

Kaon electromagnetic form factor

Fei Gao^{1,2}, Lei Chang³, Craig D. Roberts⁴, Yu-Xin Liu^{1,2}

¹ Department of Physics and State Key Laboratory of Nuclear Physics and Technology, Peking University, Beijing 100871, China

² Collaborative Innovation Center of Quantum Matter, Beijing 100871, China

³ School of Physics, Nankai University, Tianjin 300071, China

⁴ Division of Physics, Argonne National Laboratory, Argonne, IL 60439, USA

We compute the kaon electromagnetic form factor, $F_K(Q^2)$, on the entire domain of spacelike momentum in this DSE framework. With the unified description for $F_K(Q^2)$ and pion electromagnetic form factor, $F_\pi(Q^2)$, we then obtain the ratio of $F_K(Q^2)/F_\pi(Q^2)$. In the large momentum transferred region, the ratio can also be estimated by mesons' parton distribution amplitude (PDA). Our prediction shows good consistency with the estimation by PDA, however, it then leads to mismatch with the data measured for large timelike- $s_U = 17.4 GeV^2$. We here consider this puzzle is brought in by the wrong normalisation in the measurements of $F_K(Q^2)$ and $F_\pi(Q^2)$. We also calculate the charge radii of Kaon and analyze the flavour separation in Kaon. This unified description of $F_K(Q^2)$ and $F_\pi(Q^2)$ can form an accurate picture of pion and kaon's internal structure.