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## Enhanced Lattice QCD Studies on $\epsilon_K$ and $\Delta M_K$

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Two second-order quantities related to K meson mixing,  $\epsilon_K$  and  $\Delta M_K$ , are Standard Model observables that are highly sensitive to possible new physics. The RBC and UKQCD collaborations have presented results for  $\Delta M_K$  with physical quark masses and the first lattice calculation of the long-distance part of  $\epsilon_K$ . Utilizing new-generation computers and new lattice configurations with an inverse lattice spacing of  $2.7\text{GeV}$  and physical quark masses, we can extend this previous work to obtain more precise results. We will present preliminary results and the methods being applied to control systematic errors.

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