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B4: A new framework to tune an improved relativistic heavy-quark action

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We introduce a new non-perturbative method to tune the parameters of the Columbia formulation of an anisotropic, clover-improved relativistic heavy-quark (RHQ) action.

By making use of suitable observables which can be computed at a sequence of heavy-quark mass values, employing an $O(a)$ -improved discretized action with domain-wall chiral fermion, and safely interpolated between the accessible heavy-quark mass region and the static point predicted by heavy-quark effective theory, we are able to precisely determine the unknown coefficients of the RHQ action.

In this proof-of-principle study we benefit from the RBC/UKQCD Iwasaki gauge configurations with $2 + 1$ flavors of dynamical quarks, at three values of the lattice spacing varying from 0.11 to 0.062 fm.

Preliminary results and applications to bottom spectroscopy are also presented.

Primary authors: GIUSTI, Davide (University of Regensburg); LEHNER, Christoph (University of Regensburg & Brookhaven National Laboratory)

Presenter: GIUSTI, Davide (University of Regensburg)

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