$D_1(2420)^{\pm}$

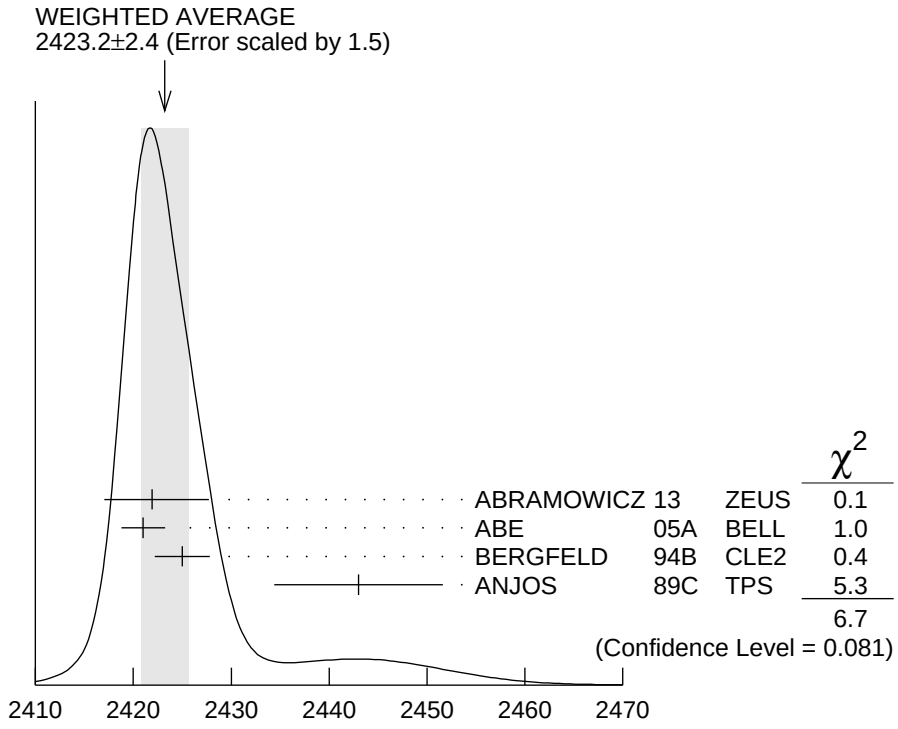
$I(J^P) = \frac{1}{2}(?^?)$
I needs confirmation.

OMITTED FROM SUMMARY TABLE
Seen in $D^*(2007)^0\pi^+$. $J^P = 0^+$ ruled out.

$D_1(2420)^{\pm}$ MASS

VALUE (MeV)	*EVTS*	*DOCUMENT ID*		*TECN*	*COMMENT*
2423.2±2.4 OUR AVERAGE		Error includes scale factor of 1.5. See the ideogram below.			
$2421.9 \pm 4.7^{+3.4}_{-1.2}$	759	[1] ABRAMOWICZ13		ZEUS	$e^{\pm}p \rightarrow D^{(*)0}\pi^+X$
2421 ±2 ±1	124	ABE	05A	BELL	$\overline{B}^0 \rightarrow D^+\pi^+\pi^-\pi^-$
2425 ±2 ±2	146	BERGFELD	94B	CLE2	$e^+e^- \rightarrow D^{*0}\pi^+X$
2443 ±7 ±5	190	ANJOS	89C	TPS	$\gamma N \rightarrow D^0\pi^+X^0$

[1] From the fit of the $M(D^0\pi^+)$ distribution. The widths of the D_1^+ and D_2^{*+} are fixed to 25 MeV and 37 MeV, and A_{D_1} and A_{D_2} are fixed to the theoretical predictions of 3 and -1, respectively.



$m_{D_1^*(2420)^{\pm}} - m_{D_1^*(2420)^0}$

VALUE (MeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
$\mathbf{4^{+2}_{-3}\pm3}$	BERGFELD	94B	CLE2	$e^+e^- \rightarrow$ hadrons

$D_1(2420)^{\pm}$ WIDTH

VALUE (MeV)	EVTS	DOCUMENT ID		TECN	COMMENT
25± 6 OUR AVERAGE					
$21\pm 5\pm 8$	124	ABE	05A	BELL	$\overline{B}^0 \to D^+\pi^+\pi^-\pi^-$
$26^{+\ 8}_{-\ 7}\pm 4$	146	BERGFELD	94B	CLE2	$e^+e^- \to D^{*0}\pi^+ X$
$41\pm 19\pm 8$	190	ANJOS	89C	TPS	$\gamma N \to D^0\pi^+ X^0$

$D_1(2420)^{\pm}$ DECAY MODES

$D_1^*(2420)^-$ modes are charge conjugates of modes below.

	Mode	Fraction (Γ_i/Γ)
Γ_1	$D^*(2007)^0\pi^+$	seen
Γ_2	$D^+\pi^+\pi^-$	seen
Γ_3	$D^+\rho^0$	
Γ_4	$D^+ f_0(500)$	
Γ_5	$D_0^*(2400)^0\pi^+$	
Γ_6	$D^0\pi^+$	not seen
Γ_7	$D^{*+}\pi^+\pi^-$	not seen

$D_1(2420)^{\pm}$ BRANCHING RATIOS

$\Gamma(D^*(2007)^0\pi^+)/\Gamma_{total}$ Γ_1/Γ

VALUE	DOCUMENT ID		TECN	COMMENT
seen	ANJOS	89C	TPS	$\gamma N \to D^0\pi^+ X^0$

$\Gamma(D^0\pi^+)/\Gamma(D^*(2007)^0\pi^+)$ Γ_6/Γ_1

VALUE	CL%	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.18	90	BERGFELD	94B	CLE2	$e^+e^- \to$ hadrons

$D_1(2420)^{\pm}$ POLARIZATION AMPLITUDE A_{D_1}

A polarization amplitude A_{D_1} is a parameter that depends on the initial polarization of the D_1 and is sensitive to a possible S-wave contribution to its decay. For D_1 decays the helicity angle, θ_h, distribution varies like $1 + A_{D_1}\cos^2\theta_h$, where θ_h is the angle in the D^* rest frame between the two pions emitted by the $D_1 \to D^*\pi$ and the $D^* \to D\pi$.

Unpolarized D_1 decaying purely via D-wave is predicted to give $A_{D_1} = 3$.

VALUE	DOCUMENT ID		TECN	COMMENT
• • • We do not use the following data for averages, fits, limits, etc. • • •				
$3.8\pm 0.6\pm 0.8$	[2] AUBERT	09Y	BABR	$B^0 \to D_1^-\ell^+\nu_\ell$

[2] Assuming $\Gamma(\Upsilon(4S) \to B^+B^-)$ / $\Gamma(\Upsilon(4S) \to B^0\overline{B}^0) = 1.065 \pm 0.026$ and equal partial widths and helicity angle distributions for charged and neutral D_1 mesons.

$D_1(2420)^{\pm}$ REFERENCES

ABRAMOWICZ	13	NP B866 229	H. Abramowicz *et al.*	(ZEUS Collab.)
AUBERT	09Y	PRL 103 051803	B. Aubert *et al.*	(BABAR Collab.)
ABE	05A	PRL 94 221805	K. Abe *et al.*	(BELLE Collab.)
BERGFELD	94B	PL B340 194	T. Bergfeld *et al.*	(CLEO Collab.)
ANJOS	89C	PRL 62 1717	J.C. Anjos *et al.*	(FNAL E691 Collab.)