Contribution ID: **49** Type: **not specified**

Possibility of Glueball at Physical Point

Sunday, 31 October 2021 11:20 (20 minutes)

We perform an exploratory study of glueballs on two RBC/UKQCD gauge ensembles with the $N_f = 2+1$ physical quark masses at two lattice spacings. The statistical uncertainties of the glueball correlation functions are considerably reduced through the cluster decomposition error reduction (CDER) method. The Bethe-Salpeter wave functions are obtained for the scalar, tensor and pseudoscalar glueballs by using the spatially extended glueball operators defined through the gauge potential $A_\mu(x)$ in the Coulomb gauge. These wave functions show similar features of non-relativistic two-gluon systems, and then are used to optimize the signals of the related correlation functions at the early time region and the ground state masses can be extracted precisely thereafter. By the assumptions that the glueball operators defined in terms gauge potentials couple almost exclusively to pure glueball states, the obtained masses are interpreted to be those of the ground state pure gauge glueballs. Our result shows the \red{possibility} of glueball states in the presence of dynamical quarks, even though many systematic uncertainties have not yet be well tackled with.

Presenter: 陈, 飞宇

Session Classification: session3