

# The $Z_{cs}$ states and the mixture of hadronic molecule and diquark-anti-diquark components within effective field theory

Tuesday, August 9, 2022 5:35 PM (15 minutes)

In this work, we construct the Lagrangian describing meson-diquark interaction, such that the diquark-anti-diquark component as well as the molecular component is introduced when studying the  $Z_{cs}$  states. In this way, the problem is solved that if only considering the  $\bar{D}^{(*)}D_s^{(*)}$  components, the potentials are suppressed by OZI rule. Through solving the Bethe-Salpeter equation, we find that the  $Z_{cs}(4000)^+$  can be explained as the mixture of  $\bar{D}^{*0}D_s^+$  and  $\bar{A}_{cs}S_{cu}$  components. Besides, for the  $\bar{D}^{*0}D_s^+/\bar{A}_{cs}A_{cu}$  system, the pole of  $4208 \pm 13i$  MeV on the second Riemann sheet is predicted, whose mass is close to that of  $Z_{cs}(4220)^+$  while the width is much smaller than  $Z_{cs}(4220)^+$ . Due to the large error of the  $Z_{cs}(4220)^+$ 's width, further measurements are expected. In addition, several other poles of different spins are predicted.

**Primary authors:** Mr CAO, Ze-Hua (Lanzhou Center for Theoretical Physics, Lanzhou University, Lanzhou, Gansu 730000, China); 何, 伟 (L)

**Co-author:** Dr SUN, Zhi-feng (Lanzhou University)

**Presenter:** 何, 伟 (L)

**Session Classification:** Parallel Session II (2): Hadron and Flavor Physics

**Track Classification:** 强子物理与味物理