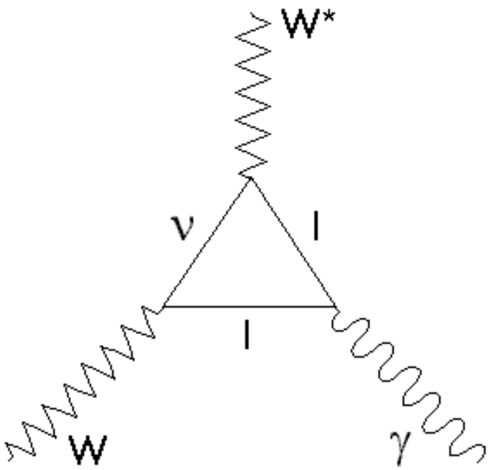
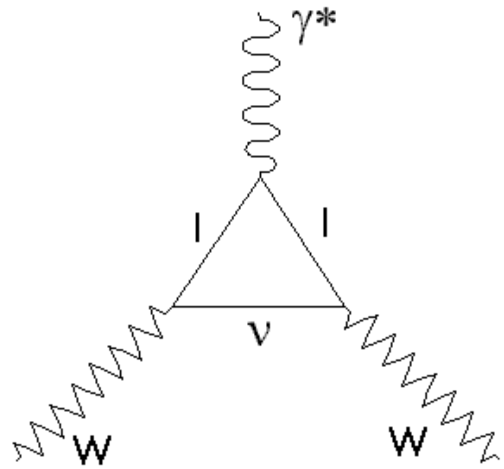
Vector Anomaly in Fermion Triangle Loop



“Sidewise” channel



“Direct” channel

$$(\Delta\kappa)_{\text{"Sidewise"}} = (\Delta\kappa)_{\text{"Direct"}} + \frac{G_F M_W^2}{6\sqrt{2}\pi^2}$$

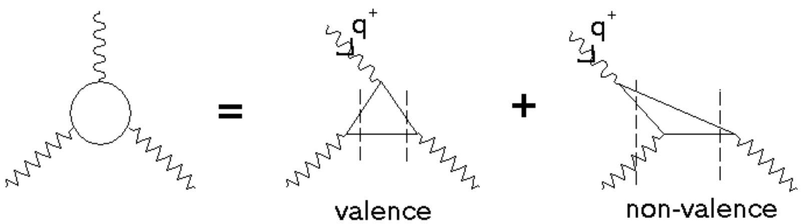
$$(\Delta Q)_{\text{"Sidewise"}} = (\Delta Q)_{\text{"Direct"}}$$

L.DeRaad, K.Milton and W.Tsai, PRD9, 2847(1974); PRD12, 3972(1975)

LFD Results

$$G^{+}_{h'h} = \langle h', p' | J^{+} | h, p \rangle \quad in \quad q^{+} = 0 \quad frame \quad with \quad \eta = Q^2 / 4M_W^2 \quad (Q^2 = -q^2),$$

$$G^{+}_{++} = 2p^{+}(F_1 + \eta F_3), G^{+}_{+0} = p^{+}\sqrt{2\eta}(2F_1 + F_2 + 2\eta F_3), G^{+}_{+-} = -2p^{+}\eta F_3, G^{+}_{00} = 2p^{+}(F_1 - 2\eta F_2 - 2\eta^2 F_3)$$



$$\left(G^{+}_{00}\right)_{Z.M.} = \frac{g^2 Q_f p^{+}}{2\pi^3 M_W^2} \int_0^1 dx \int d^2 k_\perp \frac{k_\perp^2 + m_1^2 - x(1-x)Q^2}{k_\perp^2 + m_1^2 + x(1-x)Q^2} \neq 0$$

$$\left(F_2 + 2F_1\right)^{+0} = \frac{1}{p^{+}}\left[\frac{G^{+}_{+0}}{\sqrt{2\eta}} + G^{+}_{+-}\right], \quad \left(F_2 + 2F_1\right)^{00} = \frac{1}{4p^{+}\eta}\left[(1+2\eta)G^{+}_{++} - G^{+}_{00} + (1+4\eta)G^{+}_{+-}\right]$$

$$(F_2 + 2F_1)^{+0}_{DR2} = (F_2 + 2F_1)_{DR4} + \frac{g^2 Q_f}{4\pi^2}\left(\frac{1}{6}\right)$$

$$(F_2 + 2F_1)^{00}_{DR2} = (F_2 + 2F_1)_{DR4} - \frac{g^2 Q_f}{4\pi^2}\left(\frac{1}{2\eta}\right)\left(\frac{1}{3} + \frac{2\eta}{9}\right)$$

B.Bakker and C.Ji, PRD71,053005(2005)