Relating the amplitudes of Ghent and JM models.

1, According to Ghent model:

$$\frac{d\sigma_T}{d\Omega_K^*} = \chi \frac{1}{(4\pi)^2}\left(H_{11} + H_{-1,-1}\right) \quad (1)$$

$$H_{11} = \sum_{\lambda_N \lambda_K} M_1^{\lambda_N \lambda_K} \left(M_1^{\lambda_N \lambda_K}\right)^* =$$

$$= \sum_{\lambda_N \lambda_K} \langle \lambda_K | T | 1 \lambda_N \rangle^* \langle \lambda_K | T | 1 \lambda_N \rangle$$

$$(2)$$

$$H_{-1-1} = \sum_{\lambda_N \lambda_K} M_{-1}^{\lambda_N \lambda_K} \left(M_{-1}^{\lambda_N \lambda_K}\right)^* =$$

$$= \sum_{\lambda_N \lambda_K} \langle \lambda_K | T | -1 \lambda_N \rangle^* \langle \lambda_K | T | -1 \lambda_N \rangle$$

$$M_1^{\lambda_N \lambda_K} = \langle \lambda_K | T | 1 \lambda_N \rangle = M_+$$

$$M_{-1}^{\lambda_N \lambda_K} = \langle \lambda_K | T | -1 \lambda_N \rangle = M_-$$

$$\chi = \frac{1}{K_1 \ldots M_N} \frac{|P_K^*|}{\ldots} \qquad K_1 = \frac{W^2 - M_N^2}{\ldots} = \omega_{lab} - \frac{Q^2}{2M_N}$$

2. Differential cross sections for the transverse photons in the Ghent model:

$$d\sigma_T = \frac{1}{(4\pi)^2\, 16 m_N K_L} \left\{ \sum_{\lambda_N \lambda_\gamma} |M_+|^2 + |M_-|^2 \right\} \frac{|P_K^*|}{W} \, d\Omega_K \qquad (3)$$

3. Differential cross sections for the transverse photon in the JM model

$$d\sigma_T = \frac{(4\pi\alpha)}{4 K_L M_N} \left\{ \sum_{\lambda_N \lambda_\gamma} \frac{|M_+|^2 + |M_-|^2}{2} \right\} \frac{|P_K^*|}{4\pi^2 4W} d\Omega_K \quad (4)$$

$$= \frac{(4\pi\alpha)}{64 K_L M_N \pi^2} \left\{ \sum_{\lambda_N \lambda_\gamma} \frac{|M_+|^2 + |M_-|^2}{2} \right\} \frac{|P_K^*|}{W} d\Omega_K$$

4. $d\sigma_T$ should be the same for Ghent and JM convention

$$d\sigma_T = \frac{1}{(4\pi)^2\, 16 m_N K_L} \left\{ \sum_{\lambda_N \lambda_\gamma} |M_+|^2_{Ghent} + |M_-|^2_{Ghent} \right\} \frac{|P_K^*|}{W}$$

$$= \frac{(4\pi\alpha)}{64 K_L M_N \pi^2} \frac{P^2_{Ghent \to JM}}{2} \left\{ \sum_{\lambda_N \lambda_\gamma} |M_+|^2_{Ghent} + |M_-|^2_{Ghent} \right\} \frac{|P_K^*|}{W} \quad (5)$$

$$\frac{(4\pi\alpha)}{64\,\cancel{K_L M_N}\,\cancel{\pi^2}}\;\frac{P^2_{Ghent\to JM}}{2} = \frac{1}{(\cancel{4\pi})^2\,16\,\cancel{M_N K_L}}$$

$$\frac{(4\pi\alpha)}{\cancel{128}}\;P^2_{Ghent\to JM} = \frac{1}{\cancel{256}\;2}$$

$$P^2_{Ghent\to JM} = \frac{1}{2(4\pi\alpha)}$$

$$P_{Ghent\to JM} = \frac{1}{\sqrt{2(4\pi\alpha)}} \qquad (6)$$

5. In order to ~~use~~ add up the N^* amplitude from JM model to the non-resonant amplitudes from Ghent model, the Ghent model amplitude should be replaced by

$$M_{Ghent}\,P_{Ghent\to JM} = \frac{M_{Ghent}}{\sqrt{2(4\pi\alpha)}} \qquad (7)$$

The cross sections from sum of (7) and resonant contribution should be obtained in the JM convention Eq (4).

6. The check for the prescription (7).

The ~~Sfert~~ amplitudes incorporated to the Eq (4) (JM conventions) according to Eq (7) should give us 6 kent convention or Eq. (3)

$$d\sigma_{+} = \frac{\cancel{(4\pi\alpha)}}{128 K_L M_N \pi^2} \left\{ \sum_{\lambda_N \lambda_\gamma} |M_+|^2 + |M_-|^2 \right\} \frac{1}{2\cancel{(4\pi\alpha)}} \cdot \frac{|P_K^*|}{W} d\Omega_K =$$

$$= \frac{1}{16 K_L M_N (4\pi)^2} \left\{ \sum_{\lambda_N \lambda_\gamma} |M_+|^2 + |M_-|^2 \right\} \frac{|P_K^*|}{W} d\Omega_K$$

We get the Eq. (3) The test is OK