Got Tensor Contractions?

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1 DEFINITIONS

- 1. The values of consecutive indices which are not separated by commas are assumed to form an ascending sequence (partially symmetrical storage).
- 2. Index groups separated by commas run independently.
- 3. Index ranges:

m,n,l: full occupied orbital range (e.g., [0..99]);

e,f,d: full virtual orbital range (e.g., [100..999]);

I,J,K: a small (active) subrange of the occupied orbital range (e.g., [90..99]);

A,B,C: a small (active) subrange of the virtual orbital range (e.g., [990..999]);

i,j,k: the occupied orbital range excluding the active subrange (e.g., [0..89]);

a,b,c: the virtual orbital range excluding the active subrange (e.g., [100..989]).

4. Despite multiple forms in which S/L/C tensors may appear in contractions, the only unique elements of these tensors are those which have both upper and lower indices ordered in an ascending order (separately).

2 TENSOR EXPRESSIONS

(1)
$$3.1.6: Z+=H_{d_l^b}^{l_1^b}S_{l_l^b}^{d_1^b}$$

(2)
$$3.2.7: Z+=H^{l_1^a}_{d_1^a}S^{d_1^a}_{l_1^a}$$

(3)
$$9.1.24: Z+=H_{d_1^b d_2^b}^{l_1^b l_2^b} S_{l_1^b l_2^b}^{d_1^b d_2^b}$$

$$(4) \hspace{1cm} 9.2.25: Z+=H^{l_1^a l_1^b}_{d_1^a d_1^b} S^{d_1^a d_1^b}_{l_1^a l_1^b}$$

$$(5) \hspace{1cm} 9.3.26: Z+=H^{l_1^a l_2^a}_{d_1^a d_2^a} S^{l_1^a l_2^a}_{l_1^a l_2^a}$$

$$(6) \hspace{1cm} 18.1.63: Z+ = H^{l_1^b, l_2^b}_{d_1^b, d_2^b} S^{d_1^b}_{l_1^b} S^{d_2^b}_{l_2^b} \cdot + 1/2$$

$$(7) \hspace{1cm} 18.2.64: Z+=H^{l_1^a,l_1^b}_{d_1^a,d_1^b}S^{d_1^a}_{l_1^a}S^{d_1^b}_{l_1^b}\cdot 2/2$$

(8)
$$18.3.65: Z+=H^{l_1^a,l_2^a}_{d_1^a,d_2^a}S^{d_1^a}_{l_1^a}S^{d_2^a}_{l_2^a}\cdot +1/2$$

$$(9) 1.1.1: Z_{m_1^a}^{e_1^a} + = H_{m_1^a}^{e_1^a}$$

$$(10) 4.2.9: Z_{m_1^a}^{e_1^a} += H_{d_1^a}^{e_1^a} S_{m_1^a}^{d_1^a}$$

(11)
$$5.2.11: Z_{m_1^a}^{e_1^a} + = H_{m_1^a}^{l_1^a} S_{l_1^a}^{e_1^a} \cdot -1/1$$

(12)
$$6.3.14: Z_{m_1^a}^{e_1^a} + = H_{m_1^a, d_1^b}^{e_1^a, l_1^b} Z_{l_1^b}^{d_1^b}$$

(13)
$$6.4.15: Z_{m_1^a}^{e_1^a} + = H_{m_1^a, d_1^a}^{e_1^a, l_1^a} S_{l_1^a}^{d_1^a}$$

$$(14) \qquad 10.2.28: Z_{m_1^a}^{e_1^a} + = H_{d_1^b}^{l_1^b} S_{m_1^a, l_1^b}^{e_1^a, d_1^b}$$

$$(15) \qquad 10.4.30: Z_{m_1^a}^{e_1^a} += H_{d_1^a}^{l_1^a} S_{m_1^a, l_1^a}^{e_1^a, d_1^a}$$

$$(16) \qquad 11.3.33: Z_{m_1^a}^{e_1^a} + = H_{d_1^a d_1^b}^{e_1^a, l_1^b} S_{m_1^a, l_1^b}^{d_1^a d_1^b}$$

(17)
$$11.4.34: Z_{m_1^a}^{e_1^a} + = H_{d_1^a d_2^a}^{e_1^a, l_1^a} S_{m_1^a, l_1^a}^{d_1^a d_2^a}$$

$$(18) 12.3.37: Z_{m_1^a}^{e_1^a} + = H_{m_1^a, d_1^b}^{l_1^a l_1^b} S_{l_1^a l_1^b}^{e_1^a, d_1^b} \cdot -1/1$$

$$(19) \qquad 12.4.38: Z_{m_{q}^{a}}^{e_{1}^{a}} + = H_{m_{q}^{a}, d_{q}^{a}}^{l_{1}^{a} l_{2}^{a}} S_{l_{1}^{a} l_{2}^{a}}^{e_{1}^{a}, d_{1}^{a}} \cdot -1/1$$

$$(20) \qquad 19.2.67: Z_{m_1^a}^{e_1^a} + = H_{d_1^a}^{l_1^a} S_{l_1^a}^{e_1^a} S_{m_1^a}^{d_1^a} \cdot -1/1$$

$$(21) 20.3.70: Z_{m_1^a}^{e_1^a} + = H_{d_1^a, d_1^b}^{e_1^a, l_1^b} S_{m_1^a}^{d_1^a} S_{l_1^b}^{d_1^a}$$

$$(22) 20.4.71: Z_{m_1^a}^{e_1^a} + = H_{d_1^a, d_2^a}^{e_1^a, l_1^a} S_{m_1^a}^{d_1^a} S_{l_1^a}^{d_2^a}$$

$$(23) 21.3.74: Z_{m_1^a}^{e_1^a} + = H_{m_1^a, d_1^b}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{l_1^b}^{d_1^b} \cdot -1/1$$

$$(24) 21.4.75: Z_{m_{4}^{a}}^{e_{1}^{a}} + = H_{m_{4}^{a}, d_{4}^{a}}^{l_{1}^{a}, l_{2}^{a}} S_{l_{4}^{a}}^{e_{1}^{a}} \cdot -1/1$$

$$(25) \hspace{1cm} 25.3.90: Z_{m_{1}^{a}}^{e_{1}^{a}} + = H_{d_{1}^{a}d_{1}^{b}}^{l_{1}^{a}, l_{1}^{b}} S_{m_{1}^{a}, l_{1}^{b}}^{e_{1}^{a}} \cdot M_{m_{1}^{a}, l_{1}^{b}}^{e_{1}^{a}} \cdot -1/1$$

$$(26) 25.4.91: Z_{m^a}^{e^a_1} + = H_{d^a d^a}^{l^a_1, l^a_2} S_{l^a_1}^{e^a_1} S_{m^a, l^a_2}^{d^a_1 d^a_2} \cdot -1/1$$

(27)
$$26.3.94: Z_{m_1^a}^{e_1^a} + = H_{d_1^a, d_2^b}^{l_1^a l_1^b} S_{m_1^a}^{d_1^a} S_{l_1^a l_2^b}^{e_1^a, d_2^b} \cdot -1/1$$

$$(28) \qquad 26.4.95: Z_{m_1^a}^{e_1^a} + = H_{d_1^a, d_2}^{l_1^a l_2^a} S_{m_1^a}^{d_1^a} S_{l_1^a l_2^a}^{l_1^a, d_2^a} \cdot -1/1$$

$$(29) \hspace{1cm} 27.2.97: Z_{m_1^a}^{e_1^a} + = H_{d_1^b, d_2^b}^{l_1^b, l_2^b} S_{l_1^b}^{d_1^b} S_{m_1^a, l_2^b}^{e_1^a, d_2^b}$$

$$(30) \qquad 27.4.99: Z_{m_1^a}^{e_1^a} + = H_{d_1^b, d_1^a}^{l_1^b, l_1^a} S_{l_1^b}^{d_1^b} S_{m_1^a, l_1^a}^{e_1^a, d_1^a}$$

$$(31) \qquad 27.6.101: Z_{m_{1}^{a}}^{e_{1}^{a}} + = H_{d_{1}^{a}, d_{1}^{b}}^{l_{1}^{a}, l_{1}^{b}} S_{l_{1}^{a}}^{d_{1}^{a}} S_{m_{1}^{a}, l_{1}^{b}}^{e_{1}^{a}, d_{1}^{b}}$$

$$(32) \hspace{1cm} 27.8.103: Z_{m_{1}^{a}}^{e_{1}^{a}} + = H_{d_{1}^{a}, l_{2}^{a}}^{l_{1}^{a}, l_{2}^{a}} S_{l_{1}^{a}}^{d_{1}^{a}} S_{m_{1}^{a}, l_{2}^{a}}^{e_{1}^{a}, d_{2}^{a}}$$

$$(33) \qquad 40.3.188: Z_{m_1^a}^{e_1^a} + = H_{d_1^a, d_1^b}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{m_1^a}^{d_1^a} S_{l_1^b}^{d_1^b} \cdot -1/1$$

$$(34) \qquad 40.4.189: Z_{m^a}^{e^a_1} + = H_{d^a, d^a}^{l^a_1, l^a_2} S_{l^a}^{e^a_1} S_{l^a}^{d^a_1} S_{l^a}^{d^a_2} \cdot -1/1$$

$$(35) \qquad 1.2.2: Z^{e^b_1}_{m^b_1} + = H^{e^b_1}_{m^b_1}$$

$$(36) \qquad 4.1.8: Z_{m_1^b}^{e_1^b} + = H_{d_1^b}^{e_1^b} S_{m_1^b}^{d_1^b}$$

$$(37) \hspace{1cm} 5.1.10: Z_{m_1^b}^{e_1^b} + = H_{m_1^b}^{l_1^b} S_{l_1^b}^{e_1^b} \cdot -1/1$$

$$(38) \qquad 6.1.12: Z_{m_1^b}^{e_1^b} + = H_{m_1^b, d_1^b}^{e_1^b, l_1^b} S_{l_1^b}^{d_1^b}$$

$$(39) \qquad 6.2.13: Z_{m_1^b}^{e_1^b} + = H_{m_1^b, d_1^a}^{e_1^b, l_1^a} S_{l_1^a}^{d_1^a}$$

$$(40) \qquad 10.1.27: Z_{m_1^b}^{e_1^b} + = H_{d_1^b}^{l_1^b} S_{m_1^b, l_1^b}^{e_1^b, d_1^b}$$

$$(41) 10.3.29: Z_{m_b^b}^{e_1^b} + = H_{d_1^a}^{l_1^a} S_{m_b^b, l_1^a}^{e_1^b, d_1^a}$$

$$(42) 11.1.31: Z_{m_1^b}^{e_1^b} + = H_{d_1^b d_2^b}^{e_1^b, l_1^b} S_{m_1^b, l_1^b}^{d_1^b d_2^b}$$

$$(43) 11.2.32: Z_{m_1^b}^{e_1^b} + = H_{d_1^a d_1^b}^{e_1^b, l_1^a} S_{m_2^b, l_1^a}^{d_1^a d_1^b}$$

$$(44) 12.1.35: Z_{m_l^b}^{e_l^b} + = H_{m_l^b, d_l^b}^{l_l^b l_l^b} S_{l_l^b l_l^b}^{e_l^b, d_l^b} \cdot -1/1$$

$$(45) \qquad 12.2.36: Z_{m_{l}^{b}}^{e_{l}^{b}} + = H_{m_{l}^{b}, q_{l}^{a}}^{l_{l}^{a} l_{l}^{b}} S_{l_{1}^{a} l_{1}^{b}}^{e_{l}^{b}, q_{1}^{a}} \cdot -1/1$$

$$(46) \qquad 19.1.66: Z_{m_{^{b}}}^{e_{^{b}}^{b}} + = H_{d^{b}}^{l_{^{b}}^{b}} S_{l_{^{b}}}^{e_{^{b}}^{b}} S_{m_{^{b}}}^{d_{^{b}}^{b}} \cdot -1/1$$

$$(47) 20.1.68: Z_{m_1^b}^{e_1^b} + = H_{d_1^b, d_2^b}^{e_1^b, l_1^b} S_{m_1^b}^{d_1^b} S_{l_1^b}^{d_2^b}$$

$$(48) \qquad 20.2.69: Z_{m_1^b}^{e_1^b} + = H_{d_1^b, d_1^a}^{e_1^b, l_1^a} S_{m_1^b}^{d_1^b} S_{l_1^a}^{d_1^a}$$

$$(49) 21.1.72: Z_{m^b}^{e^b_l} + = H_{m^b_l, d^b_k}^{l^b_l, l^b_2} S_{l^b_k}^{e^b_l} S_{l^b_k}^{d^b_l} \cdot -1/1$$

$$(50) \qquad 21.2.73: Z_{m_b^b}^{e_l^b} + = H_{m_b^b,d_a}^{l_1^b,l_1^a} S_{l_b^b}^{e_l^b} S_{l_1^a}^{d_1^a} \cdot -1/1$$

$$(51) \hspace{1cm} 25.1.88: Z_{m_{l}^{b}}^{e_{l}^{b}} + = H_{d_{l}^{b}d_{l}^{b}}^{l_{l}^{b}, l_{2}^{b}} S_{l_{l}^{b}}^{e_{l}^{b}} S_{m_{l}^{b}, l_{2}^{b}}^{d_{l}^{b}d_{2}^{b}} \cdot -1/1$$

$$(52) \hspace{1cm} 25.2.89: Z_{m_{l}^{b}}^{e_{l}^{b}} + = H_{d_{l}^{a}d_{l}^{b}}^{l_{l}^{b}, l_{l}^{a}} S_{m_{l}^{b}, l_{l}^{a}}^{e_{l}^{b}} \cdot -1/1$$

$$(53) \qquad 26.1.92: Z_{m_1^b}^{e_1^b} + = H_{d_1^b, d_2^b}^{l_1^b l_2^b} S_{m_1^b}^{d_1^b} S_{l_1^b l_2^b}^{e_1^b, d_2^b} \cdot -1/1$$

$$(54) 26.2.93: Z_{m_1^b}^{e_1^b} + = H_{d_1^b, d_1^a}^{l_1^a l_1^b} S_{m_1^b}^{d_1^b} S_{l_1^a l_1^b}^{e_1^b, d_1^a} \cdot -1/1$$

$$(55) 27.1.96: Z_{m_1^b}^{e_1^b} + = H_{d_1^b, d_2^b}^{l_1^b, l_2^b} S_{l_1^b}^{d_1^b} S_{m_1^b, l_2^b}^{e_1^b, d_2^b}$$

$$(56) 27.3.98: Z_{m_i^b}^{e_1^b} + = H_{d_i^b, l_a^a}^{l_1^b, l_1^a} S_{l_i^b}^{d_1^b} S_{m_i^b, l_a^a}^{e_1^b, d_1^a}$$

$$(57) \qquad 27.5.100: Z_{m_b^b}^{e_1^b} + = H_{d_a^a, d_b^b}^{l_1^a, l_b^b} S_{l_a^a}^{d_a^a} S_{m_b^b, l_b^b}^{e_1^b, d_b^b}$$

$$(58) 27.7.102: Z_{m^b}^{e^b_1} + = H_{d^a_1 d^a_2}^{l^a_1, l^a_2} S_{l^a_1}^{d^a_1} S_{m^b_1 l^a}^{e^b_1, d^a_2}$$

$$(59) \qquad 40.1.186: Z_{m_b^b}^{e_b^1} + = H_{d_b^b, d_b^b}^{l_b^1, l_b^2} S_{l_b^b}^{e_b^1} S_{l_b^b}^{d_b^1} \cdot -1/1$$

$$(60) \qquad 40.2.187: Z_{m_{1}^{b}}^{e_{1}^{b}} + = H_{d_{1}^{b}, l_{1}^{a}}^{l_{1}^{b}, l_{1}^{a}} S_{l_{1}^{b}}^{e_{1}^{b}} S_{m_{1}^{b}}^{d_{1}^{b}} S_{l_{1}^{a}}^{d_{1}^{a}} \cdot -1/1$$

$$(61) \qquad 2.2.4: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a m_1^b}^{e_1^a e_1^b}$$

(62)
$$7.2.17: Z_{n_1^a n_2^b}^{e_1^a e_1^b} + = H_{m_2, d_a}^{e_1^a e_1^b} S_{m_1^a}^{d_1^a} \cdot -1/1$$

$$(63) \qquad 7.3.18: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{a},d_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} S_{m_{1}^{b}}^{d_{1}^{b}}$$

$$(64) 8.2.21: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a m_1^b}^{e_1^b, l_1^a} S_{l_1^a}^{e_1^a}$$

$$(65) \hspace{1cm} 8.3.22: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a},l_{1}^{b}} S_{l_{1}^{b}}^{e_{1}^{b}} \cdot -1/1$$

$$(66) \qquad 13.2.40: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b}^{e_1^b} S_{m_1^a m_1^b}^{e_1^a, d_1^b}$$

$$(67) \qquad 13.3.41: Z_{m^a m^b}^{e^a_1 e^b_1} + = H_{d^a}^{e^a_1} S_{m^a m^b}^{e^b_1, d^a_1} \cdot -1/1$$

$$(68) \qquad 14.2.44: Z_{n_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{b}}^{l_{1}^{b}} S_{m_{1}^{a}, l_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} \cdot -1/1$$

$$(69) \qquad 14.3.45: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a}^{l_1^a} S_{m_1^b, l_1^a}^{e_1^a e_1^b}$$

$$(70) 15.2.48: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a d_1^b}^{e_1^a e_1^b} S_{m_1^a m_1^b}^{d_1^a d_1^b}$$

$$(71) 16.2.51: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^b, d_1^b}^{e_1^b, l_1^b} S_{m_1^a, l_1^b}^{e_1^a, d_1^b}$$

$$(72) 16.4.53: Z_{m^a m^b}^{e^a e^b} + = H_{m^b, d^a}^{e^b, l^a_1} S_{m^a, l^a}^{e^a, d^a_1}$$

$$(73) \qquad 16.5.54: Z^{e^a_1e^b_1}_{m^a_1m^b_1} + = H^{e^b_1,l^a_1}_{m^a_1,d^b_1} S^{e^a_1,d^b_1}_{m^b_1,l^a_1} \cdot -1/1$$

$$(74) \qquad 16.6.55: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{b},d_{1}^{a}}^{e_{1}^{a},l_{1}^{b}} S_{m_{1}^{a},l_{2}^{b}}^{e_{1}^{b},d_{1}^{a}} \cdot -1/1$$

$$(75) \qquad 16.7.56: Z_{m^a m^b}^{e^a_1 e^b_1} + = H_{m^a_1 d^b_2}^{e^a_1, l^b_1} S_{m^b_1, l^b_2}^{e^b_1, d^b_1}$$

$$(76) 16.9.58: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a, d_1^a}^{e_1^a, l_1^a} S_{m_1^b, l_1^a}^{e_1^b, d_1^a}$$

$$(77) \qquad 17.2.61: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{n_1^a m_1^b}^{l_1^a l_1^b} S_{l_1^a l_1^b}^{e_1^a e_1^b}$$

$$(78) \qquad 22.2.77: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_1^b}^{e_1^a e_1^b} S_{m_1^a}^{d_1^a} S_{m_1^b}^{d_1^b} \cdot 2/2$$

$$(79) \qquad 23.2.80: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}} + = H_{m_{1}^{b},d_{1}^{a}}^{e_{1}^{b}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{m_{1}^{a}}^{d_{1}^{a}} \cdot -1/1$$

$$(80) 23.3.81: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a, d_1^b}^{e_1^b, l_1^a} S_{l_1^a}^{e_1^a} S_{m_1^b}^{d_1^b}$$

$$(81) \qquad 23.4.82: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{b},d_{1}^{a}}^{e_{1}^{a}}S_{l_{1}^{b}}^{e_{1}^{b}}S_{m_{1}^{a}}^{d_{1}^{a}}$$

$$(82) \hspace{1cm} 23.5.83: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1, d_1^b}^{e_1^a, l_1^b} S_{l_1^b}^{e_1^b} S_{m_1^b}^{d_1^b} \cdot -1/1$$

$$(83) \hspace{1cm} 24.2.86: Z_{m_{1}^{a}m_{1}^{b}}^{a^{a}e_{1}^{b}} + = H_{m_{1}^{a}m_{1}^{b}}^{l_{1}^{a},l_{1}^{b}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{l_{0}^{b}}^{e_{1}^{b}} \cdot 2/2$$

$$(84) \hspace{1cm} 28.2.105: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{b}}^{l_{1}^{b}} S_{l_{1}^{b}}^{e_{1}^{b}} S_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a},d_{1}^{b}} \cdot -1/1$$

$$(85) \qquad 28.3.106: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a}}^{l_{1}^{a}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{b},d_{1}^{a}}$$

(86)
$$29.2.109: Z_{m^a m^b}^{e_1^a e_1^b} + = H_{d^b}^{l^b_1} S_{m^b}^{d^b_1} S_{m^a . l^b_2}^{e^a_1 e^b_1} \cdot -1/1$$

(87)
$$29.3.110: Z_{m^a m^b}^{e_1^a e_1^b} + = H_{d_1^a}^{l_1^a} S_{m_1^a}^{d_1^a} S_{m_1^b, l_1^a}^{e_1^a e_1^b}$$

$$(88) 30.2.113: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a d_1^b}^{e_1^b, l_1^a} S_{l_1^a}^{e_1^a} S_{m_1^a m_1^b}^{d_1^a d_1^b}$$

$$(89) \qquad 30.3.114: Z_{m^a m^b_b}^{e^a_1 e^b_1} + = H_{d^a_1 d^b_1}^{e^a_1, l^b_1} S_{l^b_1}^{e^b_1} S_{m^a_1 m^b_b}^{d^a_1 d^b_1} \cdot -1/1$$

$$(90) 31.2.117: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b, d_2^b}^{e_1^b, l_1^b} S_{m_1^b}^{d_1^b} S_{m_1^a, l_1^b}^{e_1^a, d_2^b}$$

$$(91) \qquad 31.4.119: Z_{m^a m^b}^{e^a_1 e^b_1} + = H_{d^b_1, d^a_4}^{e^b_1, l^a_1} S_{m^b_1}^{d^b_1} S_{m^a_1, l^a_1}^{e^a_1, d^a_1}$$

$$(92) 31.5.120: Z_{m_a^a m_b^b}^{e_1^a e_1^b} + = H_{d_a^a, d_b^b}^{e_1^b, l_1^a} S_{m_1^a}^{d_1^a} S_{m_b^b, l_a^a}^{e_1^a, d_b^b} \cdot -1/1$$

$$(93) \qquad 31.6.121: Z_{m_{1}^{a}m_{0}^{b}}^{e_{1}^{a}e_{0}^{b}} + = H_{d_{1}^{b},d_{1}^{a}}^{e_{1}^{a},l_{0}^{b}} S_{m_{1}^{a},l_{0}^{b}}^{e_{1}^{b},d_{1}^{a}} \cdot -1/1$$

$$(94) 31.7.122: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_1^b}^{e_1^a, l_1^b} S_{m_1^a}^{d_1^a} S_{m_1^b, l_1^b}^{e_1^b, d_1^b}$$

$$(95) 31.9.124: Z_{m_1^a m_2^b}^{e_1^a e_1^b} + = H_{d_1^a, d_2^a}^{e_1^a, l_1^a} S_{m_1^a}^{d_1^a} S_{m_2^b, l_1^a}^{e_1^b, d_2^a}$$

$$(96) \hspace{30pt} 32.2.127: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{b}, d_{2}^{b}}^{e_{1}^{b}, l_{1}^{b}} S_{l_{1}^{b}}^{e_{1}^{a}, d_{2}^{b}} \cdot -1/1$$

$$(97) \hspace{1cm} 32.4.129: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a}, d_{1}^{b}}^{e_{1}^{b}, l_{1}^{a}} S_{l_{1}^{a}}^{d_{1}^{a}} S_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}, d_{1}^{b}} \cdot -1/1$$

$$(98) \qquad 32.5.130: Z_{m_{q}^{a}m_{b}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{b,d_{q}}^{b}}^{e_{1}^{a},l_{b}^{b}} S_{l_{b}}^{d_{1}^{b}} S_{m_{q}^{a}m_{b}^{b}}^{e_{1}^{b},d_{1}^{a}}$$

$$(99) 32.7.132: Z_{m^a m^b}^{e_1^a e_b^b} + = H_{d_a^a, d_a^a}^{e_1^a, l_1^a} S_{l_a^a}^{d_1^a} S_{m^a m^b}^{e_1^b, d_2^a}$$

$$(100) \qquad 33.2.135: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^b, d_1^b}^{l_1^b, l_2^b} S_{l_1^b}^{e_1^b} S_{m_1^a, l_2^b}^{e_1^a, d_1^b} \cdot -1/1$$

$$(101) \qquad 33.4.137: Z_{m^am^b}^{e^1_1e^b_1} + = H_{m^b_1, d^a}^{l^b_1, l^a_1} S_{l^b}^{e^b_1} S_{m^a_1, l^a_1}^{e^a_1, d^a_1} \cdot -1/1$$

$$(102) \qquad 33.5.138: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{a},d_{1}^{b}}^{l_{1}^{b},l_{1}^{a}} S_{l_{1}^{b}}^{e_{1}^{b}} S_{m_{1}^{b},l_{1}^{a}}^{e_{1}^{a},d_{1}^{b}}$$

$$(103) \qquad 33.6.139: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^b, d_1^a}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{m_1^a, l_1^b}^{e_1^b, d_1^a}$$

$$(104) 33.7.140: Z_{m^a m^b}^{e^1_1 e^b_1} + = H_{m^a, d^b}^{l^a_1, l^b_1} S_{l^a}^{e^a_1} S_{m^b, l^b}^{e^1, d^b_1} \cdot -1/1$$

$$(105) \qquad 33.9.142: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a, d_1^a}^{l_1^a, l_2^a} S_{l_1^a}^{e_1^a} S_{m_b^b, l_2^a}^{e_1^b, d_1^a} \cdot -1/1$$

$$(106) \qquad 34.2.145: Z_{m^am^b}^{e^1_1e^b_1} + = H_{m^b_1,d^a}^{l^a_1l^b_1} S_{m^a_1}^{d^a_1} S_{l^a_1l^b_1}^{e^a_1e^b_1} \cdot -1/1$$

$$(107) 34.3.146: Z_{m^a m^b}^{e^a e^b} + = H_{m^a d^b}^{l^a l^b} S_{m^b}^{d^b} S_{l^a l^b}^{e^a e^b}$$

$$(108) \qquad 35.2.149: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{1}^{b}, l_{1}^{b}}^{l_{1}^{b}, l_{2}^{b}} S_{l_{1}^{b}}^{d_{1}^{b}} S_{m_{1}^{a}, l_{2}^{b}}^{e_{1}^{a}e_{1}^{b}}$$

$$(109) \qquad 35.3.150: Z_{m^am^b}^{e^1_1e^b_1} + = H_{m^a,d^b}^{l^b_1,l^a_1} S_{l^b}^{d^b_1} S_{m^b_1,l^a_2}^{e^1_1e^b} \cdot -1/1$$

$$(110) 35.6.153: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^b, d_1^a}^{l_1^a, l_1^b} S_{l_1^a}^{d_1^a} S_{m_1^a, l_1^b}^{e_1^a e_1^b}$$

$$(111) \qquad 35.7.154: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a, d_1^a}^{l_1^a, l_2^a} S_{l_1^a}^{d_1^a} S_{m_b^b, l_2^a}^{e_1^a e_1^b} \cdot -1/1$$

$$(112) 36.2.157: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b d_2^b}^{l_1^b, l_2^b} S_{m_1^a, l_1^b}^{e_1^a e_1^b} S_{m_1^b, l_2^b}^{d_1^b d_2^b} \cdot -1/1$$

$$(113) \qquad 36.4.159: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a d_1^b}^{l_1^b, l_1^a} S_{m_1^a, l_1^b}^{e_1^a e_1^b} S_{m_1^b, l_1^a}^{d_1^a d_1^b} \cdot -1/1$$

$$(114) \qquad 36.5.160: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a d_1^b}^{l_1^a, l_1^b} S_{m_1^b, l_1^a}^{e_1^a e_1^b} S_{m_1^a, l_1^b}^{d_1^a d_1^b}$$

$$(115) 36.7.162: Z_{m^a m^b}^{e^a_1 e^b_1} + = H_{d^a_1 d^a_2}^{l^a_1, l^a_2} S_{m^b_1, l^a_2}^{e^a_1 e^b_1} S_{m_1, l^a_2}^{d^a_1 d^a_2}$$

$$(116) \qquad 37.2.165: Z_{m_{a}^{a}m_{b}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{a}^{a}d_{b}^{b}}^{l_{1}^{a}l_{b}^{b}} S_{l_{1}^{a}l_{b}^{b}}^{e_{1}^{a}e_{1}^{b}} S_{m_{1}^{a}m_{b}^{b}}^{d_{1}^{a}d_{b}^{b}}$$

$$(117) \qquad 38.2.168: Z_{m^a m^b_i}^{e^1_1 e^b_1} + = H_{d^b_1, d^b_2}^{l^b_1 l^b_2} S_{m^a_1 m^b_1}^{e^a_1, d^b_1} S_{l^b_1 l^b_2}^{e^b_1, d^b_2} \cdot -1/1$$

$$(118) \qquad 38.4.170: Z_{m_a^a m_b^i}^{e_1^a e_b^b} + = H_{d_b^i, d_a^a}^{l_1^a l_b^b} S_{m_a^a m_b^i}^{e_1^a, d_1^b} S_{l_1^a l_b^i}^{e_b^i, d_1^a} \cdot -1/1$$

$$(119) \qquad 38.5.171: Z_{m_{1}^{a}m_{b}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a}d_{1}^{b}}^{l_{1}^{a}l_{b}^{b}} S_{m_{1}^{a}m_{b}^{b}}^{e_{1}^{b},d_{1}^{a}} S_{l_{1}^{a}l_{b}^{b}}^{e_{1}^{a},d_{1}^{b}}$$

$$(120) 38.7.173: Z_{m^a m^b}^{e^a e^b_1} + = H_{d^a_1, d^a_2}^{l^a_1 l^a_2} S_{m^a m^b_1}^{e^b_1, d^a_1} S_{l^a_1 l^a_2}^{e^a_1, d^a_2}$$

$$(121) \qquad 39.2.176: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b, d_2^b}^{l_1^b, l_2^b} S_{m_1^a, l_1^b}^{e_1^a, d_1^b} S_{m_1^b, l_2^b}^{e_1^b, d_2^b} \cdot 2/2$$

$$(122) \qquad 39.4.178: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b, d_1^a}^{l_1^a, l_1^b} S_{m_1^b, l_1^a}^{e_1^a, d_1^b} S_{m_1^a, l_1^b}^{e_1^b, d_1^a} \cdot -2/2$$

$$(123) \qquad 39.6.180: Z_{m^a m^b}^{e^a e^b_1} + = H_{d^a, d^b}^{l^a_1, l^b_1} S_{m^b, l^a}^{e^b, d^a_1} S_{m^a, l^b}^{e^a, d^b_1} \cdot 2/2$$

$$(124) \qquad 39.7.181: Z_{m^a m^b}^{e^a e^b_1} + = H_{d^a, d^b}^{l^a_1, l^b_1} S_{m^a, l^a}^{e^a, d^a_1} S_{m^b, l^b}^{e^b, d^b_1} \cdot 2/2$$

$$(125) 39.10.184: Z_{m_{m_{m_{b}}}^{a}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}, d_{2}}^{l_{1}^{a}, l_{2}^{a}} S_{m_{1}, l_{1}^{a}}^{e_{1}^{a}, d_{2}^{a}} S_{m_{1}, l_{2}^{a}}^{e_{1}^{b}, d_{2}^{a}} \cdot 2/2$$

$$(126) \qquad 41.2.191: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a},d_{1}^{b}}^{e_{1}^{b},l_{1}^{a}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{m_{1}^{b}}^{d_{1}^{b}} \cdot 2/2$$

$$(127) 41.3.192: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_1^b}^{e_1^a, l_1^b} S_{l_1^b}^{e_1^b} S_{m_1^a}^{d_1^a} S_{m_1^b}^{d_1^b} \cdot -2/2$$

$$(128) \qquad 42.2.195: Z_{m_{q}^{a}m_{b}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{m_{q}^{b},d_{q}^{a}}^{l_{1}^{a},l_{1}^{b}} S_{l_{q}^{b}}^{e_{1}^{a}} S_{m_{1}^{a}}^{l_{1}^{b}} \cdot -2/2$$

$$(129) \qquad 42.3.196: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{m_1^a, d_1^b}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{l_1^b}^{e_1^b} S_{m_1^b}^{d_1^b} \cdot 2/2$$

$$(130) 43.2.199: Z_{m_q^a m_l^b}^{e_1^a e_1^b} + = H_{d_q^a d_l^b}^{l_1^a, l_l^b} S_{l_1^a}^{e_1^a} S_{l_l^b}^{e_1^b} S_{m_q^a m_l^b}^{d_1^a d_l^b} \cdot 2/2$$

$$(131) \qquad 44.2.202: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b, d_2^b}^{l_1^b, l_2^b} S_{l_1^b}^{e_1^b} S_{m_1^b}^{d_1^b} S_{m_1^a, l_2^b}^{e_1^a, d_2^b} \cdot -1/1$$

$$(132) \qquad 44.4.204: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{1}e_{1}^{b}} + = H_{d_{1}^{b},d_{1}^{a}}^{l_{1}^{b},l_{1}^{a}} S_{l_{0}^{b}}^{e_{1}^{b}} S_{m_{1}^{b}}^{d_{1}^{b}} S_{m_{1}^{a},l_{1}^{a}}^{e_{1}^{a},d_{1}^{a}} \cdot -1/1$$

$$(133) 44.5.205: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_1^b}^{l_1^b, l_1^a} S_{l_1^b}^{e_1^b} S_{m_1^a}^{a_1} S_{m_1^b, l_1^a}^{e_1^a, d_1^b}$$

$$(134) 44.6.206: Z_{m_{1}^{q}m_{2}^{b}}^{e_{1}^{1}e_{1}^{b}} + = H_{d_{1}^{b},d_{1}^{a}}^{l_{1}^{1},l_{1}^{b}} S_{l_{1}^{q}}^{e_{1}^{a}} S_{m_{2}^{b}}^{d_{1}^{b}} S_{m_{1}^{a},l_{2}^{b}}^{e_{1}^{b},d_{1}^{a}}$$

$$(135) \qquad 44.7.207: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_1^b}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{m_1^a}^{d_1^a} S_{m_1^b, l_1^b}^{e_1^b, d_1^b} \cdot -1/1$$

$$(136) 44.9.209: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_2^a}^{l_1^a, l_2^a} S_{l_1^a}^{e_1^a} S_{m_1^a}^{d_1^a} S_{m_1^b, l_2^a}^{e_1^b, d_2^a} \cdot -1/1$$

$$(137) \qquad 45.2.212: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{b},d_{2}^{b}}^{l_{1}^{b},l_{2}^{b}} S_{l_{2}^{b}}^{e_{1}^{b}} S_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a},d_{2}^{b}}$$

$$(138) \qquad 45.4.214: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a},d_{1}^{b}}^{l_{1}^{b},l_{1}^{a}} S_{l_{1}^{e_{1}^{b}}}^{e_{1}^{b}} S_{l_{1}^{a}}^{e_{1}^{a},d_{1}^{b}}$$

$$(139) \qquad 45.5.215: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^b, d_1^a}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{l_1^b}^{d_1^b} S_{m_1^a m_1^b}^{e_1^b, d_1^a} \cdot -1/1$$

$$(140) 45.7.217: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a},d_{2}^{a}}^{l_{1}^{a},l_{2}^{a}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{b},d_{2}^{a}} \cdot -1/1$$

$$(141) \qquad 46.2.220: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_1^b}^{l_1^a l_1^b} S_{m_1^a}^{d_1^a} S_{m_1^b}^{d_1^b} S_{l_1^a l_1^b}^{e_1^a e_1^b} \cdot 2/2$$

$$(142) \qquad 47.2.223: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{1}e_{1}^{b}} + = H_{d_{1}^{b},d_{2}^{b}}^{l_{1}^{b},l_{2}^{b}} S_{m_{1}^{b}}^{d_{1}^{b}} S_{l_{1}^{b}}^{d_{2}^{b}} S_{m_{1}^{a},l_{2}^{b}}^{e_{1}^{a}e_{1}^{b}}$$

$$(143) \qquad 47.3.224: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{1}e_{1}^{b}} + = H_{d_{1}^{a},d_{1}^{b}}^{l_{1}^{b},l_{1}^{a}} S_{m_{1}^{a}}^{d_{1}^{a}} S_{m_{1}^{b}}^{l_{1}^{b}} S_{m_{1}^{b},l_{1}^{a}}^{e_{1}^{a}e_{1}^{b}} \cdot -1/1$$

$$(144) 47.6.227: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{b},d_{1}^{a}}^{l_{1}^{a},l_{1}^{b}} S_{m_{1}^{b}}^{d_{1}^{b}} S_{l_{1}^{a}}^{l_{1}^{a}} S_{m_{1}^{a},l_{1}^{a}}^{e_{1}^{a}e_{1}^{b}}$$

$$(145) 47.7.228: Z_{m_1^a m_1^b}^{e_1^a e_1^b} + = H_{d_1^a, d_2^a}^{l_1^a, l_2^a} S_{m_1^a}^{d_1^a} S_{l_1^a}^{d_2^a} S_{m_1^b, l_2^a}^{e_1^a e_1^b} \cdot -1/1$$

$$(146) \qquad 48.2.231: Z_{m_{1}^{a}m_{1}^{b}}^{e_{1}^{a}e_{1}^{b}} + = H_{d_{1}^{a},d_{1}^{b}}^{l_{1}^{a}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{l_{1}^{b}}^{d_{1}^{a}} S_{m_{1}^{a}}^{d_{1}^{b}} \cdot 4/4$$

(147)
$$2.1.3: Z_{m_a^a m_a^a}^{e_1^a e_2^a} + = H_{m_a^a m_a^a}^{e_1^a e_2^a}$$

$$(148) 7.4.19: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d_1^a}^{e_1^a e_2^a} S_{m_2^a}^{d_1^a}$$

$$(149) \qquad 8.4.23: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a},l_{1}^{a}} S_{l_{1}^{a}}^{e_{2}^{a}} \cdot -1/1$$

$$(150) \qquad 13.4.42: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d^a}^{e_1^a} S_{m_1^a m_2^a}^{e_2^a, d_1^a} \cdot -1/1$$

$$(151) \qquad 14.4.46: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a}^{l_1^a} S_{m_2^a, l_1^a}^{e_1^a e_2^a}$$

$$(152) 15.3.49: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a d_2^a}^{e_1^a e_2^a} S_{m_1^a m_2^a}^{d_1^a d_2^a}$$

$$(153) \qquad 16.8.57: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d_1^b}^{e_1^a, l_1^b} S_{m_2^a, l_1^b}^{e_2^a, d_1^b}$$

$$(154) \qquad 16.10.59: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, l_1^a}^{e_1^a, l_1^a} S_{m_1^a, l_1^a}^{e_2^a, d_1^a}$$

$$(155) 17.3.62: Z_{m^a m^a}^{e_1^a e_2^a} + = H_{m^a m^a}^{l_1^a l_2^a} S_{l_1 l_2}^{e_1^a e_2^a}$$

$$(156) 22.3.78: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{e_1^a e_2^a} S_{m_1^a}^{d_1^a} S_{m_2^a}^{d_2^a} \cdot + 1/2$$

$$(157) \qquad 23.6.84: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d_1^a}^{e_1^a, l_1^a} S_{l_1^a}^{e_2^a} S_{m_2^a}^{d_1^a} \cdot -1/1$$

$$(158) \qquad 24.3.87: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{m_{1}^{a}m_{2}^{a}}^{l_{1}^{a},l_{2}^{a}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{l_{2}^{a}}^{e_{2}^{a}} \cdot + 1/2$$

$$(159) 28.4.107: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a}^{l_1^a} S_{l_1^a}^{e_1^a} S_{m_1^a m_2^a}^{e_2^a, d_1^a}$$

$$(160) \qquad 29.4.111: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a}^{l_1^a} S_{m_1^a}^{d_1^a} S_{m_2, l_1^a}^{e_2^a e_2^a}$$

$$(161) \qquad 30.4.115: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a d_2^a}^{e_1^a, l_1^a} S_{l_1^a}^{e_2^a} S_{m_1^a m_2^a}^{d_1^a d_2^a} \cdot -1/1$$

$$(162) \qquad 31.8.123: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^b}^{e_1^a, l_1^b} S_{m_1^a}^{d_1^a} S_{m_2^a, l_2^b}^{e_2^a, d_1^b}$$

$$(163) \qquad 31.10.125: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{e_1^a, l_1^a} S_{m_1^a}^{d_1^a} S_{m_2^a, l_1^a}^{e_2^a, d_2^a}$$

$$(164) \qquad 32.6.131: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^b, d_1^a}^{e_1^a, l_1^b} S_{l_1^b}^{d_1^b} S_{m_1^a m_2^a}^{e_2^a, d_1^a}$$

$$(165) \qquad 32.8.133: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{d_{1}^{a},d_{2}^{a}}^{e_{1}^{a},l_{1}^{a}} S_{l_{1}^{a}}^{d_{1}^{a}} S_{m_{1}^{a}m_{2}^{a}}^{e_{2}^{a},d_{2}^{a}}$$

$$(166) \qquad 33.8.141: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d_1^b}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{m_2, l_2^b}^{e_2^a, d_1^b} \cdot -1/1$$

$$(167) \qquad 33.10.143: Z_{m_{\alpha}^{a}m_{\alpha}^{a}}^{e_{\alpha}^{1}e_{\alpha}^{2}} + = H_{m_{\alpha}^{a},d_{\alpha}^{a}}^{l_{\alpha}^{1}} S_{l_{\alpha}^{e_{\alpha}^{1}}}^{e_{\alpha}^{2},d_{\alpha}^{a}} \cdot -1/1$$

$$(168) \qquad 34.4.147: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{m_{1}^{a},d_{1}^{a}}^{l_{1}^{a}l_{2}^{a}} S_{m_{2}^{a}}^{d_{1}^{a}} S_{l_{1}^{a}l_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} \label{eq:eq:energy}$$

$$(169) \qquad 35.4.151: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d_1^b}^{l_1^b, l_1^a} S_{l_1^b}^{d_1^b} S_{m_2^a, l_1^a}^{e_1^a e_2^a} \cdot -1/1$$

$$(170) 35.8.155: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d^a}^{l_1^a, l_2^a} S_{l_1^a}^{d_1^a} S_{m_2^a, l_2^a}^{e_1^a e_2^a} \cdot -1/1$$

$$(171) 36.6.161: Z_{m^a m^a_a}^{e^a_1 e^a_2} + = H_{d^a d^b}^{l^a_1, l^b_1} S_{m^a, l^a}^{e^a_1 e^a_2} S_{m^a l^a}^{d^1_1 d^b_1} \cdot -1/1$$

$$(172) \qquad 36.8.163: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{d_{1}^{a}d_{2}^{a}}^{l_{1}^{a},l_{2}^{a}} S_{m_{1}^{a},l_{1}^{a}}^{e_{1}^{a}e_{2}^{a}} S_{m_{2}^{a},l_{2}^{a}}^{d_{1}^{a}d_{2}^{a}} \cdot -1/1$$

$$(173) \qquad 37.3.166: Z_{m_1^q m_2^a}^{e_1^a e_2^a} + = H_{d_1^a d_2^a}^{l_1^a l_2^a} S_{l_1^a l_2^a}^{e_1^a e_2^a} S_{m_1^a m_2^a}^{d_1^a d_2^a}$$

$$(174) 38.6.172: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a d_2^b}^{l_1^a l_2^b} S_{m_1^a m_2^a}^{e_1^a d_1^a} S_{l_1^a l_2^b}^{e_2^a d_1^b} \cdot -1/1$$

$$(175) \qquad 38.8.174: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{l_1^a l_2^a} S_{m_1^a m_2^a}^{e_1^a, d_1^a} S_{l_1^a l_2^a}^{e_2^a, d_2^a} \cdot -1/1$$

$$(176) \qquad 39.3.177: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^b, d_2^b}^{l_1^b, l_2^b} S_{m_1^a, l_1^b}^{e_1^a, d_1^b} S_{m_2^a, l_2^b}^{e_2^a, d_2^b} \cdot + 1/2$$

$$(177) 39.8.182: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, l_2^b}^{l_1^a, l_1^b} S_{m_1^a, l_1^a}^{e_1^a, d_1^a} S_{m_2^a, l_2^b}^{e_2^a, d_1^b} \cdot 2/2$$

$$(178) \qquad 39.11.185: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2}^{l_1^a, l_2^a} S_{m_1^a, l_1^a}^{e_1^a, d_1^a} S_{m_2^a, l_2^a}^{e_2^a, d_2^a} \cdot + 1/2$$

$$(179) \qquad 41.4.193: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{e_1^a, l_1^a} S_{l_1^a}^{e_2^a} S_{m_1^a}^{d_1^a} S_{m_2^a}^{d_2^a} \cdot -1/2$$

$$(180) \qquad 42.4.197: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{m_1^a, d_1^a}^{l_1^a, l_2^a} S_{l_1^a}^{e_1^a} S_{l_2^a}^{e_2^a} S_{m_2^a}^{d_1^a} \cdot + 1/2$$

$$(181) \qquad 43.3.200: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a d_2^a}^{l_1^a, l_2^a} S_{l_4^a}^{e_1^a} S_{l_2^a}^{e_2^a} S_{m_1^a m_2^a}^{d_1^a d_2^a} \cdot + 1/2$$

$$(182) \qquad 44.8.208: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_1^b}^{l_1^a, l_1^b} S_{l_1^a}^{e_1^a} S_{m_1^a}^{d_1^a} S_{m_2^a, l_1^b}^{e_2^a, d_1^b} \cdot -1/1$$

$$(183) \qquad 44.10.210: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{d_{1}^{a}, d_{2}^{a}}^{l_{1}^{a}} S_{l_{1}^{a}}^{e_{1}^{a}} S_{m_{2}^{a}, l_{2}^{a}}^{d_{2}^{a}} \cdot -1/1$$

$$(184) 45.6.216: Z_{m_{q}^{a}m_{3}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{d_{p}^{b},d_{q}^{a}}^{l_{1}^{a},l_{1}^{b}} S_{l_{q}^{a}}^{e_{1}^{a}} S_{l_{b}^{d}}^{d_{1}^{b}} S_{m_{q}^{a}m_{3}^{a}}^{e_{2},d_{1}^{a}} \cdot -1/1$$

$$(185) \qquad 45.8.218: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{l_1^a, l_2^a} S_{l_1^a}^{e_1^a} S_{l_2^a}^{e_1^a} S_{m_1^a m_2^a}^{e_2^a, d_2^a} \cdot -1/1$$

$$(186) \qquad 46.3.221: Z_{m_{1}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{d_{1}^{a},d_{2}^{a}}^{l_{1}^{a}l_{2}^{a}} S_{m_{1}^{a}}^{d_{1}^{a}} S_{m_{2}^{a}}^{d_{2}^{a}} S_{l_{1}^{a}l_{2}^{a}}^{e_{2}^{a}} \cdot + 1/2$$

$$(187) \qquad 47.4.225: Z_{m_{q}^{a}m_{2}^{a}}^{e_{1}^{a}e_{2}^{a}} + = H_{d_{q}^{a},d_{0}}^{l_{1}^{b},l_{1}^{a}} S_{m_{1}^{a}}^{d_{1}^{a}} S_{l_{0}^{b}}^{d_{1}^{b}} S_{m_{1}^{a},l_{1}^{a}}^{e_{1}^{a}e_{2}^{a}} \cdot -1/1$$

$$(188) \qquad 47.8.229: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{l_1^a, l_2^a} S_{m_1^a}^{d_1^a} S_{l_1^a}^{d_2^a} S_{m_2^a, l_2^a}^{e_1^a e_2^a} \cdot -1/1$$

$$(189) \qquad 48.3.232: Z_{m_1^a m_2^a}^{e_1^a e_2^a} + = H_{d_1^a, d_2^a}^{l_1^a, l_2^a} S_{l_1^a}^{e_1^a} S_{m_1^a}^{e_2^a} S_{m_2^a}^{d_1^a} \cdot + 1/4$$

$$(190) 2.3.5: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b m_2^b}^{e_1^b e_2^b}$$

$$(191) 7.1.16: Z_{m_0^b m_2^b}^{e_1^b e_2^b} + = H_{m_0^b, d_1^b}^{e_1^b e_2^b} S_{m_2^b}^{d_1^b}$$

$$(192) \qquad 8.1.20: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b m_2^b}^{e_1^b, l_1^b} S_{l_1^b}^{e_2^b} \cdot -1/1$$

$$(193) \qquad 13.1.39: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b}^{e_1^b} S_{m_1^b m_2^b}^{e_2^b, d_1^b} \cdot -1/1$$

$$(194) 14.1.43: Z_{m_p^b m_p^b}^{e_p^b e_p^b} + = H_{m_p^b}^{l_p^b} S_{m_p^b, l_p^a}^{e_p^b e_p^b}$$

$$(195) \qquad 15.1.47: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b d_2^b}^{e_1^b e_2^b} S_{m_1^b m_2^b}^{d_1^b d_2^b}$$

$$(196) 16.1.50: Z_{m_b^b m_b^b}^{e_1^b e_2^b} + = H_{m_b^b, d_b^b}^{e_1^b, l_b^b} S_{m_b^b, l_b^b}^{e_2^b, d_1^b}$$

$$(197) \qquad 16.3.52: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b, d_1^a}^{e_1^b, l_1^a} S_{m_2^b, l_1^a}^{e_2^b, d_1^a}$$

$$(198) \qquad 17.1.60: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b m_2^b}^{l_1^b l_2^b} S_{l_1^b l_2^b}^{e_1^b e_2^b}$$

$$(199) 22.1.76: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b, d_2^b}^{e_1^b e_2^b} S_{m_1^b}^{d_1^b} S_{m_2^b}^{d_2^b} \cdot + 1/2$$

$$(200) \qquad 23.1.79: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b, d_1^b}^{e_1^b, l_1^b} S_{l_2^b}^{e_2^b} S_{m_2^b}^{d_1^b} \cdot -1/1$$

$$(201) \qquad 24.1.85: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b m_2^b}^{l_1^b, l_2^b} S_{l_1^b}^{e_1^b} S_{l_2^b}^{e_2^b} \cdot + 1/2$$

$$(202) \qquad 28.1.104: Z_{m_b^b m_b^b}^{e_b^b e_b^b} + = H_{d_b^b}^{l_b^b} S_{l_b^b}^{e_b^b} S_{m_b^b m_b^b}^{e_b^b, d_b^b}$$

$$(203) \qquad 29.1.108: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b}^{l_1^b} S_{m_2^b}^{d_1^b} S_{m_2^b, l_1^b}^{e_1^b e_2^b}$$

$$(204) \qquad 30.1.112: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b d_2^b}^{e_1^b, l_1^b} S_{l_2^b}^{e_2^b} S_{m_1^b m_2^b}^{d_1^b d_2^b} \cdot -1/1$$

$$(205) \qquad 31.1.116: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b, d_2^b}^{e_1^b, l_1^b} S_{m_1^b}^{d_1^b} S_{m_2^b, l_1^b}^{e_2^b, d_2^b}$$

$$(206) 31.3.118: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b, d_1^a}^{e_1^b, l_1^a} S_{m_2^b}^{d_1^b} S_{m_2^b, l_1^a}^{e_2^b, d_1^a}$$

$$(207) \qquad 32.1.126: Z_{m_{1}^{b}m_{2}^{b}}^{e_{1}^{b}e_{2}^{b}} + = H_{d_{1}^{b},d_{2}^{b}}^{e_{1}^{b},l_{1}^{b}} S_{l_{1}^{b}}^{d_{1}^{b}} S_{m_{1}^{b}m_{2}^{b}}^{e_{2}^{b},d_{2}^{b}}$$

$$(208) 32.3.128: Z_{m_b^b m_b^b}^{e_b^b e_b^b} + = H_{d_a^a d_b^b}^{e_b^b, l_1^a} S_{l_1^a}^{d_1^a} S_{m_b^b m_b^b}^{e_b^b, d_1^b}$$

$$(209) \qquad 33.1.134: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b, d_1^b}^{l_1^b, l_2^b} S_{l_1^b}^{e_1^b} S_{m_2^b, l_2^b}^{e_2^b, d_1^b} \cdot -1/1$$

$$(210) \qquad 33.3.136: Z_{m_1^b m_2^b}^{e_2^b e_2^b} + = H_{m_1^b, q_1^a}^{l_1^b, l_1^a} S_{l_1^b}^{e_1^b} S_{m_2^b, l_1^a}^{e_2^b, d_1^a} \cdot -1/1$$

$$(211) \qquad 34.1.144: Z_{m_b^b m_b^b}^{e_b^b e_b^b} + = H_{m_b^b, d_b^b}^{l_b^b l_b^b} S_{m_b^b}^{d_b^1} S_{l_b^b l_b^b}^{e_b^1 e_b^2}$$

$$(212) \qquad 35.1.148: Z_{m_1^b m_2^b}^{e_2^b e_2^b} + = H_{m_1^b, d_1^b}^{l_1^b, l_2^b} S_{l_1^b}^{d_1^b} S_{m_2^b, l_2^b}^{e_1^b e_2^b} \cdot -1/1$$

$$(213) \qquad 35.5.152: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{m_1^b, q_1^a}^{l_1^a, l_1^b} S_{l_1^a}^{d_1^a} S_{m_2^b, l_1^b}^{e_1^b e_2^b} \cdot -1/1$$

$$(214) \qquad 36.1.156: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b d_2^b}^{l_1^b, l_2^b} S_{m_1^b, l_1^b}^{e_1^b e_2^b} S_{m_2^b, l_2^b}^{d_1^b d_2^b} \cdot -1/1$$

$$(215) \qquad 36.3.158: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^a d_1^b}^{l_1^b, l_1^a} S_{m_1^b, l_1^b}^{e_1^b, e_2^b} S_{m_2^b, l_1^a}^{d_1^a d_1^b} \cdot -1/1$$

$$(216) \qquad 37.1.164: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b d_2^b}^{l_1^b l_2^b} S_{l_1^b l_2^b}^{e_1^b e_2^b} S_{m_1^b m_2^b}^{d_1^b d_2^b}$$

$$(217) \qquad 38.1.167: Z^{e_1^b e_2^b}_{m_b^b m_b^b} + = H^{l_1^b l_2^b}_{d_1^b, d_2^b} S^{e_1^b, d_1^b}_{m_b^b m_b^b} S^{e_2^b, d_2^b}_{l_1^b l_1^b} \cdot -1/1$$

$$(218) \qquad 38.3.169: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b, d_1^a}^{l_1^a l_1^b} S_{m_1^b m_2^b}^{e_2^b, d_1^b} S_{l_1^a l_1^b}^{e_2^b, d_1^a} \cdot -1/1$$

$$(219) \qquad 39.1.175: Z_{m_{0}^{b}m_{0}^{b}}^{e_{1}^{b}e_{2}^{b}} + = H_{d_{1}^{b},d_{2}^{b}}^{l_{1}^{b},l_{2}^{b}} S_{m_{0}^{b},l_{0}^{b}}^{e_{1}^{b},d_{1}^{b}} S_{m_{0}^{b},l_{2}^{b}}^{e_{2}^{b},d_{2}^{b}} \cdot + 1/2$$

$$(220) \qquad 39.5.179: Z_{m^b_{}m^b_{}m^b_{}}^{e^b_{}l^b_{}e^b_{}} + = H_{d^a_{},d^b_{}}^{l^a_{}l^b_{}} S_{m^b_{},l^a_{}}^{e^b_{}l^d_{}a^a_{}} S_{m^b_{},l^b_{}}^{e^b_{}l^d_{}a^b_{}} \cdot 2/2$$

$$(221) \qquad 39.9.183: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^a, d_2^a}^{l_1^a, l_2^a} S_{m_1^b, l_1^a}^{e_1^b, d_1^a} S_{m_2^b, l_2^a}^{e_2^b, d_2^a} \cdot + 1/2$$

$$(222) 41.1.190: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b, d_2^b}^{e_1^b, l_1^b} S_{l_1^b}^{e_2^b} S_{m_2^b}^{d_1^b} S_{m_2^b}^{d_2^b} \cdot -1/2$$

$$(224) \qquad 43.1.198: Z_{m_1^b m_2^b}^{e_2^b e_2^b} + = H_{d_1^b d_2^b}^{l_1^b, l_2^b} S_{l_1^b}^{e_1^b} S_{l_2^b}^{e_2^b} S_{m_1^b m_2^b}^{d_1^b d_2^b} \cdot + 1/2$$

$$(225) \qquad 44.1.201: Z_{m_{1}^{b}m_{2}^{b}}^{e_{2}^{b}} + = H_{d_{1}^{b},d_{2}^{b}}^{l_{1}^{b},l_{2}^{b}} S_{l_{1}^{b}}^{e_{1}^{b}} S_{m_{2}^{b}}^{d_{1}^{b}} S_{m_{2}^{b},l_{2}^{b}}^{e_{2}^{b},d_{2}^{b}} \cdot -1/1$$

$$(226) \qquad 44.3.203: Z_{m_{1}^{b}m_{2}^{b}}^{e_{1}^{b}e_{2}^{b}} + = H_{d_{1}^{b}, l_{1}^{a}}^{l_{1}^{b}, l_{1}^{a}} S_{l_{1}^{b}}^{e_{1}^{b}} S_{m_{2}^{b}}^{d_{1}^{b}} S_{m_{2}^{b}, l_{1}^{a}}^{e_{2}^{b}, d_{1}^{a}} \cdot -1/1$$

$$(227) 45.1.211: Z_{m_b^b m_b^b}^{e_b^b e_b^b} + = H_{d_b^b, d_b^b}^{l_b^b, l_b^b} S_{l_b^b}^{e_b^b} S_{m_b^b m_b^b}^{e_b^b, d_b^b} \cdot -1/1$$

$$(228) \qquad 45.3.213: Z_{m_1^b m_2^b}^{e_2^b e_2^b} + = H_{d_1^a, d_2^b}^{l_1^b, l_1^a} S_{l_1^b}^{e_1^b} S_{l_1^a}^{d_1^a} S_{m_1^b m_2^b}^{e_2^b, d_1^b} \cdot -1/1$$

$$(229) \qquad 46.1.219: Z^{e_{1}^{b}e_{2}^{b}}_{m_{1}^{b}m_{2}^{b}} + = H^{l_{1}^{b}l_{2}^{b}}_{d_{1}^{b}d_{2}^{b}} S^{d_{1}^{b}}_{m_{2}^{b}} S^{d_{2}^{b}l_{2}^{b}b_{2}^{b}}_{l_{2}^{b}l_{2}^{b}} \cdot + 1/2$$

$$(230) \qquad 47.1.222: Z_{m_{1}^{b}m_{2}^{b}}^{e_{2}^{b}} + = H_{d_{1}^{b}, d_{2}^{b}}^{l_{1}^{b}, l_{2}^{b}} S_{m_{1}^{b}}^{d_{1}^{b}} S_{l_{2}^{b}}^{d_{2}^{b}} S_{m_{2}^{b}, l_{2}^{b}}^{e_{2}^{b}e_{2}^{b}} \cdot -1/1$$

$$(231) \qquad 47.5.226: Z_{m_{l_{1}}^{b}m_{2}^{b}}^{e_{l_{2}}^{b}}+=H_{d_{l_{1}}^{l_{1}},d_{1}^{b}}^{l_{1}^{a}}S_{m_{l_{1}}^{b}}^{d_{1}^{b}}S_{l_{1}^{a}}^{e_{1}^{b}e_{2}^{b}}\cdot-1/1$$

$$(232) 48.1.230: Z_{m_1^b m_2^b}^{e_1^b e_2^b} + = H_{d_1^b, d_2^b}^{l_1^b, l_2^b} S_{l_1^b}^{e_1^b} S_{m_1^b}^{e_2^b} S_{m_2^b}^{d_1^b} \cdot + 1/4$$