Let us use the proposed procedure by Peter

$$g_T^a(x, k_T^2) = g_T^a(x) \frac{1}{\pi \langle k_\perp^2 \rangle_{g_1}} e^{-k_T^2/\langle k_T^2 \rangle_{g_1}}$$

where $g_T^a(x) \overset{WW}{=} \int_x^1 \frac{dy}{y} g_1^a(y)$

now we have:

$$F_{LT}^{\cos\phi_h} = -\frac{2M}{Q} x^2 \sum_q e_q^2 g_T^q(x) D_1^q(z) \mathcal{G}(P_{hT})$$

$$\int d^2P_{h\perp} F_{LT}^{\cos\phi_h} = -\frac{2M}{Q} x^2 \sum_q e_q^2 g_T^q(x) D_1^q(z)$$

consistent with 7.2 a and 7.2 b

Now we revisit

$$x\, g_T^q(x, k_T^2) = g_{1T}^{\perp(1)q}(x, k_T^2) \qquad 3.3e$$

$$x\, g_T^q(x, k_T^2) = \frac{k_T^2}{2M^2} g_{1T}^{\perp q}(x, k_T^2)$$

$$\Rightarrow \underbrace{g_{1T}^{\perp q}(x, k_T^2) = \frac{2M^2 x}{k_T^2} g_T^q(x) \frac{1}{\pi \langle k_\perp^2 \rangle_{g_1}} e^{-k_T^2/\langle k_T^2 \rangle_{g_1}}}_{\text{this has to be if we choose the above parametrization of } g_T^q(x, k_T^2)} = \frac{2M^2}{k_T^2} g_{1T}^{\perp(1)}(x) \frac{1}{\pi \langle k_T^2 \rangle_{g_1}} e^{-k_\perp^2/\langle k_\perp^2 \rangle_{g_1}}$$

q

this will be our formula 6.1

So that we have $F_{LT}^{\cos(\phi_h - \phi_s)} = \mathcal{C}\left[\omega_B^{\{1\}} g_{1T}^{\perp} D_1 \right]$

$$F_{LT}^{\cos(\phi_h - \phi_s)} = x \sum_q e_q^2 g_{1T}^{\perp(1)}(x) D_1(z) \frac{2M e^{-P_{hT}^2/\langle P_\perp^2 \rangle}}{\pi z (\langle k_\perp^2 \rangle_{g_1})^2} \frac{\left(e^{\frac{P_{hT}^2 z^2 \langle k_\perp^2 \rangle_{g_1}}{\langle P_\perp^2 \rangle^2 + \langle k_\perp^2 \rangle_{g_1} \langle P_\perp^2 \rangle z^2}} - 1 \right)}{P_{hT}}$$

↑

this will be the formula

6.2a