$$\chi_{m_s}^{1/2}(\sigma_p)\phi_d(\mathbf{r}_{p1},\sigma_1)\psi_A(\xi_A)\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}_{A2},\sigma_2)$$

$$G(\mathbf{r}_{dF},\mathbf{r}'_{dF})=i\sum_l\sqrt{2l+1}\frac{f_l(k_{dF},r_<)g_l(k_{dF},r_>)}{k_{dF}r_{dF}r'_{dF}}\left[Y^l(\hat{r}_{dF})Y^l(\hat{r}'_{dF})\right]_0^0$$

$$T_{succ}^{(2)}=2\sum_{l_i,j_i}\sum_{l_f,j_f,m_f}\sum_{\substack{\sigma_1\sigma_2\\\sigma'_1\sigma'_2}}\int d\xi_A d\mathbf{r}_{dF}d\mathbf{r}_{p1}d\mathbf{r}_{A2}\chi_{pB}^{(-)*}(\mathbf{r}_{pB})\chi_B^*(\xi_B)v(\mathbf{r}_{p1})\phi_d(\mathbf{r}_{p1})\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}_{A2},\sigma_2)$$

$$\times\chi_{m_s}^{1/2}(\sigma_p)\Psi_A(\xi_A)\frac{2\mu_{dF}}{\hbar^2}\int d\xi'_A d\mathbf{r}'_{dF}d\mathbf{r}'_{p1}d\mathbf{r}'_{A2}G(\mathbf{r}_{dF},\mathbf{r}'_{dF})$$

$$\times\chi_{tA}^{(+)}(\mathbf{r}_{tA})\psi_A^*(\xi'_A)v(\mathbf{r}'_{p2})\phi_d(\mathbf{r}'_{p1})\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}'_{A2},\sigma'_2)$$

$$=2\sum_{l_i,j_i}\sum_{l_f,j_f,m_f}\sum_{\substack{\sigma_1\sigma_2\\\sigma'_1\sigma'_2}}\int d\mathbf{r}_{dF}d\mathbf{r}_{p1}d\mathbf{r}_{A2}\chi_{pB}^{(-)*}(\mathbf{r}_{pB})v(\mathbf{r}_{p1})\phi_d(\mathbf{r}_{p1})\left|\varphi_{l_f,j_f,m_f}^{A+2}(\mathbf{r}_{A1},\sigma_1,\mathbf{r}_{A2},\sigma_2)\right]_0^0$$

$$\times\frac{2\mu_{dF}}{\hbar^2}\int d\mathbf{r}'_{dF}d\mathbf{r}'_{p1}d\mathbf{r}'_{A2}G(\mathbf{r}_{dF},\mathbf{r}'_{dF})\chi_{tA}^{(+)}(\mathbf{r}'_{tA})v(\mathbf{r}'_{p2})\phi_d(\mathbf{r}'_{p1},\sigma'_1)\phi_d(\mathbf{r}'_{p2},\sigma'_2)\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}'_{A2},\sigma'_2)$$

$$T_{NO}^{(1)}=2\sum_{l_i,j_i}\sum_{l_f,j_f,m_f}\sum_{\substack{\sigma_1\sigma_2\\\sigma'_1\sigma'_2}}\int d\xi_A d\mathbf{r}_{dF}d\mathbf{r}_{p1}d\mathbf{r}_{A2}\chi_{pB}^{(-)*}(\mathbf{r}_{pB})\chi_B^*(\xi_B)v(\mathbf{r}_{p1})\phi_d(\mathbf{r}_{p1})\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}_{A2},\sigma_2)$$

$$\times\chi_{m_s}^{1/2}(\sigma_p)\Psi_A(\xi_A)\frac{2\mu_{dF}}{\hbar^2}\int d\xi'_A d\mathbf{r}'_{dF}d\mathbf{r}'_{p1}d\mathbf{r}'_{A2}$$

$$\times\chi_{tA}^{(+)}(\mathbf{r}_{tA})\psi_A^*(\xi'_A)\phi_d(\mathbf{r}'_{p1})\mathbb{I}\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}'_{A2},\sigma'_2)$$

$$=2\sum_{l_i,j_i}\sum_{l_f,j_f,m_f}\sum_{\substack{\sigma_1\sigma_2\\\sigma'_1\sigma'_2}}\int d\mathbf{r}_{dF}d\mathbf{r}_{p1}d\mathbf{r}_{A2}\chi_{pB}^{(-)*}(\mathbf{r}_{pB})v(\mathbf{r}_{p1})\phi_d(\mathbf{r}_{p1})\left|\varphi_{l_f,j_f,m_f}^{A+2}(\mathbf{r}_{A1},\sigma_1,\mathbf{r}_{A2},\sigma_2)\right]_0^0$$

$$\times\frac{2\mu_{dF}}{\hbar^2}\int d\mathbf{r}'_{dF}d\mathbf{r}'_{p1}d\mathbf{r}'_{A2}\chi_{tA}^{(+)}(\mathbf{r}'_{tA})\phi_d(\mathbf{r}'_{p1},\sigma'_1)\phi_d(\mathbf{r}'_{p2},\sigma'_2)\varphi_{l_f,j_f,m_f}^{A+1}(\mathbf{r}'_{A2},\sigma'_2)$$