

Connected light quark window - crosschecks

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ON BEHALF OF FERMILAB LATTICE, HPQCD & MILC COLLABORATIONS

Intermediate Window

Lattice data from arXiv:1902.04223
Errors quoted are statistical

Correction from $\gamma - \rho - \pi \pi$ model

$$\Pi(Q^2) = -\Sigma(Q^2) + \frac{Q^2 (1/g_\rho + g_{\rho\pi\pi}\Sigma(Q^2))^2}{Q^2 (1 + g_{\rho\pi\pi}^2 \Sigma(Q^2)) + m_{0\rho}^2}$$

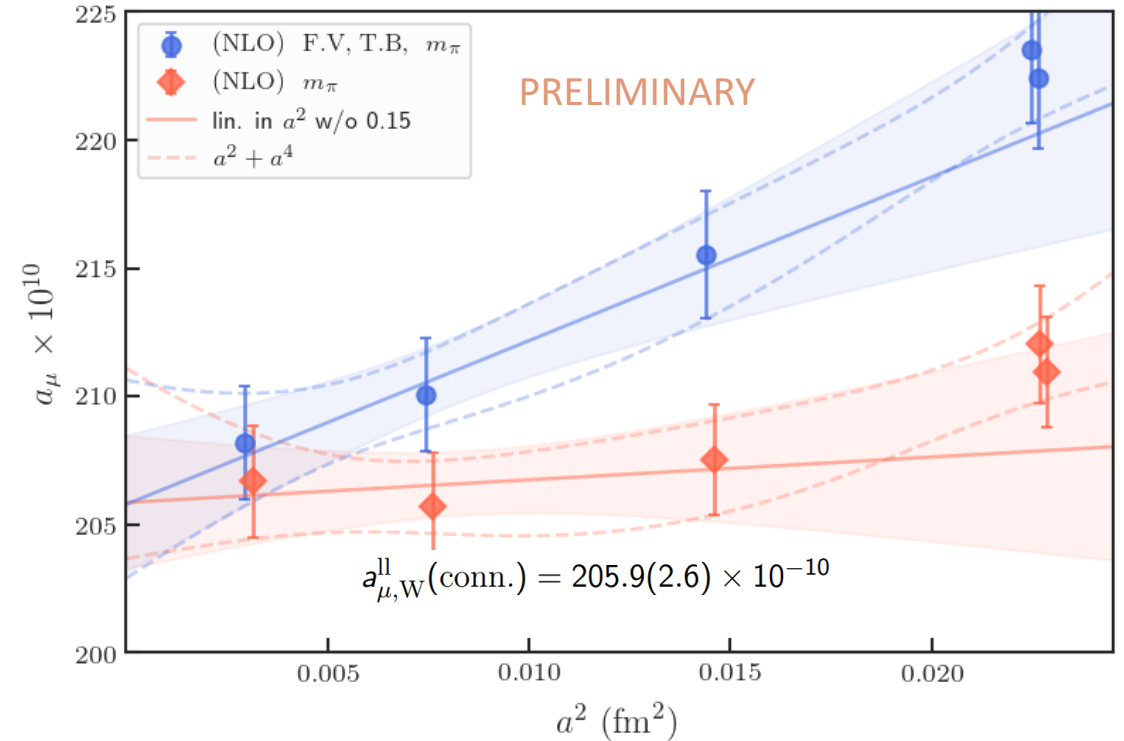
→ $C(t) = \frac{1}{3} \int_{-\infty}^{\infty} \frac{d^3\mathbf{k} \mathbf{k}^2}{(2\pi)^3 E_a E_b} e^{-(E_a+E_b)t} = \text{NLO ChPT}$

$$+ \frac{2}{3} \frac{g_{\rho\pi\pi}}{g_\rho m_{0\rho}^2} \int_{-\infty}^{\infty} \frac{d^3\mathbf{k} \mathbf{k}^2}{(2\pi)^3 E_a E_b} (E_a + E_b)^2 e^{-(E_a+E_b)t}$$

$$+ \frac{2}{9} \frac{g_{\rho\pi\pi}^2}{m_{0\rho}^2} \int \int \frac{d^3\mathbf{k} d^3\mathbf{p}}{(2\pi)^6 E_a E_b E_c E_d} \frac{\mathbf{k}^2 \mathbf{p}^2}{(E_a + E_b)(E_c + E_d)}$$

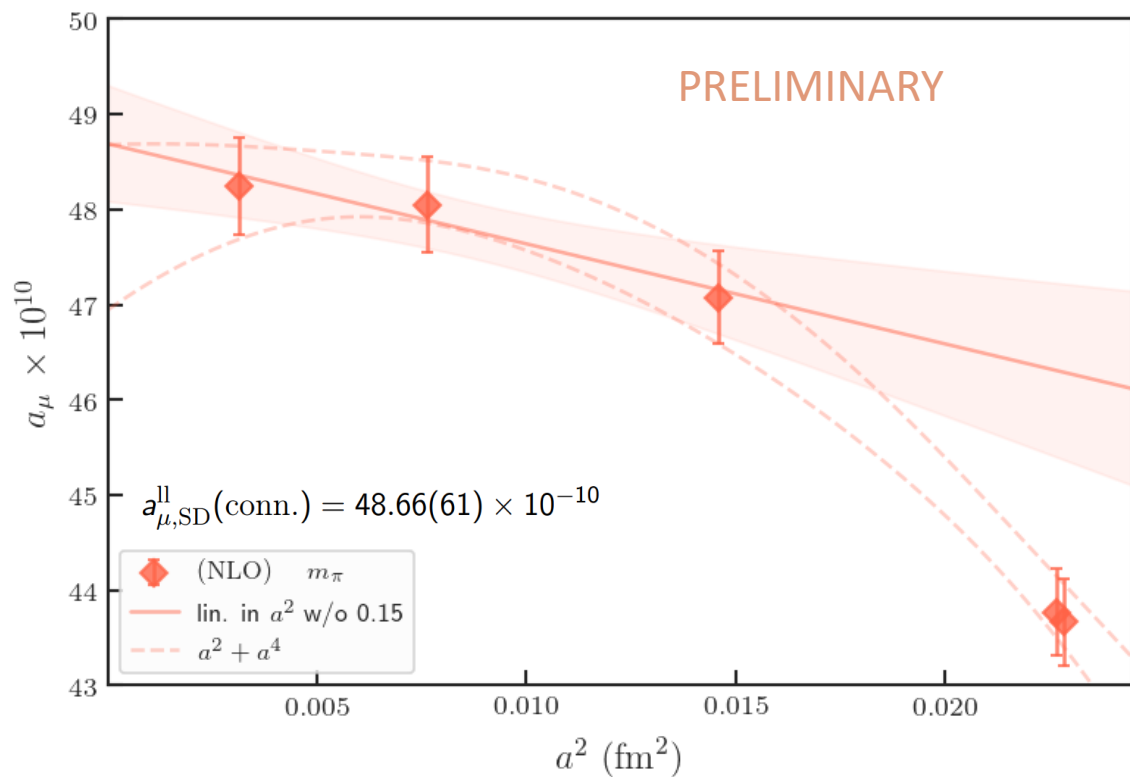
$$\times \left[\frac{(E_c + E_d)^3 e^{-(E_c+E_d)t} - (E_a + E_b)^3 e^{-(E_a+E_b)t}}{(E_a + E_b)^2 - (E_c + E_d)^2} \right] \sim \text{NNLO ChPT}$$

W Window: [0.4, 1]fm

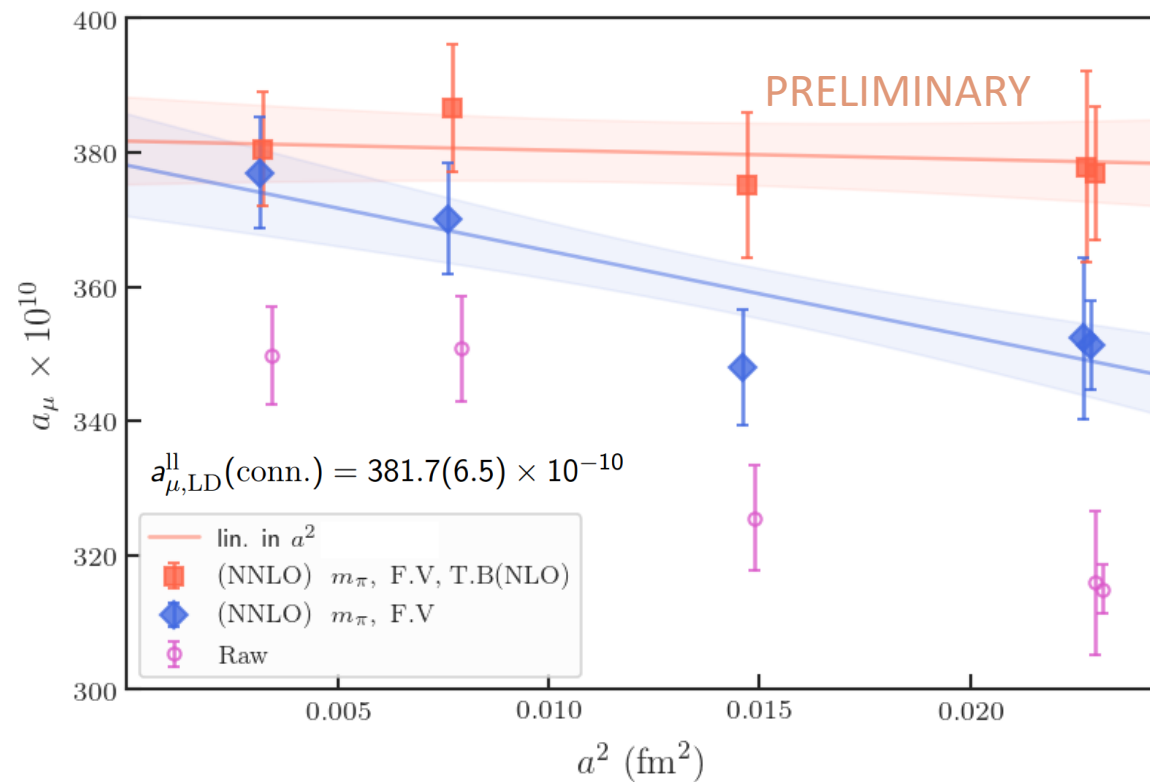


SD & LD Window

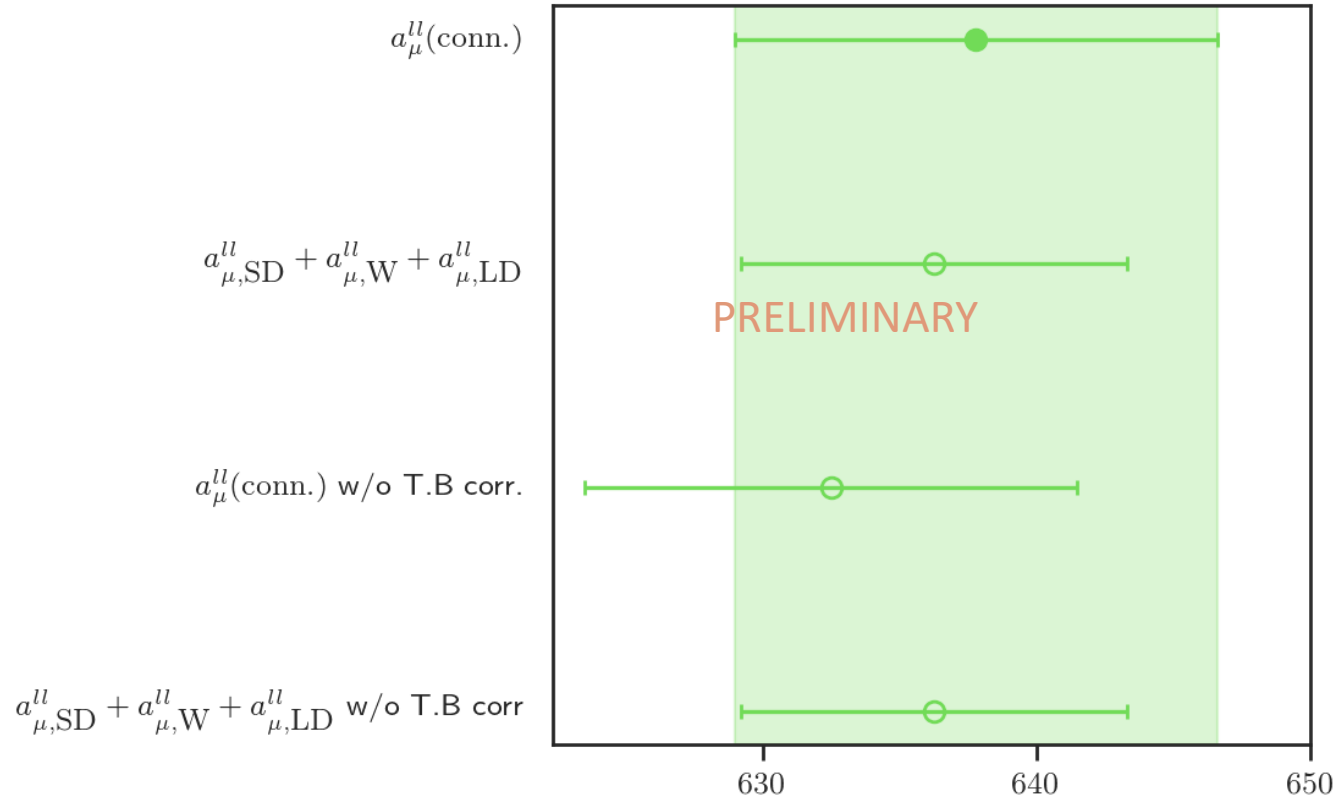
SD Window: $[-\infty, 0.4]\text{fm}$



LD Window: $[1, \infty]\text{fm}$



Crosscheck: $a_{\mu}^{ll}(\text{conn.}) = a_{\mu,SD}^{ll} + a_{\mu,W}^{ll} + a_{\mu,SD}^{ll}$



arXiv:1902.04223

- Generation and analysis of new data ongoing.
- Systematic error analysis in progress.