Ratio of Kaon and Pion valence-quark parton distributions¹ JEF-FREY TIBBALS, Seattle University — The $K^+$ and $\pi^+$ are composed of two valence quarks each, $u\bar{s}$ and $ud$, respectively. The ratio of momentum fractions carried by the up valence quarks, $u_K/u_\pi$, has been measured by Badier et al. [1], and found to decrease with increasing Bjorken $x$. I extend the statistical model of Zhang et al. [2] to calculate the parton distribution functions for the $K^+$ meson and the $\pi^+$ meson. I consider the $\pi^+$ and $K^+$ as an infinite series expansion of quark-gluon Fock states. The probabilities of each state were calculated using detailed balance and the three processes $q \leftrightarrow qg$, $g \leftrightarrow q\bar{q}$ and $g \leftrightarrow gg$. I find a sea asymmetry of $\bar{d} - \bar{u} \approx 0.265$ in the $K^+$, but no sea asymmetry in the $\pi^+$. I used the RAMBO program to produce a Monte Carlo simulation for the momentum distributions of the $n$-parton Fock states of both $K^+$ and $\pi^+$, which determine the momentum distribution functions of the mesons. I compare the ratio of momentum fractions carried by the up valence quarks in each meson, $u_K/u_\pi$, to the experimental results, and to other theoretical calculations.


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