C

$I(J^P) = 0(\frac{1}{2}^+)$

Charge $= \frac{2}{3}$ e Charm $= +1$

c-QUARK MASS

The c-quark mass is estimated from charmonium and D masses. It corresponds to the "running" mass m_c ($\mu = m_c$) in the $\overline{\text{MS}}$ scheme. We have converted masses in other schemes to the $\overline{\text{MS}}$ scheme using one-loop QCD pertubation theory with $\alpha_s(\mu{=}m_c) = 0.39$. The range 1.0–1.6 GeV for the $\overline{\text{MS}}$ mass corresponds to 1.2–1.9 GeV for the pole mass (see the "Note on Quark Masses").

VALUE (GeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1.15 to 1.35 OUR EVALUATION				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.3 ± 0.3 ± 0.3	[1] ASTIER	00D	NOMD	
1.79 $\pm$ 0.38	[2] VILAIN	99	THEO	$\overline{\text{MS}}$ scheme
1.22 $\pm$ 0.06	[3] DOMINGUEZ	94	THEO	$\overline{\text{MS}}$ scheme
$\geq$ 1.23	[4] LIGETI	94	THEO	$\overline{\text{MS}}$ scheme
$\geq$ 1.25	[5] LUKE	94	THEO	$\overline{\text{MS}}$ scheme
1.23 $\pm$ 0.04	[6] NARISON	94	THEO	$\overline{\text{MS}}$ scheme
1.31 $\pm$ 0.03	[7] TITARD	94	THEO	$\overline{\text{MS}}$ scheme
$1.5\ ^{+0.2}_{-0.1}\ \pm 0.2$	[8] ALVAREZ	93	THEO	
1.27 $\pm$ 0.02	[9] NARISON	89	THEO	
1.25 $\pm$ 0.05	[10] NARISON	87	THEO	
1.27 $\pm$ 0.05	[11] GASSER	82	THEO	

[1] Study of opposite sign dimuon events.
[2] VILAIN 99 obtain the charm quark mass from an analysis of charm production in neutrino scattering.
[3] DOMINGUEZ 94 uses QCD sum rules for $J/\psi(1S)$ system and finds a pole mass of 1.46 $\pm$ 0.07 GeV.
[4] LIGETI 94 computes lower bound of 1.43 GeV on pole mass using HQET, and experimental data on inclusive B and D decays.
[5] LUKE 94 computes lower bound of 1.46 GeV on pole mass using HQET, and experimental data on inclusive B and D decays.
[6] NARISON 94 uses spectral sum rules to two loops, and $J/\psi(1S)$ and Υ systems.
[7] TITARD 94 uses one-loop computation of the quark potential with nonperturbative gluon condensate effects to fit $J/\psi(1S)$ and Υ states.
[8] ALVAREZ 93 method is to fit the measured x_F and p_T^2 charm photoproduction distributions to the theoretical predictions of ELLIS 89C.
[9] NARISON 89 determines the Georgi-Politzer mass at $p^2{=}{-}m^2$ to be 1.26 $\pm$ 0.02 GeV using QCD sum rules.
[10] NARISON 87 computes pole mass of 1.46 $\pm$ 0.05 GeV using QCD sum rules, with $\Lambda(\overline{\text{MS}})$ = 180 $\pm$ 80 MeV.
[11] GASSER 82 uses SVZ sum rules. The renormalization point is μ = quark mass.

c-QUARK REFERENCES

ASTIER	00D	PL B486 35	P. Astier *et al.*	(CERN NOMAD Collab.)
VILAIN	99	EPJ C11 19	P. Vilain *et al.*	(CHARM II Collab.)
DOMINGUEZ	94	PL B333 184	C.A. Dominguez, G.R. Gluckman, N. Paver	(CAPE+)
LIGETI	94	PR D49 R4331	Z. Ligeti, Y. Nir	(REHO)
LUKE	94	PL B321 88	M. Luke, M.L. Savage	(TNTO, UCSD, CMU)
NARISON	94	PL B341 73	S. Narison	(CERN, MONP)
TITARD	94	PR D49 6007	S. Titard, F.J. Yndurain	(MICH, MADU)
ALVAREZ	93	ZPHY C60 53	M.P. Alvarez *et al.*	(CERN NA14/2 Collab.)
ELLIS	89C	NP B312 551	R.K. Ellis, P. Nason	(FNAL, ETH)
NARISON	89	PL B216 191	S. Narison	(ICTP)
NARISON	87	PL B197 405	S. Narison	(CERN)
GASSER	82	PRPL 87 77	J. Gasser, H. Leutwyler	(BERN)