



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

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

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 perturbation 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
1.1 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	$\overline{\text{MS}}$ scheme
≥ 1.23	² LIGETI 94	THEO	$\overline{\text{MS}}$ scheme
≥ 1.25	³ LUKE 94	THEO	$\overline{\text{MS}}$ scheme
1.23±0.04	⁴ NARISON 94	THEO	$\overline{\text{MS}}$ scheme
1.31±0.03	⁵ TITARD 94	THEO	$\overline{\text{MS}}$ scheme
1.5 $\begin{smallmatrix} +0.2 \\ -0.1 \end{smallmatrix}$ ±0.2	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 $\Lambda(\overline{\text{MS}}) = 180 \pm 80$ MeV.

⁹ GASSER 82 uses SVZ sum rules. The renormalization point is $\mu =$ 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)