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The isoscalar non-singlet axial form factor of the nucleon from lattice QCD

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We present our progress on the computation of the axial form factor of the nucleon with flavour structure $u + d - 2s$ from lattice QCD. We employ a set of $N_f = 2 + 1$ CLS ensembles with O(a)-improved Wilson fermions and the Lüscher-Weisz gauge action, with lattice spacings ranging from 0.05 fm to 0.086 fm and pion masses spanning between 130 MeV and 350 MeV.

We employ multiple source-sink separations and use the summation method to suppress the contamination from excited states. We use a z-expansion on each ensemble to parametrize the Q^2 -dependence of the form factor and simultaneously fit the available source-sink separation for all $Q^2 \leq 0.7 \text{ GeV}^2$. We outline our analysis of the stability of the fits under different ansätze and different estimations of the covariance matrix and report on our strategy for a comprehensive determination of the physical form factor.

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