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long distance part of ϵ_K from lattice QCD

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We demonstrate the lattice QCD calculation of the long distance contribution to ϵ_K . Due to the singular, short-distance structure of ϵ_{long} , we must perform a short-distance subtraction and introduce a corresponding subtraction term determined from perturbation theory, which we calculate at Next Leading Order (NLO). We perform the calculation on a $24^3 \times 64$ lattice with a pion mass of 329 MeV. This work is a complete calculation, which includes all connected and disconnected diagrams.

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