

Observation of a family of all-charm tetraquarks at CMS

Friday, 31 October 2025 18:00 (20 minutes)

The CMS experiment reports the observation of three structures in the $\bar{c}c\bar{c}c \rightarrow \bar{c}+c-\bar{c}+c$ channel — $\bar{c}c(6600)$, $\bar{c}c(6900)$, and $\bar{c}c(7100)$ — each with a significance well above 5σ , confirming and extending the earlier Run 2 results. Strong interference effects among them, also above 5σ , indicate they share the same quantum numbers. A complementary search in the $\bar{c}c\bar{c}c(2\gamma)$ channel reveals two structures consistent with $\bar{c}c(6900)$ and $\bar{c}c(7100)$. A spin-parity analysis favors a $J^{PC}=2^{++}$ assignment, a rare quantum number among known hadrons. Together, these findings strongly support the interpretation of these states as a family of all-charm tetraquarks, offering new insights into the dynamics of exotic resonances.

Primary author: Ms ZHOU, Yilin (Fudan University)

Presenter: Ms ZHOU, Yilin (Fudan University)

Session Classification: Parallel 3

Track Classification: CMS