Calculation of $\Delta I = 3/2$ kaon weak matrix elements including two-pion interaction effects in finite volume

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Abstract: We report a direct calculation of $\Delta I = 3/2$ kaon weak matrix elements, in which the two-pion interaction effect is calculated on the lattice. In this study we use domain wall fermions and the DBW2 gauge action at one coarse lattice spacing corresponding to $a^{-1} = 1.3$ GeV in the quenched approximation. In order to obtain the infinite volume, center-of-mass system, on-shell decay amplitudes at different relative momenta, we employ not only the Lellouch and Lüscher formula, but also its extension to a system with non-zero total momentum. We compare the amplitudes with the previous result calculated with H-parity(anti-periodic) boundary conditions. We also present the $I = 2$ $\pi\pi$ scattering phase shift, scattering length, and a preliminary result for $\mathrm{Re}A_2$.