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

VALUE (GeV)	*DOCUMENT ID*		*TECN*	*COMMENT*
1.1 to 1.4 OUR EVALUATION				
• • • We do not use the following data for averages, fits, limits, etc. • • •				
1.22 ± 0.06	[1] DOMINGUEZ	94	THEO	$\overline{\mathrm{MS}}$ scheme
≥ 1.23	[2] LIGETI	94	THEO	$\overline{\mathrm{MS}}$ scheme
≥ 1.25	[3] LUKE	94	THEO	$\overline{\mathrm{MS}}$ scheme
1.23 ± 0.04	[4] NARISON	94	THEO	$\overline{\mathrm{MS}}$ scheme
1.31 ± 0.03	[5] TITARD	94	THEO	$\overline{\mathrm{MS}}$ scheme
$1.5\ ^{+0.2}_{-0.1}\pm0.2$	[6] ALVAREZ	93	THEO	
1.27 ± 0.02	[7] NARISON	89	THEO	
1.25 ± 0.05	[8] NARISON	87	THEO	
1.27 ± 0.05	[9] GASSER	82	THEO	

[1] DOMINGUEZ 94 uses QCD sum rules for $J/\psi(1S)$ system and finds a pole mass of 1.46 ± 0.07 GeV.

[2] LIGETI 94 computes lower bound of 1.43 GeV on pole mass using HQET, and experimental data on inclusive B and D decays.

[3] LUKE 94 computes lower bound of 1.46 GeV on pole mass using HQET, and experimental data on inclusive B and D decays.

[4] NARISON 94 uses spectral sum rules to two loops, and $J/\psi(1S)$ and Υ systems.

[5] TITARD 94 uses one-loop computation of the quark potential with nonperturbative gluon condensate effects to fit $J/\psi(1S)$ and Υ states.

[6] ALVAREZ 93 method is to fit the measured x_F and p_T^2 charm photoproduction distributions to the theoretical predictions of ELLIS 89C.

[7] NARISON 89 determines the Georgi-Politzer mass at $p^2{=}-m^2$ to be 1.26 ± 0.02 GeV using QCD sum rules.

[8] NARISON 87 computes pole mass of 1.46 ± 0.05 GeV using QCD sum rules, with $\Lambda(\overline{\mathrm{MS}}) = 180 \pm 80$ MeV.

[9] GASSER 82 uses SVZ sum rules. The renormalization point is μ = quark mass.

c-QUARK REFERENCES

DOMINGUEZ	94	PL B333 184	+Gluckman, Paver	(CAPE, TRST, INFN)
LIGETI	94	PR D49 R4331	+Nir	(REHO)
LUKE	94	PL B321 88	+Savage	(TNTO, UCSD, CMU)
NARISON	94	PL B341 73		(CERN, MONP)
TITARD	94	PR D49 6007	+Yndurain	(MICH, MADU)
ALVAREZ	93	ZPHY C60 53	+Barate, Bloch, Bonamy+	(CERN NA14/2 Collab.)
ELLIS	89C	NP B312 551	+Nason	(FNAL, ETH)
NARISON	89	PL B216 191		(ICTP)
NARISON	87	PL B197 405		(CERN)
GASSER	82	PRPL 87 77	+Leutwyler	(BERN)