

$$\left\{ \begin{array}{l} \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} \underset{\text{H}}{\equiv} -m\Psi_A \\ \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline - & \Psi_A \end{array}} = -m\overset{A}{\underline{\Psi}}_A \\ \end{array} \right. \quad \left. \begin{array}{l} \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} \underset{\text{H}}{\equiv} {}^A\tilde{\sigma}_B^\mu \overset{B}{\text{H}} - m\bar{\Psi}_A \\ \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline \Psi_A & - \end{array}} = {}^A\sigma_B^\mu \overset{A}{\bar{\Psi}}_B - m\overset{A}{\text{H}} \end{array} \right.$$

$$\left\{ \begin{array}{l} \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}}^\mu \underset{\mu \text{H}}{\equiv} \overset{B}{\underline{\text{H}}} \tilde{\sigma}_A^\mu \\ \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline - & \Psi_A \end{array}}^\mu = 0 \\ \end{array} \right. \quad \left. \begin{array}{l} \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}}^\mu \underset{\mu \Psi_A}{\equiv} \Psi_B \overset{B}{\sigma}_A^\mu \\ \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline \Psi_A & - \end{array}}^\mu \underset{\mu \Psi_A}{\equiv} 0 \end{array} \right.$$

$$\left\{ \begin{array}{l} x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} = \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline A & A \end{array}} = -m{}^x\Psi_A \\ x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline - & \Psi_A \end{array}} = \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline - & A \end{array}} = -m\overset{x}{\underline{\Psi}}_A \\ \end{array} \right. \quad \left. \begin{array}{l} x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} \underset{\text{H}}{\equiv} \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline A & A \end{array}} \underset{\text{H}}{\equiv} {}^A\tilde{\sigma}_B^\mu \overset{x}{\underline{\text{H}}} - m\overset{x}{\bar{\Psi}}_A \\ x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} \underset{\Psi_A}{\equiv} \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline \Psi_A & - \end{array}} \underset{\Psi_A}{\equiv} {}^A\sigma_B^\mu \overset{x}{\bar{\Psi}}_B - m\overset{x}{\text{H}} \end{array} \right.$$

$$\left\{ \begin{array}{l} x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}}^\mu = \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline A & A \end{array}}^\mu = \overset{x}{\underline{\text{H}}} \tilde{\sigma}_A^\mu \\ x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline - & \Psi_A \end{array}}^\mu = \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline - & A \end{array}}^\mu = {}^x\Psi_B \overset{B}{\sigma}_A^\mu \\ \end{array} \right. \quad \left. \begin{array}{l} x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} \underset{\text{H}}{\equiv} \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline A & A \end{array}} \underset{\text{H}}{\equiv} 0 \\ x \boxed{\begin{array}{c|c} \text{H} & \text{H} \\ \hline \text{H}^* & \text{H}^* \\ \hline A & A \end{array}} \underset{\Psi_A}{\equiv} \boxed{\begin{array}{c|c} x\text{H} & x\text{H} \\ \hline x\text{H}^* & x\text{H}^* \\ \hline \Psi_A & - \end{array}} \underset{\Psi_A}{\equiv} 0 \end{array} \right.$$

$$-m^x \Psi_A = \begin{array}{c} x \\ \boxed{\begin{array}{c} \Psi \\ \Psi^* \\ \vdots \end{array}} \\ A \end{array} = \underbrace{\begin{array}{c} x \\ \boxed{\begin{array}{c} \Psi \\ \Psi^* \\ \vdots \end{array}} \\ \mu \\ A \end{array}}_{\mu}^{\mu} = \frac{x \Psi^B B \tilde{\sigma}_A^\mu}{\mu}$$

$${}^A \tilde{\sigma}_B^\mu {}^x \bar{\Psi}_{\mu} - m^x \bar{\Psi}_A = \begin{array}{c} x \\ \boxed{\begin{array}{c} \bar{\Psi} \\ \bar{\Psi}^* \\ \vdots \end{array}} \\ A \end{array} = \underbrace{\begin{array}{c} x \\ \boxed{\begin{array}{c} \bar{\Psi} \\ \bar{\Psi}^* \\ \vdots \end{array}} \\ \mu \\ A \end{array}}_{\mu}^{\mu} = 0$$

$$-m \underline{x} \bar{\Psi} = \begin{array}{c} x \\ \boxed{\begin{array}{c} \bar{\Psi} \\ \bar{\Psi}^* \\ \vdots \end{array}} \\ \underline{-} \end{array} = \underbrace{\begin{array}{c} x \\ \boxed{\begin{array}{c} \bar{\Psi} \\ \bar{\Psi}^* \\ \vdots \end{array}} \\ \mu \\ \underline{-} \end{array}}_{\mu}^{\mu} = \frac{x \Psi_B^B \sigma_A^\mu}{\mu}$$

$${}^A \sigma_B^\mu {}^x \bar{\Psi}_{\mu} - m^x \bar{\Psi} = \begin{array}{c} x \\ \boxed{\begin{array}{c} \bar{\Psi} \\ \bar{\Psi}^* \\ \vdots \end{array}} \\ A \end{array} = \underbrace{\begin{array}{c} x \\ \boxed{\begin{array}{c} \bar{\Psi} \\ \bar{\Psi}^* \\ \vdots \end{array}} \\ \mu \\ A \end{array}}_{\mu}^{\mu} = 0$$

$$\left\{ \begin{array}{l} \mathbb{L}_{AB}^\mu \dot{\bar{\Psi}}^* - m\psi_A = \frac{\partial \mathcal{L}}{\partial \psi^A} = \partial_\mu \frac{\partial \mathcal{L}}{\partial_\mu \Psi^A} = 0 \quad -m\psi^A = \frac{\partial \mathcal{L}}{\partial \psi^A} = \partial_\mu \frac{\partial \mathcal{L}}{\partial_\mu \Psi_A} = {}^{\underline{\mu}} \bar{\Psi}_{\dot{B}} \tilde{\mathbb{L}}^{\mu \dot{B} A} \\ \tilde{\mathbb{L}}^{\mu \dot{A} B} \underline{\Psi}_B - m\bar{\psi}^{\dot{A}} = \frac{\partial \mathcal{L}}{\partial \bar{\psi}^{\dot{A}}} = \partial_\mu \frac{\partial \mathcal{L}}{\partial_\mu \bar{\Psi}^{\dot{A}}} = 0 \quad -m\bar{\psi}^{\dot{A}} = \frac{\partial \mathcal{L}}{\partial \bar{\psi}^{\dot{A}}} = \partial_\mu \frac{\partial \mathcal{L}}{\partial_\mu \bar{\Psi}^{\dot{A}}} = {}^{\underline{\mu}} \bar{\Psi}_{\dot{B}} \mathbb{L}^\mu_{B \dot{A}} \end{array} \right.$$

$$\mathcal{D}\psi$$

$$\mathcal{L}(\psi)$$

$$D^g = \underline{\mathcal{V}}^\mu \boxtimes \underline{\mathsf{H}}_{\mu \underline{\mathfrak{c}}}^g$$

$$D^g = \underline{\mathcal{V}}^\mu \boxtimes \underline{\mathsf{H}}_{\mu \underline{\mathfrak{c}}}^g$$

$$D^g \underline{\mathcal{V}}^\nu + \underline{\mathcal{V}}^\nu D^g = \underline{\mathcal{V}}^\lambda \star \underline{\mathcal{V}}^\mu \underbrace{\left( d^g \underline{\mathcal{L}} g \right)_\mu}_\lambda^{\nu} 1 + 2 \underline{\mathcal{V}}^\lambda \star \underline{\mathcal{V}}^\nu \underline{\mathcal{H}}_{\lambda^\nu}^g$$

$$\text{LHS} = \underline{\mathcal{V}}^\lambda \underline{\mathcal{H}}_{\lambda^\nu}^g \underline{\mathcal{V}}^\nu + \underline{\mathcal{V}}^\nu \underline{\mathcal{V}}^\lambda \underline{\mathcal{H}}_{\lambda^\nu}^g = \underline{\mathcal{V}}^\lambda \left( D_{\underline{\mathcal{L}}_\lambda}^g \star \underline{\mathcal{V}}^\nu \right) + \underbrace{\underline{\mathcal{V}}^\lambda \underline{\mathcal{V}}^\nu + \underline{\mathcal{V}}^\nu \underline{\mathcal{V}}^\lambda}_{\underline{\mathcal{H}}_{\lambda^\nu}^g} = \text{RHS}$$

$$\partial \underline{\mathcal{L}} D^g \underline{\mathcal{Q}}^o = \underline{\mathcal{L}} \underline{\mathcal{V}}^\mu \underbrace{\underline{\mathcal{L}} g}_\mu + \left( d^g \underline{\mathcal{L}} g \right)_\mu = \underline{\mathcal{L}} \underline{\mathcal{Q}}^j \underbrace{\underline{\mathcal{L}}}_j + \left( d^g \underline{\mathcal{L}} g \right)_j$$

$$D = \gamma^\mu{}_\mu \partial$$

$$D = \gamma^\mu{}_\mu \partial$$