A classification of free fermion topological phases under
order-two point group symmetries

- Z$_2$ Global
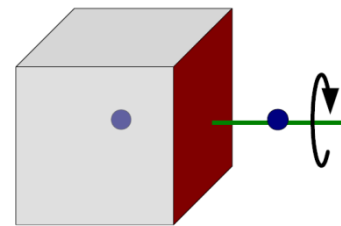- Reflection
- C$_2$-rotation
- Inversion
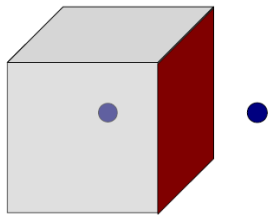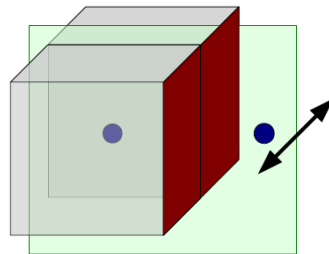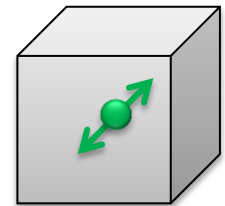
$(x, y, z) \mapsto (x, y, z)$ $(x, y, z) \mapsto (-x, y, z)$ $(x, y, z) \mapsto (-x, -y, z)$ $(x, y, z) \mapsto (-x, -y, -z)$

Results:

✓ New periodicity in number of coordinate under order-two point group symmetry

✓ A defect gapless state can be considered as a boundary gapless state.

✓ A classification of stable fermi points