

## Decays of $1^{-+}$ Charmoniumlike Hybrid

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By extracting the transition amplitudes, we give the first lattice QCD prediction of the two-body decay partial widths of the  $1^{-+}$  charmoniumlike hybrid  $\eta_{c1}$ . Given the calculated mass value  $m_{\eta_{c1}} = 4.329(36)$  GeV, the  $\eta_{c1}$  decay is dominated by the open charm modes  $D_1\bar{D}$ ,  $D^*\bar{D}$  and  $D^*\bar{D}^*$  with partial widths of 258(133) MeV, 88(18) MeV and 150(118) MeV, respectively. The coupling of  $\eta_{c1}$  to  $\chi_{c1}$  plus a flavor singlet pseudoscalar is not small, but  $\chi_{c1}\eta$  decay is suppressed by the small  $\eta - \eta'$  mixing angle. The partial width of  $\eta_{c1} \rightarrow \eta_c\eta'$  is estimated to be around 1 MeV. We suggest experiments to search for  $\eta_{c1}$  in the  $P$ -wave  $D^*\bar{D}$  and  $D^*\bar{D}^*$  systems. Especially, the polarization of  $D^*\bar{D}^*$  can be used to distinguish the  $1^{-+}$  product (total spin  $S = 1$ ) from  $1^{-}$  products ( $S = 0$ ).

### Parallel Session

Hadron Spectroscopy

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