# $\rho_3(2250)$

$I^G(J^{PC}) = 1^+(3^{--})$

OMITTED FROM SUMMARY TABLE

Contains results mostly from formation experiments. For further production experiments see the Further States entry. See also $\rho(2150)$, $f_2(2150)$, $f_4(2300)$, $\rho_5(2350)$.

## $\rho_3(2250)$ MASS

### $\overline{p}p \to \pi\pi$ or $K\overline{K}$

| VALUE (MeV) | EVTS | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| $2248 \pm 17^{+59}_{-5}$ | 1.8k | [1] ABLIKIM | 20F | BES3 | | $\psi(2S) \to K^+K^-\eta$ |
| $\sim 2232$ | | HASAN | 94 | RVUE | | $\overline{p}p \to \pi\pi$ |
| $\sim 2090$ | | [2] OAKDEN | 94 | RVUE | | 0.36–1.55 $\overline{p}p \to \pi\pi$ |
| $\sim 2250$ | | [3] MARTIN | 80B | RVUE | | |
| $\sim 2300$ | | [3] MARTIN | 80C | RVUE | | |
| $\sim 2140$ | | [4] CARTER | 78B | CNTR | 0 | 0.7–2.4 $\overline{p}p \to K^-K^+$ |
| $\sim 2150$ | | [5] CARTER | 77 | CNTR | 0 | 0.7–2.4 $\overline{p}p \to \pi\pi$ |

[1] Seen in $\psi(2S)$ decay with branching ratio $\psi(2S) \to X\eta \to K^+K^-\eta = (1.9 \pm 0.4^{+0.5}_{-1.3}) \times 10^{-6}$.
[2] See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.
[3] $I(J^P) = 1(3^-)$ from simultaneous analysis of $p\overline{p} \to \pi^-\pi^+$ and $\pi^0\pi^0$.
[4] $I = 0$, 1. $J^P = 3^-$ from Barrelet-zero analysis.
[5] $I(J^P) = 1(3^-)$ from amplitude analysis.

### $S$-CHANNEL $\overline{N}N$

| VALUE (MeV) | DOCUMENT ID | | TECN | CHG | COMMENT |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $2260 \pm 20$ | [6] ANISOVICH | 02 | SPEC | | 0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ |
| $\sim 2190$ | [7] CUTTS | 78B | CNTR | | 0.97–3 $\overline{p}p \to \overline{N}N$ |
| $2155 \pm 15$ | [7,8] COUPLAND | 77 | CNTR | 0 | 0.7–2.4 $\overline{p}p \to \overline{p}p$ |
| $2193 \pm 2$ | [7,9] ALSPECTOR | 73 | CNTR | | $\overline{p}p$ $S$ channel |
| $2190 \pm 10$ | [10] ABRAMS | 70 | CNTR | | $S$ channel $\overline{p}N$ |

[6] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.
[7] Isospins 0 and 1 not separated.
[8] From a fit to the total elastic cross section.
[9] Referred to as $T$ or $T$ region by ALSPECTOR 73.
[10] Seen as bump in $I = 1$ state. See also COOPER 68. PEASLEE 75 confirm $\overline{p}p$ results of ABRAMS 70, no narrow structure.

### Other processes

| VALUE (MeV) | DOCUMENT ID | | TECN | COMMENT |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $2290 \pm 20 \pm 30$ | AMELIN | 00 | VES | 37 $\pi^- p \to \eta\pi^+\pi^- n$ |

# $\rho_3(2250)$ WIDTH

## $\overline{p}p \to \pi\pi$ or $K\overline{K}$

| *VALUE* (MeV) | *EVTS* | *DOCUMENT ID* | | *TECN* | *CHG* | *COMMENT* |
|---|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | | |
| $185^{+31}_{-26}{}^{+17}_{-103}$ | 1.8k | [11] ABLIKIM | 20F | BES3 | | $\psi(2S) \to K^+K^-\eta$ |
| $\sim 220$ | | HASAN | 94 | RVUE | | $\overline{p}p \to \pi\pi$ |
| $\sim 60$ | | [12] OAKDEN | 94 | RVUE | | 0.36–1.55 $\overline{p}p \to \pi\pi$ |
| $\sim 250$ | | [13] MARTIN | 80B | RVUE | | |
| $\sim 200$ | | [13] MARTIN | 80C | RVUE | | |
| $\sim 150$ | | [14] CARTER | 78B | CNTR | 0 | 0.7–2.4 $\overline{p}p \to K^-K^+$ |
| $\sim 200$ | | [15] CARTER | 77 | CNTR | 0 | 0.7–2.4 $\overline{p}p \to \pi\pi$ |

[11] Seen in $\psi(2S)$ decay with branching ratio $\psi(2S) \to X\eta \to K^+K^-\eta = (1.9 \pm 0.4^{+0.5}_{-1.3}) \times 10^{-6}$.

[12] See however KLOET 96 who fit $\pi^+\pi^-$ only and find waves only up to $J = 3$ to be important but not significantly resonant.

[13] $I(J^P) = 1(3^-)$ from simultaneous analysis of $p\overline{p} \to \pi^-\pi^+$ and $\pi^0\pi^0$.

[14] $I = 0$, 1. $J^P = 3^-$ from Barrelet-zero analysis.

[15] $I(J^P) = 1(3^-)$ from amplitude analysis.

## *S*-CHANNEL $\overline{N}N$

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *CHG* | *COMMENT* |
|---|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| $160 \pm 25$ | [16] ANISOVICH | 02 | SPEC | | 0.6–1.9 $p\overline{p} \to \omega\pi^0$, $\omega\eta\pi^0$, $\pi^+\pi^-$ |
| $135 \pm 75$ | [17,18] COUPLAND | 77 | CNTR | 0 | 0.7–2.4 $\overline{p}p \to \overline{p}p$ |
| $98 \pm 8$ | [18] ALSPECTOR | 73 | CNTR | | $\overline{p}p$ *S* channel |
| $\sim 85$ | [19] ABRAMS | 70 | CNTR | | *S* channel $\overline{p}N$ |

[16] From the combined analysis of ANISOVICH 00J, ANISOVICH 01D, ANISOVICH 01E, and ANISOVICH 02.

[17] From a fit to the total elastic cross section.

[18] Isospins 0 and 1 not separated.

[19] Seen as bump in $I = 1$ state. See also COOPER 68. PEASLEE 75 confirm $\overline{p}p$ results of ABRAMS 70, no narrow structure.

## Other processes

| *VALUE* (MeV) | *DOCUMENT ID* | | *TECN* | *COMMENT* |
|---|---|---|---|---|
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | |
| $230 \pm 50 \pm 80$ | AMELIN | 00 | VES | 37 $\pi^- p \to \eta\pi^+\pi^- n$ |

# $\rho_3(2250)$ REFERENCES


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| KLOET | 96 | PR D53 6120 | W.M. Kloet, F. Myhrer | (RUTG, NORD) |
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