

Lattice QCD Evidence for Exotic Tetraquark Resonance

Presenter: Hideo Suganuma

H. Suganuma (Kyoto U.), N. Ishii (TokyoTech) and F. Okiharu (Nihon U.)

Abstract: Exotic tetraquark resonances are studied in SU(3) anisotropic lattice QCD at the quenched level. We investigate the correlator of the exotic four-quark (4Q) system, $c\bar{s}u\bar{d}$, using the $O(a)$ -improved Wilson quark action at $\beta = 5.75$ on $16^3 \times 96$ with renormalized anisotropy $a_s/a_t = 4$. To clarify whether the 4Q state is a localized resonance state or a two-meson scattering state, we use the Hybrid Boundary Condition (HBC) method, where the periodic and the anti-periodic boundary conditions are imposed on quarks (c, u) and antiquarks (\bar{s}, \bar{d}), respectively. On a finite lattice with the HBC, the threshold of the two-meson scattering state is raised up, while the mass of a compact 4Q resonance is expected to be unchanged. From the comparison between HBC and the ordinary boundary condition, we observe a localized exotic 4Q resonance state on the quenched lattice, besides a two-meson scattering state.