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Renormalization constants for one-derivative fermion operators in twisted mass QCD

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We present perturbative and non-perturbative results on the renormalization constants of the twist-2 vector and axial vector operators. Non-perturbative results are obtained using the twisted mass Wilson fermion formulation employing two degenerate dynamical quarks and the tree-level Symanzik improved gluon action for pion masses in the range of about 450-260 MeV and at values of the lattice spacing 0.055, 0.07, 0.089 fm. Subtraction of $O(a^2)$ terms is carried out by performing the perturbative evaluation of these operators at 1-loop and up to $O(a^2)$. The renormalization conditions are defined in the RI'-MOM scheme, for both perturbative and non-perturbative results. The Z-factors, obtained for different values of the renormalization scale, are evolved perturbatively to a reference scale set by the inverse of the lattice spacing. In addition, they are translated to \overline{MS} at 2 GeV using 3-loop perturbative results for the conversion factors.

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talk

Primary author: CONSTANTINOU, Martha (University of Cyprus)

Co-authors: Dr ALEXANDROU, Constantia (University of Cyprus); Mr STYLIANOU, Fotos (University of Cyprus); Dr PANAGOPOULOS, Haralambos (University of Cyprus); Dr KORZEC, Tomasz (University of Humboldt)

Presenter: CONSTANTINOU, Martha (University of Cyprus)

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