

1 $\psi^2 H^4 D$

$l^2 H^4 D$:

$$\begin{aligned}
& i(\bar{l}_p \gamma^\mu l_r)(H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger H) \\
& i(\bar{l}_p \gamma^\mu \tau^I l_r)[(H^\dagger \overleftrightarrow{D}_\mu^I H)(H^\dagger H) + (H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger \tau^I H)] \\
& i\epsilon^{IJK}(\bar{l}_p \gamma^\mu \tau^I l_r)(H^\dagger \overleftrightarrow{D}_\mu^J H)(H^\dagger \tau^K H) \\
& \epsilon^{IJK}(\bar{l}_p \gamma^\mu \tau^I l_r)(H^\dagger \tau^J H)D_\mu(H^\dagger \tau^K H)
\end{aligned} \tag{1}$$

$$\begin{aligned}
& (\bar{l}_p \gamma^\mu l_r)D_\mu(H^\dagger H)(H^\dagger H) \\
& i(\bar{l}_p \gamma^\mu \overleftrightarrow{D}_\mu l_r)(H^\dagger H)(H^\dagger H) \\
& i(\bar{l}_p \gamma^\mu \overleftrightarrow{D}_\mu^I l_r)(H^\dagger \tau^I H)(H^\dagger H) \\
& D_\mu(\bar{l}_p \gamma^\mu \tau^I l_r)(H^\dagger \tau^I H)(H^\dagger H)
\end{aligned} \tag{2}$$

$e^2 H^4 D$:

$$i(\bar{e}_p \gamma^\mu e_r)(H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger H) \tag{3}$$

$$\begin{aligned}
& (\bar{e}_p \gamma^\mu e_r)D_\mu(H^\dagger H)(H^\dagger H) \\
& i(\bar{e}_p \gamma^\mu \overleftrightarrow{D}_\mu e_r)(H^\dagger H)(H^\dagger H)
\end{aligned} \tag{4}$$

$q^2 H^4 D$:

$$\begin{aligned}
& i(\bar{q}_p \gamma^\mu q_r)(H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger H) \\
& i(\bar{q}_p \gamma^\mu \tau^I q_r)[(H^\dagger \overleftrightarrow{D}_\mu^I H)(H^\dagger H) + (H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger \tau^I H)] \\
& i\epsilon^{IJK}(\bar{q}_p \gamma^\mu \tau^I q_r)(H^\dagger \overleftrightarrow{D}_\mu^J H)(H^\dagger \tau^K H) \\
& \epsilon^{IJK}(\bar{q}_p \gamma^\mu \tau^I q_r)(H^\dagger \tau^J H)D_\mu(H^\dagger \tau^K H)
\end{aligned} \tag{5}$$

$$\begin{aligned}
& (\bar{q}_p \gamma^\mu q_r)D_\mu(H^\dagger H)(H^\dagger H) \\
& i(\bar{q}_p \gamma^\mu \overleftrightarrow{D}_\mu q_r)(H^\dagger H)(H^\dagger H) \\
& i(\bar{q}_p \gamma^\mu \overleftrightarrow{D}_\mu^I q_r)(H^\dagger \tau^I H)(H^\dagger H) \\
& D_\mu(\bar{q}_p \gamma^\mu \tau^I q_r)(H^\dagger \tau^I H)(H^\dagger H)
\end{aligned} \tag{6}$$

$u^2 H^4 D$:

$$i(\bar{u}_p \gamma^\mu u_r)(H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger H) \tag{7}$$

$$\begin{aligned}
& (\bar{u}_p \gamma^\mu u_r)D_\mu(H^\dagger H)(H^\dagger H) \\
& i(\bar{u}_p \gamma^\mu \overleftrightarrow{D}_\mu u_r)(H^\dagger H)(H^\dagger H)
\end{aligned} \tag{8}$$

$d^2 H^4 D$:

$$i(\bar{d}_p \gamma^\mu d_r)(H^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger H) \quad (9)$$

$$\begin{aligned} & (\bar{d}_p \gamma^\mu d_r) D_\mu (H^\dagger H)(H^\dagger H) \\ & i(\bar{d}_p \gamma^\mu \overleftrightarrow{D}_\mu d_r)(H^\dagger H)(H^\dagger H) \end{aligned} \quad (10)$$

$udH^4 D$:

$$i(\bar{u}_p \gamma^\mu d_r)(\tilde{H}^\dagger \overleftrightarrow{D}_\mu H)(H^\dagger H) \quad (11)$$

2 $\psi^2 X H^2 D$

$e^2 W H^2 D$:

$$\begin{aligned} & (\bar{e}_p \gamma^\nu e_r) D^\mu (H^\dagger \tau^I H) W_{\mu\nu}^I \\ & (\bar{e}_p \gamma^\nu e_r) D^\mu (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\ & i(\bar{e}_p \gamma^\nu e_r)(H^\dagger \overleftrightarrow{D}^{I\mu} H) W_{\mu\nu}^I \\ & i(\bar{e}_p \gamma^\nu e_r)(H^\dagger \overleftrightarrow{D}^{I\mu} H) \widetilde{W}_{\mu\nu}^I \end{aligned} \quad (12)$$

$$\begin{aligned} & D^\mu (\bar{e}_p \gamma^\nu e_r)(H^\dagger \tau^I H) W_{\mu\nu}^I \\ & i(\bar{e}_p \gamma^\nu \overleftrightarrow{D}^\mu e_r)(H^\dagger \tau^I H) W_{\mu\nu}^I \\ & i(\bar{e}_p \gamma^\nu \overleftrightarrow{D}^\mu e_r)(H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \end{aligned} \quad (13)$$

$e^2 B H^2 D$:

$$\begin{aligned} & (\bar{e}_p \gamma^\nu e_r) D^\mu (H^\dagger H) B_{\mu\nu} \\ & (\bar{e}_p \gamma^\nu e_r) D^\mu (H^\dagger H) \tilde{B}_{\mu\nu} \\ & i(\bar{e}_p \gamma^\nu e_r)(H^\dagger \overleftrightarrow{D}^\mu H) B_{\mu\nu} \\ & i(\bar{e}_p \gamma^\nu e_r)(H^\dagger \overleftrightarrow{D}^\mu H) \tilde{B}_{\mu\nu} \end{aligned} \quad (14)$$

$$\begin{aligned} & D^\mu (\bar{e}_p \gamma^\nu e_r)(H^\dagger H) B_{\mu\nu} \\ & i(\bar{e}_p \gamma^\nu \overleftrightarrow{D}^\mu e_r)(H^\dagger H) B_{\mu\nu} \\ & i(\bar{e}_p \gamma^\nu \overleftrightarrow{D}^\mu e_r)(H^\dagger H) \tilde{B}_{\mu\nu} \end{aligned} \quad (15)$$

$u^2 G H^2 D$:

$$\begin{aligned} & (\bar{u}_p \gamma^\nu T^A u_r) D^\mu (H^\dagger H) G_{\mu\nu}^A \\ & (\bar{u}_p \gamma^\nu T^A u_r) D^\mu (H^\dagger H) \tilde{G}_{\mu\nu}^A \\ & i(\bar{u}_p \gamma^\nu T^A u_r)(H^\dagger \overleftrightarrow{D}^\mu H) G_{\mu\nu}^A \\ & i(\bar{u}_p \gamma^\nu T^A u_r)(H^\dagger \overleftrightarrow{D}^\mu H) \tilde{G}_{\mu\nu}^A \end{aligned} \quad (16)$$

$$\begin{aligned}
& D^\mu(\bar{u}_p \gamma^\nu T^A u_r)(H^\dagger H)G_{\mu\nu}^A \\
& i(\bar{u}_p \gamma^\nu T^A \overleftrightarrow{D}^\mu u_r)(H^\dagger H)G_{\mu\nu} \\
& i(\bar{u}_p \gamma^\nu T^A \overleftrightarrow{D}^\mu u_r)(H^\dagger H)\tilde{G}_{\mu\nu}
\end{aligned} \tag{17}$$

$u^2 W H^2 D$:

$$\begin{aligned}
& (\bar{u}_p \gamma^\nu u_r) D^\mu (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& (\bar{u}_p \gamma^\nu u_r) D^\mu (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\
& i(\bar{u}_p \gamma^\nu u_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) W_{\mu\nu}^I \\
& i(\bar{u}_p \gamma^\nu u_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) \widetilde{W}_{\mu\nu}^I
\end{aligned} \tag{18}$$

$$\begin{aligned}
& D^\mu(\bar{u}_p \gamma^\nu u_r)(H^\dagger \tau^I H)W_{\mu\nu}^I \\
& i(\bar{u}_p \gamma^\nu \overleftrightarrow{D}^\mu u_r)(H^\dagger \tau^I H)W_{\mu\nu}^I \\
& i(\bar{u}_p \gamma^\nu \overleftrightarrow{D}^\mu u_r)(H^\dagger \tau^I H)\widetilde{W}_{\mu\nu}^I
\end{aligned} \tag{19}$$

$u^2 B H^2 D$:

$$\begin{aligned}
& (\bar{u}_p \gamma^\nu u_r) D^\mu (H^\dagger H) B_{\mu\nu} \\
& (\bar{u}_p \gamma^\nu u_r) D^\mu (H^\dagger H) \tilde{B}_{\mu\nu} \\
& i(\bar{u}_p \gamma^\nu u_r) (H^\dagger \overleftrightarrow{D}^\mu H) B_{\mu\nu} \\
& i(\bar{u}_p \gamma^\nu u_r) (H^\dagger \overleftrightarrow{D}^\mu H) \tilde{B}_{\mu\nu}
\end{aligned} \tag{20}$$

$$\begin{aligned}
& D^\mu(\bar{u}_p \gamma^\nu u_r)(H^\dagger H)B_{\mu\nu} \\
& i(\bar{u}_p \gamma^\nu \overleftrightarrow{D}^\mu u_r)(H^\dagger H)B_{\mu\nu} \\
& i(\bar{u}_p \gamma^\nu \overleftrightarrow{D}^\mu u_r)(H^\dagger H)\tilde{B}_{\mu\nu}
\end{aligned} \tag{21}$$

$d^2 G H^2 D$:

$$\begin{aligned}
& (\bar{d}_p \gamma^\nu T^A d_r) D^\mu (H^\dagger H) G_{\mu\nu}^A \\
& (\bar{d}_p \gamma^\nu T^A d_r) D^\mu (H^\dagger H) \tilde{G}_{\mu\nu}^A \\
& i(\bar{d}_p \gamma^\nu T^A d_r) (H^\dagger \overleftrightarrow{D}^\mu H) G_{\mu\nu}^A \\
& i(\bar{d}_p \gamma^\nu T^A d_r) (H^\dagger \overleftrightarrow{D}^\mu H) \tilde{G}_{\mu\nu}^A
\end{aligned} \tag{22}$$

$$\begin{aligned}
& D^\mu(\bar{d}_p \gamma^\nu T^A d_r)(H^\dagger H)G_{\mu\nu}^A \\
& i(\bar{d}_p \gamma^\nu T^A \overleftrightarrow{D}^\mu d_r)(H^\dagger H)G_{\mu\nu} \\
& i(\bar{d}_p \gamma^\nu T^A \overleftrightarrow{D}^\mu d_r)(H^\dagger H)\tilde{G}_{\mu\nu}
\end{aligned} \tag{23}$$

$d^2 W H^2 D$:

$$\begin{aligned}
& (\bar{d}_p \gamma^\nu d_r) D^\mu (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& (\bar{d}_p \gamma^\nu d_r) D^\mu (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\
& i(\bar{d}_p \gamma^\nu d_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) W_{\mu\nu}^I \\
& i(\bar{d}_p \gamma^\nu d_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) \widetilde{W}_{\mu\nu}^I
\end{aligned} \tag{24}$$

$$\begin{aligned}
& D^\mu (\bar{d}_p \gamma^\nu d_r) (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& i(\bar{d}_p \gamma^\nu \overleftrightarrow{D}^\mu d_r) (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& i(\bar{d}_p \gamma^\nu \overleftrightarrow{D}^\mu d_r) (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I
\end{aligned} \tag{25}$$

$d^2 B H^2 D$:

$$\begin{aligned}
& (\bar{d}_p \gamma^\nu d_r) D^\mu (H^\dagger H) B_{\mu\nu} \\
& (\bar{d}_p \gamma^\nu d_r) D^\mu (H^\dagger H) \widetilde{B}_{\mu\nu} \\
& i(\bar{d}_p \gamma^\nu d_r) (H^\dagger \overleftrightarrow{D}^\mu H) B_{\mu\nu} \\
& i(\bar{d}_p \gamma^\nu d_r) (H^\dagger \overleftrightarrow{D}^\mu H) \widetilde{B}_{\mu\nu}
\end{aligned} \tag{26}$$

$$\begin{aligned}
& D^\mu (\bar{d}_p \gamma^\nu d_r) (H^\dagger H) B_{\mu\nu} \\
& i(\bar{d}_p \gamma^\nu \overleftrightarrow{D}^\mu d_r) (H^\dagger H) B_{\mu\nu} \\
& i(\bar{d}_p \gamma^\nu \overleftrightarrow{D}^\mu d_r) (H^\dagger H) \widetilde{B}_{\mu\nu}
\end{aligned} \tag{27}$$

$udGH^2D$:

$$\begin{aligned}
& (\bar{u}_p \gamma^\nu T^A d_r) (\widetilde{H}^\dagger D^\mu H) G_{\mu\nu}^A \\
& (\bar{u}_p \gamma^\nu T^A d_r) (\widetilde{H}^\dagger D^\mu H) \widetilde{G}_{\mu\nu}^A
\end{aligned} \tag{28}$$

$udWH^2D$:

$$\begin{aligned}
& (\bar{u}_p \gamma^\nu d_r) (\widetilde{H}^\dagger \tau^I D^\mu H) W_{\mu\nu}^I \\
& (\bar{u}_p \gamma^\nu d_r) (\widetilde{H}^\dagger \tau^I D^\mu H) \widetilde{W}_{\mu\nu}^I
\end{aligned} \tag{29}$$

$$\begin{aligned}
& (\bar{u}_p \gamma^\nu D^\mu d_r) (\widetilde{H}^\dagger \tau^I H) W_{\mu\nu}^I \\
& (\bar{u}_p \gamma^\nu D^\mu d_r) (\widetilde{H}^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\
& (\bar{u}_p \gamma^\nu d_r) (\widetilde{H}^\dagger \tau^I H) D^\mu W_{\mu\nu}^I
\end{aligned} \tag{30}$$

$udBH^2D$:

$$\begin{aligned}
& (\bar{u}_p \gamma^\nu d_r) (\widetilde{H}^\dagger D^\mu H) B_{\mu\nu} \\
& (\bar{u}_p \gamma^\nu d_r) (\widetilde{H}^\dagger D^\mu H) \widetilde{B}_{\mu\nu}
\end{aligned} \tag{31}$$

l^2WH^2D :

$$\begin{aligned}
& (\bar{l}_p \gamma^\nu l_r) D^\mu (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& (\bar{l}_p \gamma^\nu l_r) D^\mu (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu l_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) W_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu l_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) \widetilde{W}_{\mu\nu}^I \\
& (\bar{l}_p \gamma^\nu \tau^I l_r) D^\mu (H^\dagger H) W_{\mu\nu}^I \\
& (\bar{l}_p \gamma^\nu \tau^I l_r) D^\mu (H^\dagger H) \widetilde{W}_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \overleftrightarrow{D}^\mu H) W_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \overleftrightarrow{D}^\mu H) \widetilde{W}_{\mu\nu}^I \\
& \epsilon^{IJK} (\bar{l}_p \gamma^\nu \tau^I l_r) D^\mu (H^\dagger \tau^J H) W_{\mu\nu}^K \\
& \epsilon^{IJK} (\bar{l}_p \gamma^\nu \tau^I l_r) D^\mu (H^\dagger \tau^J H) \widetilde{W}_{\mu\nu}^K \\
& i\epsilon^{IJK} (\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \overleftrightarrow{D}^{J\mu} H) W_{\mu\nu}^K \\
& i\epsilon^{IJK} (\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \overleftrightarrow{D}^{J\mu} H) \widetilde{W}_{\mu\nu}^K
\end{aligned} \tag{32}$$

$$\begin{aligned}
& D^\mu (\bar{l}_p \gamma^\nu l_r) (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^\mu l_r) (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^\mu l_r) (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\
& D^\mu (\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger H) W_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^{I\mu} l_r) (H^\dagger H) W_{\mu\nu}^I \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^{I\mu} l_r) (H^\dagger H) \widetilde{W}_{\mu\nu}^I \\
& \epsilon^{IJK} D^\mu (\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \tau^J H) W_{\mu\nu}^K \\
& i\epsilon^{IJK} (\bar{l}_p \gamma^\nu \overleftrightarrow{D}^{I\mu} l_r) (H^\dagger \tau^J H) W_{\mu\nu}^K \\
& i\epsilon^{IJK} (\bar{l}_p \gamma^\nu \overleftrightarrow{D}^{I\mu} l_r) (H^\dagger \tau^J H) \widetilde{W}_{\mu\nu}^K
\end{aligned} \tag{33}$$

l^2BH^2D :

$$\begin{aligned}
& (\bar{l}_p \gamma^\nu \tau^I l_r) D^\mu (H^\dagger \tau^I H) B_{\mu\nu} \\
& (\bar{l}_p \gamma^\nu \tau^I l_r) D^\mu (H^\dagger \tau^I H) \tilde{B}_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) B_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu \tau^I l_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) \tilde{B}_{\mu\nu} \\
& (\bar{l}_p \gamma^\nu l_r) D^\mu (H^\dagger H) B_{\mu\nu} \\
& (\bar{l}_p \gamma^\nu l_r) D^\mu (H^\dagger H) \tilde{B}_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu l_r) (H^\dagger \overleftrightarrow{D}^\mu H) B_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu l_r) (H^\dagger \overleftrightarrow{D}^\mu H) \tilde{B}_{\mu\nu}
\end{aligned} \tag{34}$$

$$\begin{aligned}
& D^\mu(\bar{l}_p \gamma^\nu \tau^I l_r)(H^\dagger \tau^I H) B_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^{I\mu} l_r)(H^\dagger \tau^I H) B_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^{I\mu} l_r)(H^\dagger \tau^I H) \tilde{B}_{\mu\nu} \\
& D^\mu(\bar{l}_p \gamma^\nu l_r)(H^\dagger H) B_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^\mu l_r)(H^\dagger H) B_{\mu\nu} \\
& i(\bar{l}_p \gamma^\nu \overleftrightarrow{D}^\mu l_r)(H^\dagger H) \tilde{B}_{\mu\nu}
\end{aligned} \tag{35}$$

$q^2 G H^2 D$:

$$\begin{aligned}
& (\bar{q}_p \gamma^\nu T^A \tau^I q_r) D^\mu (H^\dagger \tau^I H) G_{\mu\nu}^A \\
& (\bar{q}_p \gamma^\nu T^A \tau^I q_r) D^\mu (H^\dagger \tau^I H) \tilde{G}_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A \tau^I q_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) G_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A \tau^I q_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) \tilde{G}_{\mu\nu}^A \\
& (\bar{q}_p \gamma^\nu T^A q_r) D^\mu (H^\dagger H) G_{\mu\nu}^A \\
& (\bar{q}_p \gamma^\nu T^A q_r) D^\mu (H^\dagger H) \tilde{G}_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A q_r) (H^\dagger \overleftrightarrow{D}^\mu H) G_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A q_r) (H^\dagger \overleftrightarrow{D}^\mu H) \tilde{G}_{\mu\nu}^A
\end{aligned} \tag{36}$$

$$\begin{aligned}
& D^\mu(\bar{q}_p \gamma^\nu T^A \tau^I q_r)(H^\dagger \tau^I H) G_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A \overleftrightarrow{D}^{I\mu} q_r)(H^\dagger \tau^I H) G_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A \overleftrightarrow{D}^{I\mu} q_r)(H^\dagger \tau^I H) \tilde{G}_{\mu\nu}^A \\
& D^\mu(\bar{q}_p \gamma^\nu T^A q_r)(H^\dagger H) G_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A \overleftrightarrow{D}^\mu q_r)(H^\dagger H) G_{\mu\nu}^A \\
& i(\bar{q}_p \gamma^\nu T^A \overleftrightarrow{D}^\mu q_r)(H^\dagger H) \tilde{G}_{\mu\nu}^A
\end{aligned} \tag{37}$$

$q^2 W H^2 D$:

$$\begin{aligned}
& (\bar{q}_p \gamma^\nu q_r) D^\mu (H^\dagger \tau^I H) W_{\mu\nu}^I \\
& (\bar{q}_p \gamma^\nu q_r) D^\mu (H^\dagger \tau^I H) \widetilde{W}_{\mu\nu}^I \\
& i(\bar{q}_p \gamma^\nu q_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) W_{\mu\nu}^I \\
& i(\bar{q}_p \gamma^\nu q_r) (H^\dagger \overleftrightarrow{D}^{I\mu} H) \widetilde{W}_{\mu\nu}^I \\
& (\bar{q}_p \gamma^\nu \tau^I q_r) D^\mu (H^\dagger H) W_{\mu\nu}^I \\
& (\bar{q}_p \gamma^\nu \tau^I q_r) D^\mu (H^\dagger H) \widetilde{W}_{\mu\nu}^I \\
& i(\bar{q}_p \gamma^\nu \tau^I q_r) (H^\dagger \overleftrightarrow{D}^\mu H) W_{\mu\nu}^I \\
& i(\bar{q}_p \gamma^\nu \tau^I q_r) (H^\dagger \overleftrightarrow{D}^\mu H) \widetilde{W}_{\mu\nu}^I \\
& \epsilon^{IJK} (\bar{q}_p \gamma^\nu \tau^I q_r) D^\mu (H^\dagger \tau^J H) W_{\mu\nu}^K \\
& \epsilon^{IJK} (\bar{q}_p \gamma^\nu \tau^I q_r) D^\mu (H^\dagger \tau^J H) \widetilde{W}_{\mu\nu}^K \\
& i\epsilon^{IJK} (\bar{q}_p \gamma^\nu \tau^I q_r) (H^\dagger \overleftrightarrow{D}^{J\mu} H) W_{\mu\nu}^K \\
& i\epsilon^{IJK} (\bar{q}_p \gamma^\nu \tau^I q_r) (H^\dagger \overleftrightarrow{D}^{J\mu} H) \widetilde{W}_{\mu\nu}^K
\end{aligned} \tag{38}$$

$$\begin{aligned}
& D^\mu(\bar{q}_p\gamma^\nu q_r)(H^\dagger\tau^I H)W_{\mu\nu}^I \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^\mu q_r)(H^\dagger\tau^I H)W_{\mu\nu}^I \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^\mu q_r)(H^\dagger\tau^I H)\widetilde{W}_{\mu\nu}^I \\
& D^\mu(\bar{q}_p\gamma^\nu\tau^I q_r)(H^\dagger H)W_{\mu\nu}^I \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^{I\mu} q_r)(H^\dagger H)W_{\mu\nu}^I \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^{I\mu} q_r)(H^\dagger H)\widetilde{W}_{\mu\nu}^I \\
& \epsilon^{IJK}D^\mu(\bar{q}_p\gamma^\nu\tau^I q_r)(H^\dagger\tau^J H)W_{\mu\nu}^K \\
& i\epsilon^{IJK}(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^{I\mu} q_r)(H^\dagger\tau^J H)W_{\mu\nu}^K \\
& i\epsilon^{IJK}(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^{I\mu} q_r)(H^\dagger\tau^J H)\widetilde{W}_{\mu\nu}^K
\end{aligned} \tag{39}$$

q^2BH^2D :

$$\begin{aligned}
& (\bar{q}_p\gamma^\nu\tau^I q_r)D^\mu(H^\dagger\tau^I H)B_{\mu\nu} \\
& (\bar{q}_p\gamma^\nu\tau^I q_r)D^\mu(H^\dagger\tau^I H)\widetilde{B}_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu\tau^I q_r)(H^\dagger\overleftrightarrow{D}^{I\mu} H)B_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu\tau^I q_r)(H^\dagger\overleftrightarrow{D}^{I\mu} H)\widetilde{B}_{\mu\nu} \\
& (\bar{q}_p\gamma^\nu q_r)D^\mu(H^\dagger H)B_{\mu\nu} \\
& (\bar{q}_p\gamma^\nu q_r)D^\mu(H^\dagger H)\widetilde{B}_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu q_r)(H^\dagger\overleftrightarrow{D}^\mu H)B_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu q_r)(H^\dagger\overleftrightarrow{D}^\mu H)\widetilde{B}_{\mu\nu}
\end{aligned} \tag{40}$$

$$\begin{aligned}
& D^\mu(\bar{q}_p\gamma^\nu\tau^I q_r)(H^\dagger\tau^I H)B_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^{I\mu} q_r)(H^\dagger\tau^I H)B_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^{I\mu} q_r)(H^\dagger\tau^I H)\widetilde{B}_{\mu\nu} \\
& D^\mu(\bar{q}_p\gamma^\nu q_r)(H^\dagger H)B_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^\mu q_r)(H^\dagger H)B_{\mu\nu} \\
& i(\bar{q}_p\gamma^\nu\overleftrightarrow{D}^\mu q_r)(H^\dagger H)\widetilde{B}_{\mu\nu}
\end{aligned} \tag{41}$$

3 $\psi^2H^3D^2$

leH^3D^2 :

$$\begin{aligned}
& (\bar{l}_p e_r H)(D_\mu H^\dagger D^\mu H) \\
& (\bar{l}_p e_r \tau^I H)(D_\mu H^\dagger \tau^I D^\mu H) \\
& (\bar{l}_p \sigma^{\mu\nu} e_r H)(D_\mu H^\dagger D_\nu H) \\
& (\bar{l}_p \sigma^{\mu\nu} e_r \tau^I H)(D_\mu H^\dagger \tau^I D_\nu H) \\
& (\bar{l}_p e_r D^\mu H)(H^\dagger D_\mu H) \\
& (\bar{l}_p \sigma^{\mu\nu} e_r D_\nu H)(H^\dagger D_\mu H)
\end{aligned} \tag{42}$$

$$\begin{aligned}
& (\bar{l}_p D^\mu e_r H) D_\mu (H^\dagger H) \\
& (\bar{l}_p D^\mu e_r H) (H^\dagger i \overleftrightarrow{D}_\mu H) \\
& (\bar{l}_p \sigma^{\mu\nu} D_\mu e_r H) D_\nu (H^\dagger H) \\
& (\bar{l}_p \sigma^{\mu\nu} D_\mu e_r H) (H^\dagger i \overleftrightarrow{D}_\nu H) \\
& (D^\mu \bar{l}_p e_r H) D_\mu (H^\dagger H) \\
& (D^\mu \bar{l}_p e_r H) (H^\dagger i \overleftrightarrow{D}_\mu H) \\
& (\bar{l}_p D^2 e_r H) (H^\dagger H) \\
& (\bar{l}_p e_r D^2 H) (H^\dagger H) \\
& (D^\mu \bar{l}_p e_r D_\mu H) (H^\dagger H) \\
& (D_\mu \bar{l}_p \sigma^{\mu\nu} D_\nu e_r H) (H^\dagger H)
\end{aligned} \tag{43}$$

$quH^3 D^2$:

$$\begin{aligned}
& (\bar{q}_p u_r \tilde{H}) (D_\mu H^\dagger D^\mu H) \\
& (\bar{q}_p u_r \tau^I \tilde{H}) (D_\mu H^\dagger \tau^I D^\mu H) \\
& (\bar{q}_p \sigma^{\mu\nu} u_r \tilde{H}) (D_\mu H^\dagger D_\nu H) \\
& (\bar{q}_p \sigma^{\mu\nu} u_r \tau^I \tilde{H}) (D_\mu H^\dagger \tau^I D_\nu H) \\
& (\bar{q}_p u_r D^\mu \tilde{H}) (D_\mu H^\dagger H) \\
& (\bar{q}_p \sigma^{\mu\nu} u_r D_\nu \tilde{H}) (D_\mu H^\dagger H)
\end{aligned} \tag{44}$$

$$\begin{aligned}
& (\bar{q}_p D^\mu u_r \tilde{H}) D_\mu (H^\dagger H) \\
& (\bar{q}_p D^\mu u_r \tilde{H}) (H^\dagger i \overleftrightarrow{D}_\mu H) \\
& (\bar{q}_p \sigma^{\mu\nu} D_\mu u_r \tilde{H}) D_\nu (H^\dagger H) \\
& (\bar{q}_p \sigma^{\mu\nu} D_\mu u_r \tilde{H}) (H^\dagger i \overleftrightarrow{D}_\nu H) \\
& (D^\mu \bar{q}_p u_r \tilde{H}) D_\mu (H^\dagger H) \\
& (D^\mu \bar{q}_p u_r \tilde{H}) (H^\dagger i \overleftrightarrow{D}_\mu H) \\
& (\bar{q}_p D^2 u_r \tilde{H}) (H^\dagger H) \\
& (\bar{q}_p u_r D^2 \tilde{H}) (H^\dagger H) \\
& (D^\mu \bar{q}_p u_r D_\mu \tilde{H}) (H^\dagger H) \\
& (D_\mu \bar{q}_p \sigma^{\mu\nu} D_\nu u_r \tilde{H}) (H^\dagger H)
\end{aligned} \tag{45}$$

$qdH^3 D^2$:

$$\begin{aligned}
& (\bar{q}_p d_r H) (D_\mu H^\dagger D^\mu H) \\
& (\bar{q}_p d_r \tau^I H) (D_\mu H^\dagger \tau^I D^\mu H) \\
& (\bar{q}_p \sigma^{\mu\nu} d_r H) (D_\mu H^\dagger D_\nu H) \\
& (\bar{q}_p \sigma^{\mu\nu} d_r \tau^I H) (D_\mu H^\dagger \tau^I D_\nu H) \\
& (\bar{q}_p d_r D^\mu H) (H^\dagger D_\mu H) \\
& (\bar{q}_p \sigma^{\mu\nu} d_r D_\nu H) (H^\dagger D_\mu H)
\end{aligned} \tag{46}$$

$$\begin{aligned}
& (\bar{q}_p D^\mu d_r H) D_\mu (H^\dagger H) \\
& (\bar{q}_p D^\mu d_r H) (H^\dagger i \overleftrightarrow{D}_\mu H) \\
& (\bar{q}_p \sigma^{\mu\nu} D_\mu d_r H) D_\nu (H^\dagger H) \\
& (\bar{q}_p \sigma^{\mu\nu} D_\mu d_r H) (H^\dagger i \overleftrightarrow{D}_\nu H) \\
& (D^\mu \bar{q}_p d_r H) D_\mu (H^\dagger H) \\
& (D^\mu \bar{q}_p d_r H) (H^\dagger i \overleftrightarrow{D}_\mu H) \\
& (\bar{q}_p D^2 d_r H) (H^\dagger H) \\
& (\bar{q}_p d_r D^2 H) (H^\dagger H) \\
& (D^\mu \bar{q}_p d_r D_\mu H) (H^\dagger H) \\
& (D_\mu \bar{q}_p \sigma^{\mu\nu} D_\nu d_r H) (H^\dagger H)
\end{aligned} \tag{47}$$

4 $\psi^2 H^2 D^3$

$l^2 H^2 D^3$:

$$\begin{aligned}
& i(\bar{l}_p \gamma^\mu D^\nu l_r) (D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D^\nu l_r) (H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (D_{(\mu} D_{\nu)} H^\dagger \tau^I H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (H^\dagger \tau^I D_{(\mu} D_{\nu)} H) + \text{h.c.}
\end{aligned} \tag{48}$$

$$\begin{aligned}
& (\bar{l}_p \gamma^\mu D^\nu l_r) (D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D^\nu l_r) (H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D^\nu l_r) (D_\mu H^\dagger D_\nu H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D^\nu l_r) (D_\nu H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D^\nu l_r) (D_\mu H^\dagger D_\nu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D^\nu l_r) (D_\nu H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D_\mu l_r) (D^2 H^\dagger H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D_\mu l_r) (H^\dagger D^2 H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \overleftrightarrow{D}_\mu l_r) (D^\nu H^\dagger D_\nu H) \\
& \epsilon^{\mu\nu\rho\lambda} (\bar{l}_p \gamma_\mu D_\nu l_r) (D_\rho H^\dagger D_\lambda H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu l_r) (H^\dagger D_\mu D^2 H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D_\mu D^\nu l_r) (H^\dagger D_\nu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D_\mu D^\nu l_r) (H^\dagger D_\nu H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D_\mu D^\nu l_r) (D_\nu H^\dagger H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D^2 l_r) (H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu D^2 l_r) (H^\dagger D_\mu H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu D_\mu D^2 l_r) (H^\dagger H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (D_{(\mu} D_{\nu)} H^\dagger \tau^I H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (H^\dagger \tau^I D_{(\mu} D_{\nu)} H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (D_\mu H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (D_\nu H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (D_\mu H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D^\nu l_r) (D_\nu H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D_\mu l_r) (D^2 H^\dagger \tau^I H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D_\mu l_r) (H^\dagger \tau^I D^2 H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I \overleftrightarrow{D}_\mu l_r) (D^\nu H^\dagger \tau^I D_\nu H) \\
& \epsilon^{\mu\nu\rho\lambda} (\bar{l}_p \gamma_\mu \tau^I D_\nu l_r) (D_\rho H^\dagger \tau^I D_\lambda H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I l_r) (H^\dagger \tau^I D_\mu D^2 H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D_\mu D^\nu l_r) (H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D_\mu D^\nu l_r) (H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D_\mu D^\nu l_r) (D_\nu H^\dagger \tau^I H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D^2 l_r) (H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& (\bar{l}_p \gamma^\mu \tau^I D^2 l_r) (H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& i(\bar{l}_p \gamma^\mu \tau^I D_\mu D^2 l_r) (H^\dagger \tau^I H) + \text{h.c.}
\end{aligned} \tag{49}$$

$e^2 H^2 D^3$:

$$\begin{aligned} & i(\bar{e}_p \gamma^\mu D^\nu e_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D^\nu e_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \end{aligned} \quad (50)$$

$$\begin{aligned} & (\bar{e}_p \gamma^\mu D^\nu e_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D^\nu e_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D^\nu e_r)(D_\mu H^\dagger D_\nu H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D^\nu e_r)(D_\nu H^\dagger D_\mu H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D^\nu e_r)(D_\mu H^\dagger D_\nu H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D^\nu e_r)(D_\nu H^\dagger D_\mu H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D_\mu e_r)(D^2 H^\dagger H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D_\mu e_r)(H^\dagger D^2 H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu \overleftrightarrow{D}_\mu e_r)(D^\nu H^\dagger D_\nu H) \\ & \epsilon^{\mu\nu\rho\lambda}(\bar{e}_p \gamma_\mu D_\nu e_r)(D_\rho H^\dagger D_\lambda H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu e_r)(H^\dagger D_\mu D^2 H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D_\mu D^\nu e_r)(H^\dagger D_\nu H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D_\mu D^\nu e_r)(H^\dagger D_\nu H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D_\mu D^\nu e_r)(D_\nu H^\dagger H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D^2 e_r)(H^\dagger D_\mu H) + \text{h.c.} \\ & (\bar{e}_p \gamma^\mu D^2 e_r)(H^\dagger D_\mu H) + \text{h.c.} \\ & i(\bar{e}_p \gamma^\mu D_\mu D^2 e_r)(H^\dagger H) + \text{h.c.} \end{aligned} \quad (51)$$

$q^2 H^2 D^3$:

$$\begin{aligned} & i(\bar{q}_p \gamma^\mu D^\nu q_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\ & i(\bar{q}_p \gamma^\mu D^\nu q_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\ & i(\bar{q}_p \gamma^\mu \tau^I D^\nu q_r)(D_{(\mu} D_{\nu)} H^\dagger \tau^I H) + \text{h.c.} \\ & i(\bar{q}_p \gamma^\mu \tau^I D^\nu q_r)(H^\dagger \tau^I D_{(\mu} D_{\nu)} H) + \text{h.c.} \end{aligned} \quad (52)$$

$$\begin{aligned}
& (\bar{q}_p \gamma^\mu D^\nu q_r) (D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D^\nu q_r) (H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu D^\nu q_r) (D_\mu H^\dagger D_\nu H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu D^\nu q_r) (D_\nu H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D^\nu q_r) (D_\mu H^\dagger D_\nu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D^\nu q_r) (D_\nu H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D_\mu q_r) (D^2 H^\dagger H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D_\mu q_r) (H^\dagger D^2 H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \overleftrightarrow{D}_\mu q_r) (D^\nu H^\dagger D_\nu H) \\
& \epsilon^{\mu\nu\rho\lambda} (\bar{q}_p \gamma_\mu D_\nu q_r) (D_\rho H^\dagger D_\lambda H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu q_r) (H^\dagger D_\mu D^2 H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu D_\mu D^\nu q_r) (H^\dagger D_\nu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D_\mu D^\nu q_r) (H^\dagger D_\nu H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu D_\mu D^\nu q_r) (D_\nu H^\dagger H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu D^2 q_r) (H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu D^2 q_r) (H^\dagger D_\mu H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu D_\mu D^2 q_r) (H^\dagger H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D^\nu q_r) (D_{(\mu} D_{\nu)} H^\dagger \tau^I H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D^\nu q_r) (H^\dagger \tau^I D_{(\mu} D_{\nu)} H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I D^\nu q_r) (D_\mu H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I D^\nu q_r) (D_\nu H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D^\nu q_r) (D_\mu H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D^\nu q_r) (D_\nu H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D_\mu q_r) (D^2 H^\dagger \tau^I H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D_\mu q_r) (H^\dagger \tau^I D^2 H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I \overleftrightarrow{D}_\mu q_r) (D^\nu H^\dagger \tau^I D_\nu H) \\
& \epsilon^{\mu\nu\rho\lambda} (\bar{q}_p \gamma_\mu \tau^I D_\nu q_r) (D_\rho H^\dagger \tau^I D_\lambda H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I q_r) (H^\dagger \tau^I D_\mu D^2 H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I D_\mu D^\nu q_r) (H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D_\mu D^\nu q_r) (H^\dagger \tau^I D_\nu H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I D_\mu D^\nu q_r) (D_\nu H^\dagger \tau^I H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I D^2 q_r) (H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& (\bar{q}_p \gamma^\mu \tau^I D^2 q_r) (H^\dagger \tau^I D_\mu H) + \text{h.c.} \\
& i(\bar{q}_p \gamma^\mu \tau^I D_\mu D^2 q_r) (H^\dagger \tau^I H) + \text{h.c.}
\end{aligned} \tag{53}$$

$u^2 H^2 D^3$:

$$\begin{aligned} & i(\bar{u}_p \gamma^\mu D^\nu u_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D^\nu u_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \end{aligned} \quad (54)$$

$$\begin{aligned} & (\bar{u}_p \gamma^\mu D^\nu u_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D^\nu u_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D^\nu u_r)(D_\mu H^\dagger D_\nu H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D^\nu u_r)(D_\nu H^\dagger D_\mu H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D^\nu u_r)(D_\mu H^\dagger D_\nu H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D^\nu u_r)(D_\nu H^\dagger D_\mu H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D_\mu u_r)(D^2 H^\dagger H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D_\mu u_r)(H^\dagger D^2 H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu \overleftrightarrow{D}_\mu u_r)(D^\nu H^\dagger D_\nu H) \\ & \epsilon^{\mu\nu\rho\lambda}(\bar{u}_p \gamma_\mu D_\nu u_r)(D_\rho H^\dagger D_\lambda H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu u_r)(H^\dagger D_\mu D^2 H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D_\mu D^\nu u_r)(H^\dagger D_\nu H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D_\mu D^\nu u_r)(H^\dagger D_\nu H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D_\mu D^\nu u_r)(D_\nu H^\dagger H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D^2 u_r)(H^\dagger D_\mu H) + \text{h.c.} \\ & (\bar{u}_p \gamma^\mu D^2 u_r)(H^\dagger D_\mu H) + \text{h.c.} \\ & i(\bar{u}_p \gamma^\mu D_\mu D^2 u_r)(H^\dagger H) + \text{h.c.} \end{aligned} \quad (55)$$

$d^2 H^2 D^3$:

$$\begin{aligned} & i(\bar{d}_p \gamma^\mu D^\nu d_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\ & i(\bar{d}_p \gamma^\mu D^\nu d_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \end{aligned} \quad (56)$$

$$\begin{aligned}
& (\bar{d}_p \gamma^\mu D^\nu d_r)(D_{(\mu} D_{\nu)} H^\dagger H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D^\nu d_r)(H^\dagger D_{(\mu} D_{\nu)} H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu D^\nu d_r)(D_\mu H^\dagger D_\nu H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu D^\nu d_r)(D_\nu H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D^\nu d_r)(D_\mu H^\dagger D_\nu H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D^\nu d_r)(D_\nu H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D_\mu d_r)(D^2 H^\dagger H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D_\mu d_r)(H^\dagger D^2 H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu \overleftrightarrow{D}_\mu d_r)(D^\nu H^\dagger D_\nu H) \\
& \epsilon^{\mu\nu\rho\lambda}(\bar{d}_p \gamma_\mu D_\nu d_r)(D_\rho H^\dagger D_\lambda H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu d_r)(H^\dagger D_\mu D^2 H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu D_\mu D^\nu d_r)(H^\dagger D_\nu H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D_\mu D^\nu d_r)(H^\dagger D_\nu H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu D_\mu D^\nu d_r)(D_\nu H^\dagger H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu D^2 d_r)(H^\dagger D_\mu H) + \text{h.c.} \\
& (\bar{d}_p \gamma^\mu D^2 d_r)(H^\dagger D_\mu H) + \text{h.c.} \\
& i(\bar{d}_p \gamma^\mu D_\mu D^2 d_r)(H^\dagger H) + \text{h.c.}
\end{aligned} \tag{57}$$

udH^2D^3 :

$$i(\bar{u}_p \gamma^\mu D^\nu d_r)(\tilde{H}^\dagger D_{(\mu} D_{\nu)} H) \tag{58}$$

$$\begin{aligned}
& i(\bar{u}_p \gamma^\mu D^\nu d_r)(D_\mu \tilde{H}^\dagger D_\nu H) \\
& i(\bar{u}_p \gamma^\mu d_r)(D^\nu \tilde{H}^\dagger D_{(\mu} D_{\nu)} H) \\
& i(\bar{u}_p \gamma^\mu d_r)(\tilde{H}^\dagger D_\mu D^2 H) \\
& i(\bar{u}_p \gamma^\mu d_r)(D_\mu \tilde{H}^\dagger D^2 H) \\
& i(\bar{u}_p \gamma^\mu D_\mu d_r)(\tilde{H}^\dagger D^2 H) \\
& i(\bar{u}_p \gamma^\mu D^2 d_r)(\tilde{H}^\dagger D_\mu H) \\
& i(\bar{u}_p \gamma^\mu D_\mu D_\nu d_r)(\tilde{H}^\dagger D^\nu H) \\
& \epsilon^{\mu\nu\rho\lambda}(\bar{u}_p \gamma_\mu D_\nu d_r)(D_\rho \tilde{H}^\dagger D_\lambda H)
\end{aligned} \tag{59}$$

5 $\psi^2 X H^3$

$leWH^3$:

$$\begin{aligned}
& (\bar{l}_p \sigma^{\mu\nu} e_r) \tau^I H (H^\dagger H) W_{\mu\nu}^I \\
& (\bar{l}_p \sigma^{\mu\nu} e_r) H (H^\dagger \tau^I H) W_{\mu\nu}^I
\end{aligned} \tag{60}$$

$leBH^3$:

$$(\bar{l}_p \sigma^{\mu\nu} e_r) H (H^\dagger H) B_{\mu\nu} \quad (61)$$

$quGH^3$:

$$(\bar{q}_p \sigma^{\mu\nu} T^A u_r) \tilde{H} (H^\dagger H) G_{\mu\nu}^A \quad (62)$$

$quWH^3$:

$$(\bar{q}_p \sigma^{\mu\nu} u_r) \tau^I \tilde{H} (H^\dagger H) W_{\mu\nu}^I \quad (63)$$

$$(\bar{q}_p \sigma^{\mu\nu} u_r) \tilde{H} (H^\dagger \tau^I H) W_{\mu\nu}^I \quad (64)$$

$quBH^3$:

$$(\bar{q}_p \sigma^{\mu\nu} u_r) \tilde{H} (H^\dagger H) B_{\mu\nu} \quad (65)$$

$qdGH^3$:

$$(\bar{q}_p \sigma^{\mu\nu} T^A d_r) H (H^\dagger H) G_{\mu\nu}^A \quad (66)$$

$qdWH^3$:

$$(\bar{q}_p \sigma^{\mu\nu} d_r) \tau^I H (H^\dagger H) W_{\mu\nu}^I \quad (67)$$

$$(\bar{q}_p \sigma^{\mu\nu} d_r) H (H^\dagger \tau^I H) W_{\mu\nu}^I \quad (68)$$

$qdBH^3$:

$$(\bar{q}_p \sigma^{\mu\nu} d_r) H (H^\dagger H) B_{\mu\nu} \quad (69)$$

6 $\psi^2 H^5$

leH^5 :

$$(\bar{l}_p e_r H) (H^\dagger H)^2 \quad (70)$$

quH^5 :

$$(\bar{q}_p u_r \tilde{H}) (H^\dagger H)^2 \quad (71)$$

qdH^5 :

$$(\bar{q}_p d_r H) (H^\dagger H)^2 \quad (72)$$