

Search for hexaquark or di-baryon state at BESIII

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Using the data sets above 4.0 GeV collected by the BESIII detector on the Beijing Positron Electron Collider, which corresponds a total integrated luminosity greater than 1.5fb^{-1} , the hexaquark or di-baryon state is searched through $e^+ e^- \rightarrow 2(p \bar{p})$ and $e^+ e^- \rightarrow p \bar{p} \bar{n} \pi^- + \text{c.c.}$. We observed these two final states for the first time, and the Born cross sections of $e^+ e^- \rightarrow 2(p \bar{p})$ have been measured in 23 center-of-mass energies ranges between 4.009 and 4.6 GeV. The average Born cross sections of the $e^+ e^- \rightarrow p \bar{p} \bar{n} \pi^- + \text{c.c.}$ within the energy range of (4.160, 4.380) GeV, (4.400, 4.600) GeV and (4.610, 4.700) GeV are measured. By fitting the invariant mass spectra of $p\bar{n}$, $p\bar{p}\pi$ and $p\bar{p}$, we found that their lineshape are consistent with the phase space distribution, no significant resonance structures were found.

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