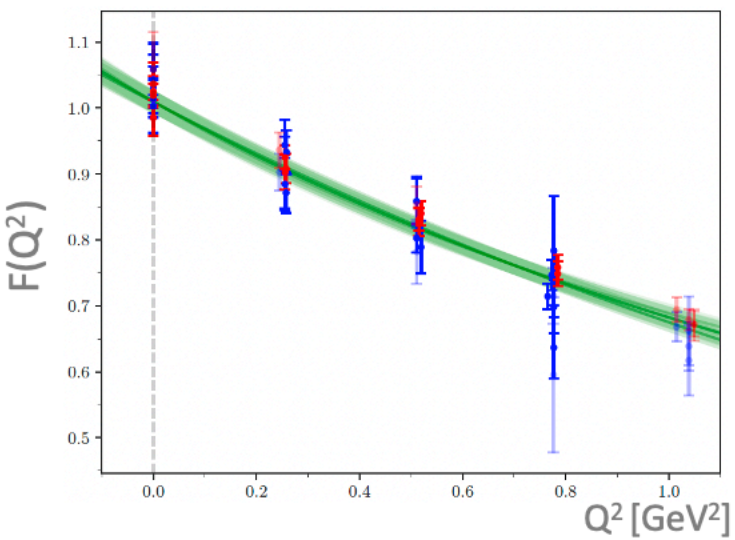
$\bar{c}c$

charge distribution

$$\langle \chi_{c0} | J^{\mu}_{em}(Q) | \chi_{c0} \rangle$$



$$\rho_{el}(\vec{r}) = F.T.\ F(\vec{Q})$$

$$\langle r^2 \rangle = -6 \frac{dF}{dQ^2}_{Q^2=0}$$

$$\langle r^2_{\eta_c} \rangle^{\frac{1}{2}} < \langle r^2_{\chi_{c0}} \rangle^{\frac{1}{2}} < \langle r^2_{\eta'_c} \rangle^{\frac{1}{2}}$$

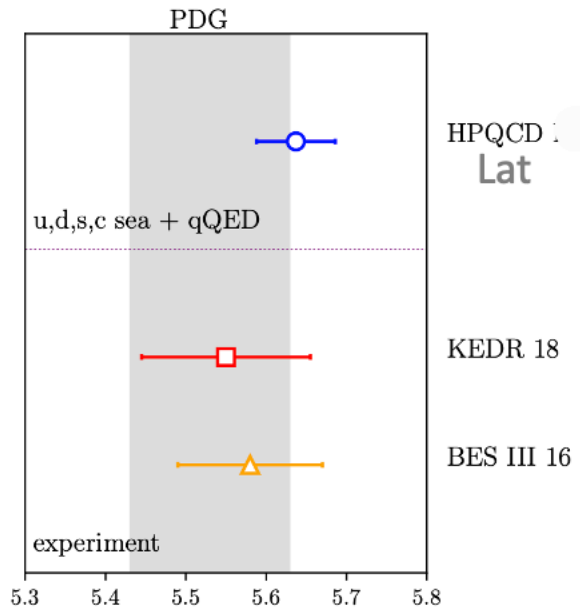
in agreement with expectation from quark model

Delaney et al, HadSpec: 2301.08213

$\bar{c}c$

info on wave function at the origin

$$\langle 0 | \bar{c} \gamma^{\mu} c | J/\psi \rangle$$



+ many other properties of cc and bb

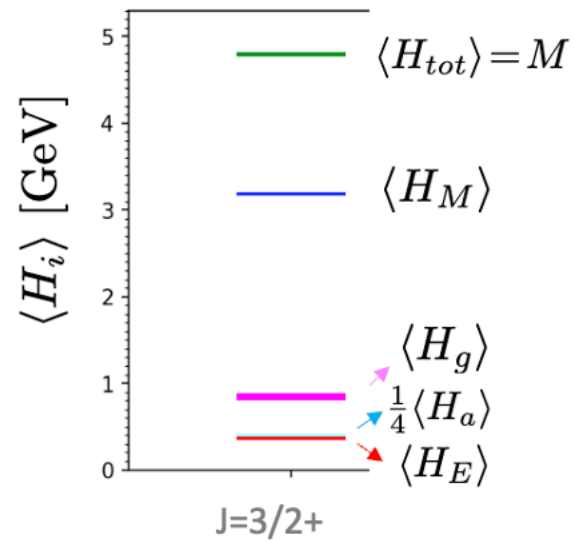
HPQCD: 2204.02137, 2005.01845, 2101.08103

QCD+QED

ccc

mass decomposition

$$\langle \text{baryon} | H_i | \text{baryon} \rangle$$



$$H_{\rm QCD} = H_E^{(\mu)} + H_M + H_g^{(\mu)} + \frac{1}{4} H_a$$

$$H_E^{(\mu)} = \sum_f \int d^3x \bar{\psi}^{(f)} i(\vec{D} \cdot \vec{\gamma}) \psi^{(f)},$$

$$H_M = \sum_f \int d^3x \bar{\psi}^{(f)} m_f \psi^{(f)},$$

$$H_g^{(\mu)} = \int d^3x \frac{1}{2}(E^2 + B^2),$$

Yin-Bo Li et al, 2211.04713