(Takashi Suzuki)

Extracting the meson form factors from lattice QCD

2016   14:40 - 16:10

H   7   A (H701   )

Precise computation of meson form factors in lattice QCD plays an important role in examining the standard model of particle physics. In this thesis, we study how to obtain a better control of three major systematic errors in the computation of the relevant three point functions to the form factors, finite lattice volume, finite lattice spacing, and violation of the chiral symmetry.

In the first part, we focus on the finite volume effects on the pion form factors. Using chiral perturbation theory, we find ratios of correlators, which automatically cancel the dominant finite volume effects coming from the zero momentum mode of pions. We show that a precise extraction of the pion charge radius can be carried out on a rather small lattice size $L \sim 3$ fm.

In the second part, we report on our recent numerical study in JLQCD collaboration. We use the Möbius domain-wall fermions in order to reduce the systematic errors due to violation of chiral symmetry, as well as finite lattice spacing by simulating fine lattices. Our preliminary result for the semileptonic D meson form factors with the cutoff $1/a \sim 2.4$ GeV already shows a good agreement with the experiments.