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Conserved non-singlet charges for staggered fermion Hamiltonian in 3+1 dimensions

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We study conserved charges for the 3+1 D staggered fermion Hamiltonian.

In addition to $U(1)_V$ charge Q_0 , we find that the system has three independent non-singlet charges Q_{x_i} ($i = x, y, z$) that generate axial $SU(2)_A$ transformations in the continuum limit. On the lattice, these charges do not commute with Q_0 , signaling a mixed anomaly between $U(1)_V$ and the subgroups $U(1)_F$ of $SU(2)_L \times SU(2)_R \times U(1)_A$.

We show that this anomaly becomes trivial in the continuum by analyzing the lattice Ward–Takahashi identity associated with $U(1)_F$.

Parallel Session (for talks only)

Theoretical developments and applications beyond Standard Model

Author: ONOGI, Tetsuya (The University of Osaka)

Co-author: YAMAOKA, Tatsuya (The university of Osaka)

Presenter: ONOGI, Tetsuya (The University of Osaka)

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