

Symmetry protected topological phases and ultracold alkaline-earth fermionic atoms in one dimension

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Alkaline-earth and ytterbium cold atomic gases make it possible to simulate $SU(N)$ -symmetric fermionic systems in a very controlled fashion. Such a high symmetry is expected to give rise to a variety of novel phenomena in many-body quantum physics.

We describe the main exotic properties of alkaline-earth and ytterbium fermions loading into a one-dimensional optical lattice. In particular, a special emphasis will be laid on the nature of one-dimensional symmetry-protected topological phases with an $SU(N)$ symmetry that one can stabilize with these fermions.

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