$^3D_1$

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September 7, 2017

$$\left\langle 0\middle|\bar{c}\gamma^\mu c\middle|{}^3D_1\right\rangle = \int \mathrm{d}\Omega \sum_{\lambda_1\lambda_2 S_z m} \mathrm{tr}\{\Pi_1\gamma^\mu\} \left\langle 1J_z\middle|2m;1S_z\right\rangle Y_{2m}(\theta,\phi)$$

$$\mathrm{tr}\{\Pi_1\gamma^\mu\} = \frac{\sqrt{2}p^\mu(p\cdot\epsilon)}{E(E+m)} + \epsilon^\mu$$

$$\begin{pmatrix} \left\langle 0\middle|\bar{c}\gamma^\mu c\middle|{}^3D_1\right\rangle^{(-)} \\ \left\langle 0\middle|\bar{c}\gamma^\mu c\middle|{}^3D_1\right\rangle^{(0)} \\ \left\langle 0\middle|\bar{c}\gamma^\mu c\middle|{}^3D_1\right\rangle^{(+)} \end{pmatrix} = \begin{pmatrix} 0 & -\frac{2\sqrt{\pi}(E^2-m^2)}{15E(m+E)} & \frac{2i\sqrt{\pi}(E^2-m^2)}{15E(m+E)} & 0 \\ 0 & 0 & \frac{2i\sqrt{2\pi}(E^2-m^2)}{5E(m+E)} & \frac{8\sqrt{\pi}(E^2-m^2)}{15E(m+E)} \\ 0 & -\frac{2\sqrt{\pi}(E^2-m^2)}{15E(m+E)} & -\frac{2i\sqrt{\pi}(E^2-m^2)}{15E(m+E)} & 0 \end{pmatrix}$$

$$\left\langle 0\middle|\bar{c}\gamma^\mu c\middle|{}^3D_1\right\rangle^{(0)} = \int \mathrm{d}\Omega - \frac{e^{-i\phi}\overline{p}^\mu\left(\overline{p}\cdot\overline{\epsilon 1}\right)\left(6e^{i\phi}\cos^2(\theta) + 3\sqrt{2}\left(-1+e^{2i\phi}\right)\sin(\theta)\cos(\theta) - 2e^{i\phi}\right)}{4\sqrt{\pi}E(E+m)}$$