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Complete leading-twist baryon light-cone distribution amplitudes from lattice QCD

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We present the first lattice QCD calculation of all components of the leading-twist light-cone distribution amplitudes (LCDAs) of baryons at the physical pion mass and in the continuum limit, within the Large-Momentum Effective Theory (LaMET) framework.
This work provides a systematic first-principles determination of baryon LCDAs beyond moment-based approaches, enabling direct access to their full momentum dependence. In this work, we develop and implement the key ingredients that make such a calculation possible, including a hybrid renormalization strategy to remove linear divergences, HQET-guided analytic extrapolation of quasi-DAs, as well as controlled matching to the $\overline{\mathrm{MS}}$ scheme and reliable extrapolations to the physical and continuum limits.
These advances establish a comprehensive framework for precision studies of baryon structure from lattice QCD, paving the way for future high-precision investigations of hadron structure.

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