

Observation of a double charged tetraquark state and its neutral partner at LHCb

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The discoveries of meson-like exotic states have been attracting huge interest from the hadron physics community. A doubly charged tetraquark, $T_{c\bar{s}}^{\bar{a}(2900)^{++}}$, and its neutral partner, $T_{c\bar{s}}^{\bar{a}(2900)^0}$, are observed in the combined amplitude analysis of $B^+ \rightarrow D^- D_s^+ \pi^+$ and $B^0 \rightarrow D^0 \bar{D}_s^+ \pi^-$ decays, based on the totally 9 fb^{-1} pp collision datasets collected by LHCb Collaboration. They are the manifestly tetraquark candidates, with the minimum quark contents $[c\bar{s}u\bar{d}]$ and $[c\bar{s}\bar{u}d]$. It's the first observation of a doubly charged meson and its isospin partner, which belong to the same isospin triplet. The masses, widths and spin-parity numbers of new exotic resonances are measured in the analysis. The measured masses of them are similar with the $X_0(2900)$ ($[cs\bar{u}\bar{d}]$) previously observed in LHCb, but the width and flavor contents are different.

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