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x-dependent Light Baryon LCDAs from Lattice QCD

We present the results of lattice QCD calculation of all leading-twist x-dependent Light-cone Distribution Amplitudes (LCDAs) for baryons in light octet, within the framework of Large-momentum Effective Theory (LaMET). We implement a novel Hybrid renormalization scheme for baryon nonlocal operators, and perform simulations at 4 different lattice spacings a = {0.052, 0.068, 0.077, 0.105} fm, achieving reliable and precise results of x-dependent baryon LCDA. To access the large momentum regime and facilitate matching to light-cone, we simulate the quasi-Distribution Amplitudes (quasi-DAs) with hadron momenta Pz of about 1~3 GeV. The numerical calculations employ CLQCD ensembles with stout smeared clover fermions and a Symanzik gauge action, and several new techniques are also developed to improve the extrapolation and inversion in matching procedure. We present the resulting momentum-fraction distributions for the two light quarks in the light baryon.

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