Contribution ID: **67**   Type: **Poster**

Lattice QCD study of Z_b and Z_c

Wednesday, 12 April 2023 18:50 (5 minutes)

We present two lattice studies: The $\bar{b}b\bar{q}q$ systems with various quantum numbers using static bottom quarks and $\bar{c}c\bar{q}q$ systems with $I(J^{PC}) = 1(1^{+\pm})$.

Only one set of quantum numbers that couples to Z_b and $\Upsilon\,\pi$ was explored on the lattice before; these studies found an attractive potential between B and $\bar{B}^*$ resulting in a bound state below the threshold. The first study ($\bar{b}b\bar{q}q$) considers the other three sets of quantum numbers. Eigen-energies are extracted as a function of separation between b and $\bar{b}$. The resulting eigen-energies do not show any sizable deviation from noninteracting energies of the systems $\bar{b}b + \bar{q}q$ and $\bar{b}q + \bar{q}b$, so no significant attraction or repulsion is found.

Our second study ($\bar{c}c\bar{q}q$) is the first study for four-quark states with $I(J^{PC}) = 1(1^{+\pm})$, a non-zero total momentum and two different lattice volumes. Our preliminary lattice results show that the energy shifts for eigenstates dominated by $D\bar{D}^*$ are very small in the 1^{++} channel and consistent with zero in the 1^{+-} channel. Our future plan is to determine the scattering amplitude for the coupled $J/\psi\pi - D\bar{D}^*$ scattering close to the $D\bar{D}^*$ threshold that reproduces experimental results and lattice spectra.

Primary author: Mr SADL, Mitja

Co-author: PRELOVSEK, Sasa

Presenter: Mr SADL, Mitja

Session Classification: Posters, wine and cheese

Track Classification: Flavour