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Spin-taste structure of minimally doubled fermions

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Minimally doubled fermions realize one degenerate pair of Dirac fermions on the lattice. Similarities to staggered fermions exist, namely, spin and taste degrees of freedom become intertwined, and a remnant, non-singlet chiral symmetry and ultralocality are maintained. However, charge conjugation, isotropy and some space-time reflection symmetries are broken by the cutoff.
For two variants, i.e., Karsten-Wilcek (KW) or Borici-Creutz (BC) fermions, a tasted charge conjugation symmetry can be identified, and the respective representations of the spin-taste algebra can be constructed explicitly. In the case of BC fermions, the tasted symmetry indicates that amendments to the published counterterms are necessary.
The spin-taste representation on the quark level permits construction of local or extended hadron interpolating operators for any spin-taste combination, albeit with contamination by parity partners and taste-symmetry violation. The few available numerical results for KW fermions are in line with expectations.

Topical area

Theoretical Developments

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