

## The $Z_{cs}$ states based on the molecular picture

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The  $Z_{cs}(3985)$  state was reported as a new exotic state by BESIII collaboration. After its discovery, the  $Z_{cs}(4000)$  and  $Z_{cs}(4220)$  states were observed at LHCb. We study the  $Z_{cs}(3985)$  state based on the  $\bar{D}_s D^*$  with the coupled channels of the vector-pseudoscalar mesons [1]. We find that we can explain this state by the threshold effect from the coupled-channel interaction and our calculation is in fair agreement with the BESIII data. We also study the  $Z_{cs}$  state based on  $D_s^* \bar{D}^*$  with the coupled channels of the vector-vector mesons [2]. The  $D_s^* \bar{D}^*$  system does not develop a bound state, however, the  $J^P = 2^+$  channel has enough attraction to create a strong cusp structure that shows up in the  $J/\psi K^+$  invariant mass distribution in the  $B^+ \rightarrow J/\psi \phi K^+$  decay at the  $D_s^* \bar{D}^*$  threshold. I will give a presentation based on Refs. [1]-[2].

[1] N. Ikeno, R. Molina and E. Oset, Phys. Lett. B 814, 136120 (2021).

[2] N. Ikeno, R. Molina and E. Oset, Phys. Rev. D 105, 014012 (2022).

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