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Re-evaluation of the Parton Distributions of Strangeness in the nucleon

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In 2008 HERMES published the results of an "isoscalar" extraction
in leading logarithmic order (LO) in the strong coupling constant of
quantum chromodynamics of the momentum and helicity density distributions of the strange sea in the nucleon from the charged-kaon production in deep-inelastic scattering (DIS) on the deuteron (Phys. Lett. B666, 446 (2008). The shape of the momentum distribution was observed to be softer than that of the average of the ubar and dbar quarks.The helicity distribution was found to be compatible with zero within experimental uncertainties in the region of measurement $0.02 < x < 0.60$. HERMES has since finalized the extraction of multiplicites for charged Kaons in semi-inclusive deep-inelastic positron scattering. A re-evaluation of the extraction of the PDFs of strange quarks has been made using the results of the new final extraction of the multiplicities for charged kaons. In the measured range of x the strength of the polarization averaged PDF S(x)=s(x)+sbar(x) is substantially less than reported earlier, but the shape is similar, i.e., the momentum densities are softer than previously assumed. The first moment of the helicity distribution Delta S(x) is consistent with zero and the partial moment of the octet axial combination is observed to be substantially less than the axial charge extracted from hyperon decays under the assumption of SU(3) symmetry.

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