
kaon questions

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1. How strongly can one claim that measuring the charged and neutral $K \rightarrow \pi \nu \bar{\nu}$ with total error in the 3-5% range is a compelling test of MFV? How would various non-MFV variants map onto the plane of $BR(K^+ \rightarrow \pi^+ \nu \bar{\nu})$ vs $BR(K_L \rightarrow \pi^0 \nu \bar{\nu})$? Is “MFV” sufficiently well-defined?
2. The SM prediction for $K \rightarrow \pi \nu \bar{\nu}$ depends on V_{cb}^4 . Is it possible to measure V_{cb} at the 0.25 % level? How? What improvements in theory, LQCD, have to be made? What future experimental measurements are required?
3. $K^+ \rightarrow \pi^0 \nu \bar{\nu}$ has a significant uncertainty from the charm quark mass. What are the future prospects to reduce this uncertainty? What improvements in theory, LQCD have to be made? What future experimental measurements are required?
4. Buras et al looked at MFV contributions to $K_L \rightarrow \pi^0 e^+e^-$ and $K_L \rightarrow \pi^0 \mu^+\mu^-$, where the new physics contribution appears as a subdominant interference of the indirect and direct CPV contributions. Because of the uncertainty in the SM indirect CPV part, and because the MFV enhancement is at most 8-10%, they claim nothing can be done here. Do we accept this? What about non-MFV contributions?
5. Buras et al found MFV contributions of up to 20% to $K_L \rightarrow \mu^+\mu^-$. The dominant SM contribution is from $K_L \rightarrow \gamma^* \gamma^* \rightarrow \mu^+\mu^-$; how well can this be estimated now? What is the smallest uncertainty that we could achieve on estimating $K_L \rightarrow \mu^+\mu^- / K_L \rightarrow \gamma \gamma$?
6. Project X could measure the ratio $K \rightarrow e \nu / K \rightarrow \mu \nu$ to less than 0.1% statistical error. Is it useful? What about the “direct photon emission” from the kaon decay vertex?