

$h_c(1P)$

$$I^G(J^{PC}) = ??(???)$$

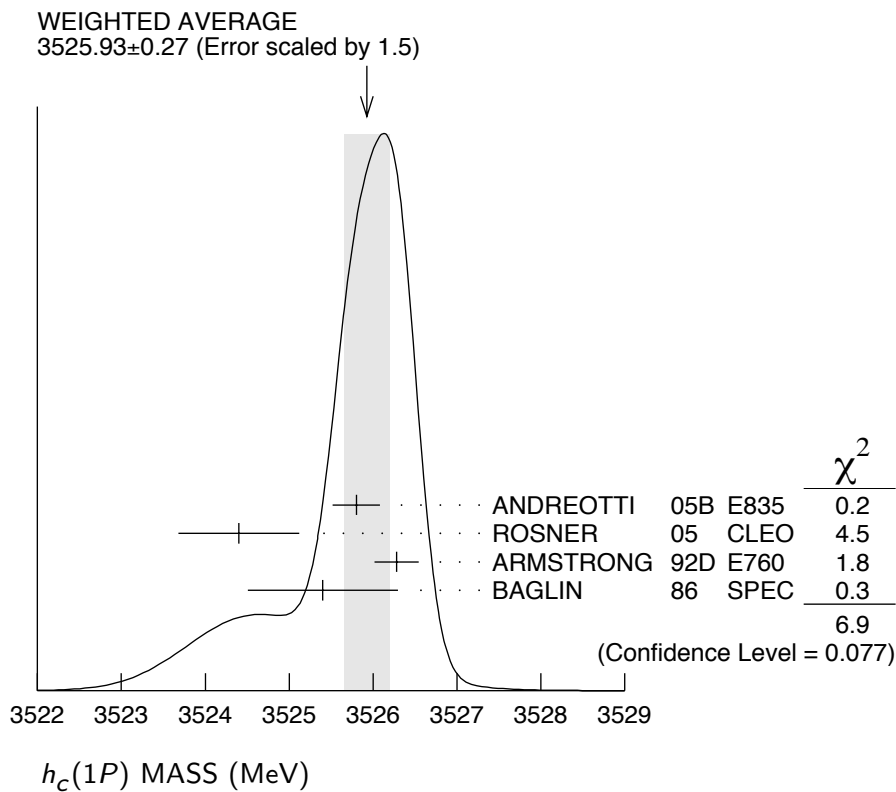
OMITTED FROM SUMMARY TABLE

Needs confirmation.

$h_c(1P)$ MASS

| <u>VALUE (MeV)</u> | <u>EVTS</u> | <u>DOCUMENT ID</u> | <u>TECN</u> | <u>COMMENT</u> |
|---|-------------|---|-------------|---|
| 3525.93±0.27 OUR AVERAGE | | Error includes scale factor of 1.5. See the ideogram below. | | |
| 3525.8 ±0.2 ±0.2 | 13 | ANDREOTTI 05B E835 | | $\bar{p}p \rightarrow \eta_c \gamma$ |
| 3524.4 ±0.6 ±0.4 | 168 ± 40 | ROSNER 05 CLEO | | $\psi(2S) \rightarrow \pi^0 \eta_c \gamma$ |
| 3526.28±0.18±0.19 | 59 | ¹ ARMSTRONG 92D E760 | | $\bar{p}p \rightarrow J/\psi \pi^0$ |
| 3525.4 ±0.8 ±0.4 | 5 | BAGLIN 86 SPEC | | $\bar{p}p \rightarrow J/\psi X$ |
| ● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ● | | | | |
| 3527 ±8 | 42 | ANTONIAZZI 94 E705 | | 300 $\pi^\pm, pLi \rightarrow J/\psi \pi^0 X$ |

¹ Mass central value and systematic error recalculated by us according to Eq. (16) in ARMSTRONG 93B, using the value for the $\psi(2S)$ mass from AULCHENKO 03.



$h_c(1P)$ WIDTH

| VALUE (MeV) | CL% | EVTS | DOCUMENT ID | TECN | COMMENT |
|---|-----|------|-------------|----------|--------------------------------------|
| <1 | | 13 | ANDREOTTI | 05B E835 | $\bar{p}p \rightarrow \eta_c \gamma$ |
| • • • We do not use the following data for averages, fits, limits, etc. • • • | | | | | |
| <1.1 | 90 | 59 | ARMSTRONG | 92D E760 | $\bar{p}p \rightarrow J/\psi \pi^0$ |

$h_c(1P)$ DECAY MODES

| Mode | Fraction (Γ_i/Γ) |
|-------------------------------|--------------------------------|
| Γ_1 $J/\psi(1S)\pi^0$ | |
| Γ_2 $J/\psi(1S)\pi\pi$ | not seen |
| Γ_3 $\rho\bar{p}$ | |
| Γ_4 $\eta_c \gamma$ | seen |

$h_c(1P)$ PARTIAL WIDTHS

$h_c(1P) \Gamma(i)\Gamma(\bar{p}p)/\Gamma(\text{total})$

| $\Gamma(\eta_c \gamma) \times \Gamma(\rho\bar{p})/\Gamma_{\text{total}}$ | | | | | $\Gamma_4\Gamma_3/\Gamma$ |
|--|------|------------------------|----------|--------------------------------------|---------------------------|
| VALUE (eV) | EVTS | DOCUMENT ID | TECN | COMMENT | |
| 12.0 ± 4.5 | 13 | ² ANDREOTTI | 05B E835 | $\bar{p}p \rightarrow \eta_c \gamma$ | |
| ² Assuming $\Gamma = 1$ MeV. | | | | | |

$h_c(1P)$ BRANCHING RATIOS

| $\Gamma(J/\psi(1S)\pi\pi)/\Gamma(J/\psi(1S)\pi^0)$ | | | | | Γ_2/Γ_1 |
|--|-----|-------------|----------|-------------------------------------|---------------------|
| VALUE | CL% | DOCUMENT ID | TECN | COMMENT | |
| <0.18 | 90 | ARMSTRONG | 92D E760 | $\bar{p}p \rightarrow J/\psi \pi^0$ | |

| $\Gamma(\eta_c \gamma)/\Gamma_{\text{total}}$ | | | | | Γ_4/Γ |
|---|--------------|---------------------|---------|--|-------------------|
| VALUE | EVTS | DOCUMENT ID | TECN | COMMENT | |
| seen | 168 ± 40 | ³ ROSNER | 05 CLEO | $\psi(2S) \rightarrow \pi^0 \eta_c \gamma$ | |
| ³ CLEO measures the product $B(\psi(2S) \rightarrow \pi^0 h_c) \times B(h_c \rightarrow \eta_c \gamma)$ to be $(4.0 \pm 0.8 \pm 0.7) \times 10^{-4}$. | | | | | |

$h_c(1P)$ REFERENCES

| | | | | |
|------------|-----|---------------|------------------------------|---------------------------|
| ANDREOTTI | 05B | PR D72 032001 | M. Andreotti <i>et al.</i> | (FNAL E835 Collab.) |
| ROSNER | 05 | PRL 95 102003 | J.L. Rosner <i>et al.</i> | (CLEO Collab.) |
| AULCHENKO | 03 | PL B573 63 | V.M. Aulchenko <i>et al.</i> | (KEDR Collab.) |
| ANTONIAZZI | 94 | PR D50 4258 | L. Antoniazzi <i>et al.</i> | (E705 Collab.) |
| ARMSTRONG | 93B | PR D47 772 | T.A. Armstrong <i>et al.</i> | (FNAL E760 Collab.) |
| ARMSTRONG | 92D | PRL 69 2337 | T.A. Armstrong <i>et al.</i> | (FNAL, FERR, GENO+) |
| BAGLIN | 86 | PL B171 135 | C. Baglin <i>et al.</i> | (LAPP, CERN, TORI, STRB+) |

————— **OTHER RELATED PAPERS** —————

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| AUBERT | 05R | PR D71 071103R | B. Aubert <i>et al.</i> | (BABAR Collab.) |
| RUBIN | 05 | PR D72 092004 | P. Rubin <i>et al.</i> | (CLEO Collab.) |
| EICHTEN | 02 | PRL 89 162002 | E.J. Eichten, K. Lane, C. Quigg | |
