Contribution ID: **193** Type: **Parallel Talk**

O(a) improved Wilson quarks and the O(am) rescaling of the bare coupling

Tuesday, 1 August 2023 13:50 (20 minutes)

Lattice QCD with Wilson quarks near the continuum limit can be described by Symanzik's effective continuum action which contains the dimension 5 operator, $m\,tr(F_{\mu\nu}F_{\mu\nu})$. Its effect can be eliminated by an O(am) rescaling of the bare lattice coupling constant.The corresponding improvement coefficient, b_g, is currently only known to 1-loop order and the resulting uncertainty is now one of the dominant systematic errors in the recent determination of $\alpha_s(m_Z)$ with the decoupling method by the ALPHA collaboration. In this talk, I will discuss practical improvement conditions to determine b_g non-perturbatively. A perturbative test reproduces the known 1-loop result and first non-perturbative results at parameters required for the alpha_s determination will be shown in a poster by Mattia Dalla Brida.

Topical area

Standard Model Parameters

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Session Classification: Standard Model Parameters