



High Energy Physics - Phenomenology

# Predicted charged charmonium-like structures in the hidden-charm dipion decay of higher charmonia

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In this work, we predict two charged charmonium-like structures close to the  $D^{\ast}\bar{D}$  and  $D^{\ast}\bar{D}^{\ast}$  thresholds, where the Initial Single Pion Emission mechanism is introduced in the hidden-charm dipion decays of higher charmonia  $\psi(4040)$ ,  $\psi(4160)$ ,  $\psi(4415)$  and charmonium-like state  $Y(4260)$ . We suggest BESIII to search for these structures in the  $J/\psi\pi^+\pi^-$ ,  $\psi(2S)\pi^+\pi^-$  and  $h_b(1P)\pi^+\pi^-$  invariant mass spectra of the  $\psi(4040)$  decays into  $J/\psi\pi^+\pi^-$ ,  $\psi(2S)\pi^+\pi^-$  and  $h_b(1P)\pi^+\pi^-$ . In addition, the experimental search for these structures in the  $J/\psi\pi^+\pi^-$ ,  $\psi(2S)\pi^+\pi^-$  and  $h_c(1P)\pi^+\pi^-$  invariant mass spectra of the  $\psi(4260)$  hidden-charm dipion decays will be accessible at Belle and BaBar.

Comments: 7 pages, 6 figures, 1 table. More discussions added.  
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