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$\Delta I = 1/2$ process of $K \rightarrow \pi\pi$ decay on multiple ensembles with periodic boundary conditions

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Calculation of ε' , a measure of direct CP violation, using periodic boundary conditions (PBC) is desired to complement our previous lattice calculations performed with G-parity boundary conditions (GPBC). This approach will also be an important step towards incorporating electromagnetic and isospin-violating effects. Last year, we published our first PBC result for ε' , demonstrating its feasibility despite the challenges in extracting the signal of the two-pion excited state to realize the physical kinematics in a periodic box. Now we extend our production including a smaller lattice spacing, which is the same as the earlier GPBC calculation, to control the finite lattice spacing error, one of the largest systematic errors. In this talk, some preliminary results from these new calculations will be presented.

Primary author: TOMII, Masaaki (University of Connecticut)

Presenter: TOMII, Masaaki (University of Connecticut)

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