

Contribution ID: 345

Type: Oral presentation

The mixing of η_c and the Pseudoscalar Glueball

Thursday 29 July 2021 06:00 (15 minutes)

The first lattice QCD study of the mixing of η_c and the pseudoscalar glueball is performed. We generate a large gauge configuration ensemble with $N_f = 2$ degenerate charm quarks on an isotropic lattice. The correlation functions of the charm quark bilinear operators, both connected part and disconnected part, are computed via the distillation method. And the correlation functions of glueball operators are also computed on this ensemble and variational analysis method is adopted to obtain optimized operators. By peforming a simutaneous two states fit of correlation functions $C_{CC}(t)$, $C_{GG}(t)$ and $C_{GC}(t)$, the mixing angle of η_c and pseudoscalar glueball is obtained, which is obviously nonzero but quit small. It would be helpful for understanding the properties of η_c .

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Session Classification: Hadron Spectroscopy and Interactions

Track Classification: Hadron Spectroscopy and Interactions