

PARTICLE PHYSICS SEMINAR SERIES

Precision Standard-Model Prediction of ϵ_K

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The parameter ϵ_K describes CP violation in the neutral kaon system and is one of the most sensitive probes of new physics. The large uncertainties related to the charm-quark contribution to ϵ_K have so far prevented a reliable standard-model prediction. In this talk, I will review mixing in the neutral kaon system, and then show that CKM unitarity enforces a unique form of the weak effective Hamiltonian in which the short-distance theory uncertainty of the imaginary part is dramatically reduced. The uncertainty related to the charm-quark contribution is now at the percent level. I will conclude with an outlook on further calculations that have the potential to render ϵ_K a precision observable on par with the rare kaon decays.



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