

$P_{c\bar{c}}(4440)^+$

$I(J^P) = \frac{1}{2}(??)$  Status: \*

OMITTED FROM SUMMARY TABLE  
Was  $P_c(4440)^+$ .

| $P_{c\bar{c}}(4440)^+$ MASS    |             |          |                      |
|--------------------------------|-------------|----------|----------------------|
| VALUE (MeV)                    | DOCUMENT ID | TECN     | COMMENT              |
| $4440.3 \pm 1.3^{+4.1}_{-4.7}$ | AAIJ        | 19W LHCb | $pp$ at 7, 8, 13 TeV |

| $P_{c\bar{c}}(4440)^+$ WIDTH  |             |          |                      |
|-------------------------------|-------------|----------|----------------------|
| VALUE (MeV)                   | DOCUMENT ID | TECN     | COMMENT              |
| $20.6 \pm 4.9^{+8.7}_{-10.1}$ | AAIJ        | 19W LHCb | $pp$ at 7, 8, 13 TeV |

| $P_{c\bar{c}}(4440)^+$ DECAY MODES                 |                                |
|----------------------------------------------------|--------------------------------|
| Mode                                               | Fraction ( $\Gamma_i/\Gamma$ ) |
| $\Gamma_1 \quad J/\psi p$                          | seen                           |
| $\Gamma_2 \quad \Lambda_c^+ \bar{D}^0$             | not seen                       |
| $\Gamma_3 \quad \Lambda_c^+ \pi^+ D^-$             | not seen                       |
| $\Gamma_4 \quad \Sigma_c(2455)^{++} D^-$           | not seen                       |
| $\Gamma_5 \quad \Sigma_c(2520)^{++} D^-$           | not seen                       |
| $\Gamma_6 \quad \bar{\Lambda}_c^- \pi^+ D^+$       | [a] not seen                   |
| $\Gamma_7 \quad \bar{\Sigma}_c(2455)^0 D^+$        | [a] not seen                   |
| $\Gamma_8 \quad \bar{\Sigma}_c(2520)^0 D^+$        | [a] not seen                   |
| $\Gamma_9 \quad \Lambda_c^+ \pi^+ D^{*-}$          | not seen                       |
| $\Gamma_{10} \quad \bar{\Lambda}_c^- \pi^+ D^{*+}$ | [a] not seen                   |

[a] Searched for the charge conjugate mode from  $\bar{P}_{c\bar{c}}^-$  decays.

| $P_{c\bar{c}}(4440)^+$ BRANCHING RATIOS  |                    |          |                        |
|------------------------------------------|--------------------|----------|------------------------|
| $\Gamma(J/\psi p)/\Gamma_{\text{total}}$ |                    |          | $\Gamma_1/\Gamma$      |
| VALUE                                    | DOCUMENT ID        | TECN     | COMMENT                |
| seen                                     | <sup>1</sup> POPOV | 21 D0    | $p\bar{p}$ at 1.96 TeV |
| seen                                     | AAIJ               | 19W LHCb | $pp$ at 7, 8, 13 TeV   |

<sup>1</sup>Search for  $J/\psi$  inclusive production in association with a charged particle, assumed to be a proton. POPOV 21 observes a resonant signal consistent with a superposition of the  $P_{c\bar{c}}(4440)^+$  and  $P_{c\bar{c}}(4457)^+$ , using masses and widths measured by AAIJ 19W, at significance of  $3\sigma$ .

| $\Gamma(\Lambda_c^+ \bar{D}^0)/\Gamma_{\text{total}}$          | $\Gamma_2/\Gamma$                                                         |
|----------------------------------------------------------------|---------------------------------------------------------------------------|
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $pp$ , 5.7 fb <sup>-1</sup> at 13 TeV                       |
| $\Gamma(\Lambda_c^+ \pi^+ D^-)/\Gamma_{\text{total}}$          | $\Gamma_3/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $pp$ , 5.7 fb <sup>-1</sup> at 13 TeV                       |
| $\Gamma(\Sigma_c(2455)^{++} D^-)/\Gamma_{\text{total}}$        | $\Gamma_4/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $pp$ , 5.7 fb <sup>-1</sup> at 13 TeV                       |
| $\Gamma(\Sigma_c(2520)^{++} D^-)/\Gamma_{\text{total}}$        | $\Gamma_5/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $pp$ , 5.7 fb <sup>-1</sup> at 13 TeV                       |
| $\Gamma(\bar{\Lambda}_c^- \pi^+ D^+)/\Gamma_{\text{total}}$    | $\Gamma_6/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $\bar{P}_{c\bar{c}}^- \rightarrow \Lambda_c^+ \pi^- D^-$    |
| $\Gamma(\bar{\Sigma}_c(2455)^0 D^+)/\Gamma_{\text{total}}$     | $\Gamma_7/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $\bar{P}_{c\bar{c}}^- \rightarrow \Sigma_c(2455)^0 D^-$     |
| $\Gamma(\bar{\Sigma}_c(2520)^0 D^+)/\Gamma_{\text{total}}$     | $\Gamma_8/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $\bar{P}_{c\bar{c}}^- \rightarrow \Sigma_c(2520)^0 D^-$     |
| $\Gamma(\Lambda_c^+ \pi^+ D^{*-})/\Gamma_{\text{total}}$       | $\Gamma_9/\Gamma$                                                         |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $pp$ , 5.7 fb <sup>-1</sup> at 13 TeV                       |
| $\Gamma(\bar{\Lambda}_c^- \pi^+ D^{*+})/\Gamma_{\text{total}}$ | $\Gamma_{10}/\Gamma$                                                      |
| VALUE                                                          | DOCUMENT ID TECN COMMENT                                                  |
| not seen                                                       | AAIJ 24Z LHCB $\bar{P}_{c\bar{c}}^- \rightarrow \Lambda_c^+ \pi^- D^{*-}$ |

### $P_{c\bar{c}}(4440)^+$ REFERENCES

|       |     |                |                          |                |
|-------|-----|----------------|--------------------------|----------------|
| AAIJ  | 24Z | PR D110 032001 | R. Aaij <i>et al.</i>    | (LHCb Collab.) |
| POPOV | 21  | PAN 83 1383    | A.V. Popov <i>et al.</i> | (D0 Collab.)   |
| AAIJ  | 19W | PRL 122 222001 | R. Aaij <i>et al.</i>    | (LHCb Collab.) |