Contribution ID: **318** Type: **Talk**

Error Scaling of Sea Quark Isospin-Breaking Effects

Thursday, 1 August 2024 11:50 (20 minutes)

Sea-quark isospin-breaking effects (IBE) are difficult to compute since they require the evaluation of all-to-all propagators. However, the quest for high-precision calculations motivates a detailed study of these contributions. There are theoretical arguments that the stochastic error associated with these quantities should diverge in the continuum and infinite-volume limit, resulting in a possible bottleneck for the method. In this talk, we present the study of the error scaling for these quantities using $N_f = 3$ O(a) improved Wilson fermions QCD with C-periodic boundary conditions in space, a pion mass $M_\pi \approx 415$ MeV, a range of lattice spacings $a \approx 0.05,\ 0.075,\ 0.1$ fm, and spacial extensions $L \approx 1.6,\ 2.4,\ 3.2$ fm. This work is part of the program of the RC* collaboration. The analysis of the error as a function of the number of stochastic sources shows that we reach the gauge error for the dominant contributions. The errors do not show the leading order divergence $1/a$ for strong-IBE and $1/a^2$ for electromagnetic IBE, in the considered range of lattice spacings. On the other hand, our error data are consistent with the predicted leading divergence $\sqrt{V}$.

Primary author: COTELLUCCI, Alessandro (Humboldt-Universität zu Berlin)

Presenter: COTELLUCCI, Alessandro (Humboldt-Universität zu Berlin)

Session Classification: Hadronic and nuclear spectrum and interactions

Track Classification: Hadronic and Nuclear Spectrum and Interactions