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## The pole structures of the $X(1840)/X(1835)$ and the $X(1880)$

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Whether the  $N\bar{N}$  interaction could form a state or not is a long standing question, even before the observation of the  $p\bar{p}$  threshold enhancement in 2003. The recent high statistic measurement in the  $J/\psi \rightarrow \gamma 3(\pi^+\pi^-)$  channel would provide a good opportunity to probe the nature of the peak structures around the  $p\bar{p}$  threshold in various processes. By constructing the  $N\bar{N}$  interaction respecting chiral symmetry, we extract the pole positions by fitting the  $p\bar{p}$  and  $3(\pi^+\pi^-)$  invariant mass distributions of the  $J/\psi \rightarrow \gamma p\bar{p}$  and  $J/\psi \rightarrow \gamma 3(\pi^+\pi^-)$  processes. The threshold enhancement in the  $p\bar{p}$  invariant mass distribution is from the pole on the third Riemann sheet, which more couples to the isospin triplet channel. The broader structure in the  $3(\pi^+\pi^-)$  invariant mass comes from the pole on the physical Riemann sheet, which more couples to the isospin singlet channel. Furthermore, the large compositeness indicates that there should exist  $p\bar{p}$  resonance based on the current experimental data. In addition, we also see a clear threshold enhancement in the  $n\bar{n}$  channel, but not as significant as that in  $p\bar{p}$  channel, which is useful and compared with further experimental measurement.

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