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LQCD Determination of Quark Spin in Octet Baryons and SU(3)-Flavor Symmetry

We employed a novel “blending method” to investigate the quark spin contributions in the octet baryons. Our lattice QCD calculations were performed on three ensembles, covering two pion masses and two lattice spacings. The sea quark contribution to the quark spin is found to observe SU(3) flavor symmetry to a good approximation within error. In contrast, the valence quark contribution exhibits a ~20% SU(3) flavor symmetry breaking effect. Furthermore, the symmetry is better preserved within specific diquark structures, as seen in the pairs like (n, Σ) and (Λ, Ξ).

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