

Chiral symmetry on the lattice

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Abstract content

Summary

In the last century the non-perturbative regularisation of chiral fermions was a long-standing problem, which made the existence of light fermions in Nature appear mysterious. We review how this problem was finally overcome by the formulation of a modified but exact form of chiral symmetry on the lattice. This also provides a sound definition of the topological charge. We illustrate a variety of applications, ranging from conceptual issues in the Schwinger model to QCD in the epsilon- and p-regime, where simulation results can now be related to Random Matrix Theory and Chiral Perturbation Theory. Finally we sketch ongoing applications to the nucleon structure functions, where the use of chiral quarks is vital to suppress uncontrolled operator mixing.

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