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Fermionic twisted boundary conditions with reweighting method

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Imposing twisted boundary conditions on the fermion fields is a procedure extensively used when evaluating, for example, form factors on the lattice. Twisting is usually performed for one flavour and only in the valence, and this causes a breaking of unitarity.
In this work we explore the possibility to restore the unitarity through the reweighting method. We evaluate the change in the fermion determinant with different boundary conditions and include that in the expectation values, avoiding in this way the cost of generating new configurations for each choice of the twisting angle, theta.

As expected the effect of the reweighting is negligible in the case of large volumes but it is important when the volumes are small and the twisting angles are large. In particular we find a measurable effect for the plaquette and the pion correlation function in the case of theta=pi/2 in a volume 16x8^3, and we found a systematic upward shift in the pion dispersion relation.

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