insulator, protected by spatial symmetry, is found for SnTe. Thus, SPT
phases protected by this type of symmetry are naturally expected, and classifica-
tions of such phases are desired. In this article, we address this issue by focusing on
a reflection symmetry. Our analysis based on the Chern-Simons approach proposes
periodic tables for bosonic and fermionic SPT phases in two dimensions. Besides
that, we show an SPT phase with the reflection symmetry is stabilized in a spin
model of honeycomb lattice.

Tsuneya Yoshida
RIKEN