

Pion Transition Form Factor in Lattice QCD

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We investigate the neutral pion transition form factor $F_{\pi^0\gamma^*\gamma^*}(q_1^2, q_2^2)$ in lattice QCD and confirm that the connected and disconnected contributions, in the short-distance regime with a fixed time integration, have the same sign. We employ the recently proposed blending method, which supplies an unbiased and cheap estimators for the required all-to-all propagators.

The external pion states are treated within the distillation framework, while the electromagnetic currents are evaluated via blending method.

Numerical tests are performed on an $N_f = 2 + 1$ lattice ensemble. Our result shows that the contribution of the disconnected part is approximately 1% of that of the connected part and enables constructive interference of probability amplitudes.

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