the spin and tensor termsare zero.

The Coulomb term (eq. COU-2)

$$D_C = 4\pi e^2 \int dr_1 r_1^2 \, h_{n_1,l_1}(r_1)\, h_{n_1',l_1}(r_1) \left[\frac{1}{r_1} \int_0^{r_1} dr_2 r_2^2 \rho_p(r_2) + \int_{r_1}^{\infty} dr_2 r_2 \rho_p(r_2) \right]$$

$$= e^2 \sum_{\substack{n_2 l_2 j_2 \\ n_2' l_2 j_2}} (2j_2+1)\, a^{t_2}_{n_2,l_2,j_2}\, a^{t_2}_{n_2',l_2,j_2}$$

$$\int dr_1 r_1^2 \, h_{n_1,l_1}(r_1)\, h_{n_1',l_1}(r_1) \left[\frac{1}{r_1} \int_0^{r_1} dr_2 r_2^2 \, h_{n_2,l_2}(r_2)\, h_{n_2',l_2}(r_2) + \int_{r_1}^{\infty} dr_2 r_2 \, h_{n_2,l_2}(r_2)\, h_{n_2',l_2}(r_2) \right] \quad (11)$$

t_p - only protons

Exchange

Scalar Term (eq. HEX-2)

$$E_1 = \sqrt{\frac{2}{\pi}} \sum_{\substack{n_2 l_2 j_2 t_2 \\ n_1^2}} a^{t_2}_{n_2,l_2,j_2}\, a^{t_2}_{n_2',l_2,j_2} \sum_L (2j_2+1)(2L+1) \begin{pmatrix} j_2 & L & j_1 \\ \frac{1}{2} & 0 & -\frac{1}{2} \end{pmatrix}^2 \xi(l_1+l_2+L)$$

$$\delta_{t_2 t_1} \int dr_1 r_1^2 \, h_{n_1,l_1}(r_1) \, h_{n_2,l_2}(r_2) \int dr_2 r_2^2 \, h_{n_1',l_1}(r_1)\, h_{n_2',l_2}(r_2) \int dq q^2 j_L(qr_1)\, j_L(qr_2)\, V_1(q) \quad (12)$$

Spin term (eq. HEX-3)

$$E_2 = \frac{12}{\sqrt{2\pi}} \sum_{n_2 l_2 j_2 t_2} a^{t_2}_{n_2,l_2,j_2}\, a^{t_2}_{n_2',l_2,j_2} \sum_{L\bar{J}} \left[\hat{l}_1 \hat{l}_2 \hat{L} \hat{j}_2 \hat{\bar{J}} \begin{Bmatrix} l_2 & \frac{1}{2} & j_2 \\ l_1 & \frac{1}{2} & j_1 \\ L & 1 & \bar{J} \end{Bmatrix} \begin{pmatrix} l_2 & l_1 & L \\ 0 & 0 & 0 \end{pmatrix} \right]^2$$

$$\int dr_1 r_1^2 \, h_{n_1,l_1}(r_1)\, h_{n_2,l_2}(r_1) \int dr_2 r_2^2 \, h_{n_1',l_1}(r_1)\, h_{n_2',l_2}(r_2) \int dq q^2 j_L(qr_1)\, j_L(qr_2)\, V_2(q) \quad (13)$$