

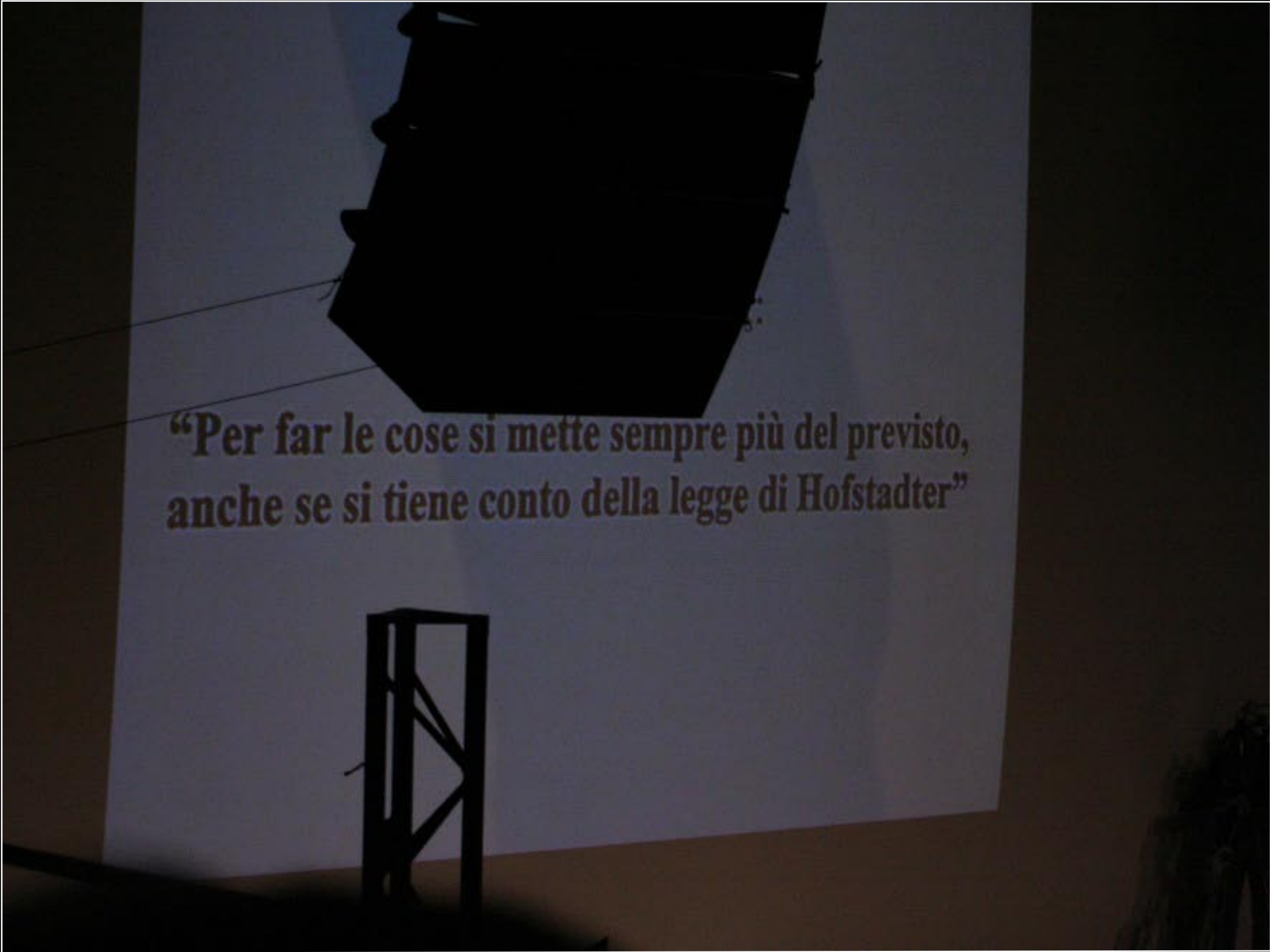


Festival 16 Marzo 2007



non sono l'unico a fare le foto ...



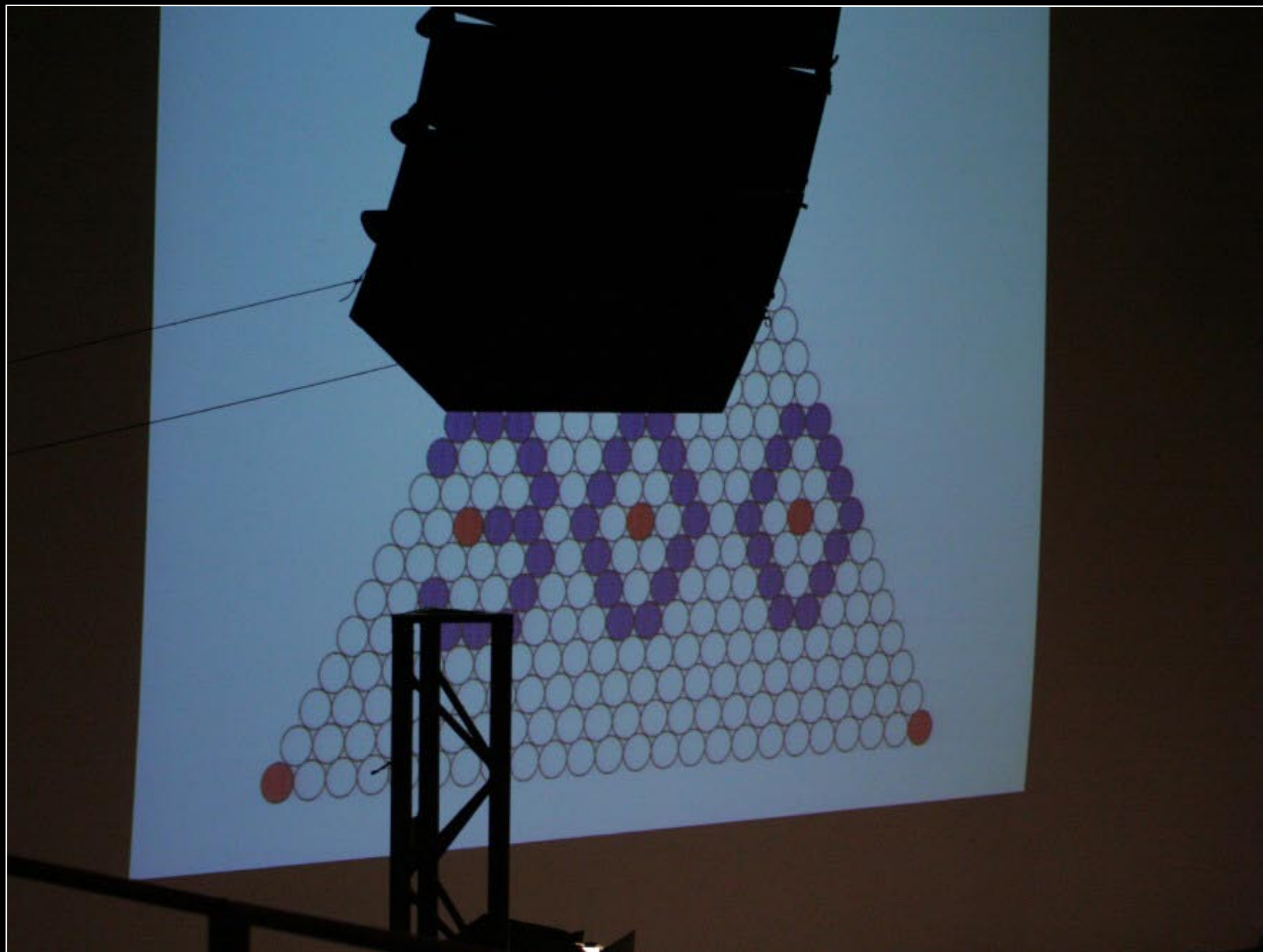


**“Per far le cose si mette sempre più del previsto,
anche se si tiene conto della legge di Hofstadter”**



Douglas Hofstadter



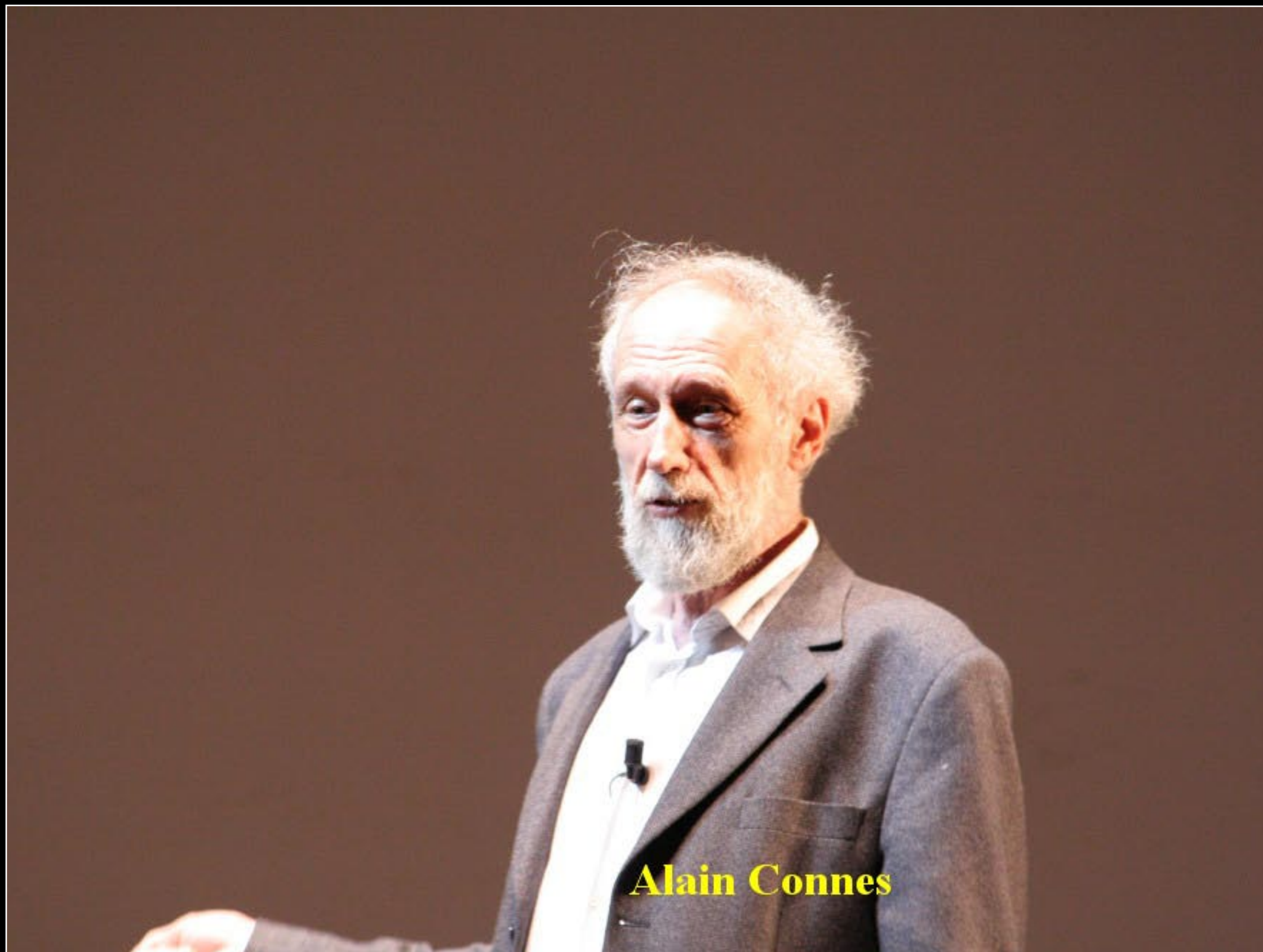




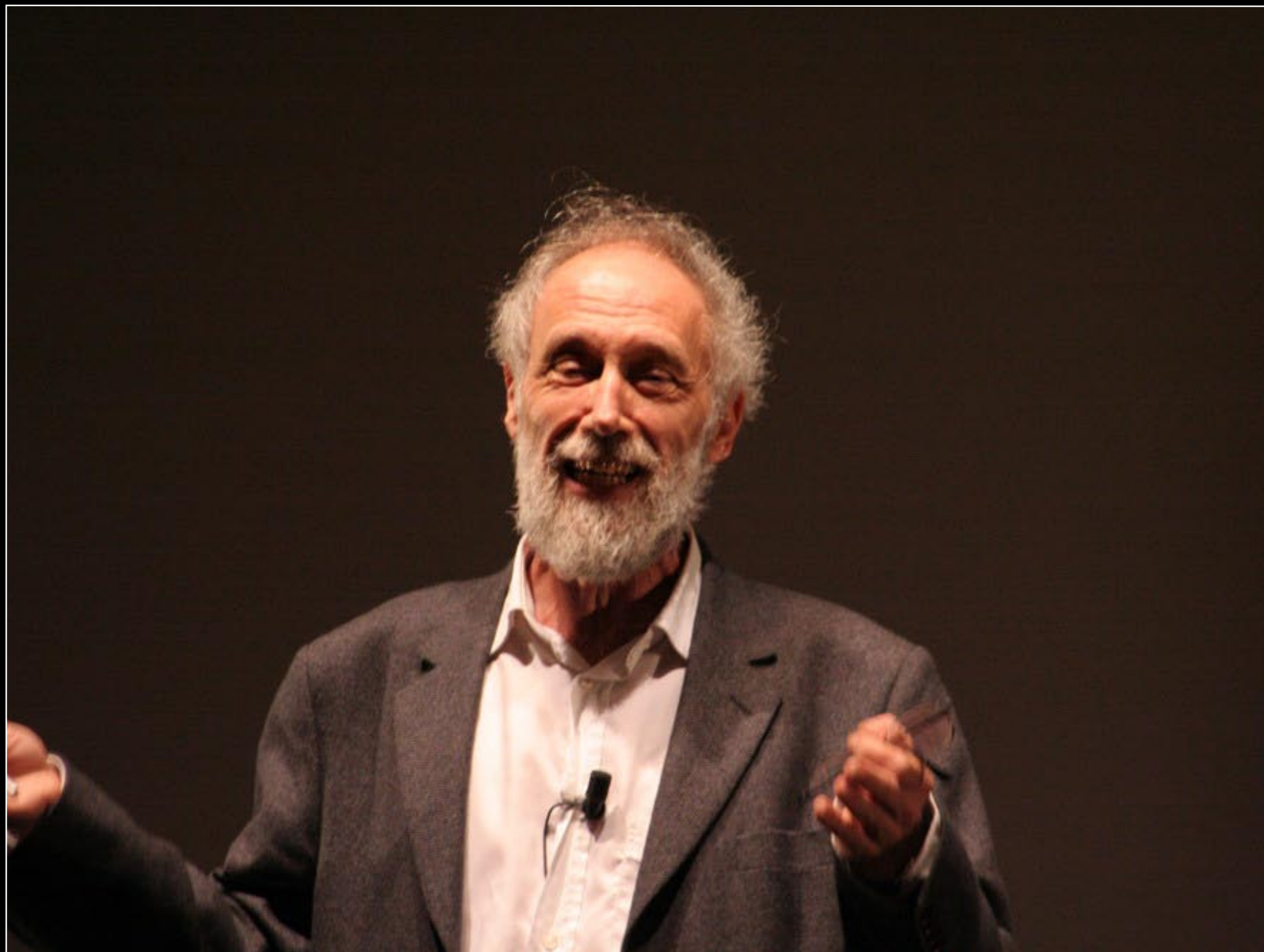


John Nash e Andrew Wiles





Alain Connes



$$\begin{aligned}
\mathcal{L}_{int} = & -\frac{1}{2} \partial_\mu \phi^\dagger \partial_\mu \phi - g_1 f^{abc} \partial_\mu \phi^\dagger \partial_\mu \phi A_\mu^a - \frac{1}{2} g_1^2 f^{abc} f^{ade} \phi^\dagger \phi A_\mu^a A_\mu^b A_\mu^c A_\mu^d - \partial_\mu W_\nu^+ \partial_\mu W_\nu^- - \\
& M^2 W_\mu^+ W_\mu^- - \frac{1}{2} \partial_\mu Z_\nu^0 \partial_\mu Z_\nu^0 - \frac{1}{2} M_Z^2 Z_\mu^0 Z_\mu^0 - \frac{1}{2} \partial_\mu A_\nu \partial_\mu A_\nu - i g_2 \omega (\partial_\mu Z_\nu^0 (W_\mu^+ W_\nu^- - \\
& W_\mu^- W_\nu^+) - Z_\mu^0 (W_\mu^+ \partial_\nu W_\nu^- - W_\mu^- \partial_\nu W_\nu^+) + Z_\mu^0 (W_\nu^+ \partial_\mu W_\nu^- - W_\nu^- \partial_\mu W_\nu^+)) - \\
& i g_2 \omega (\partial_\mu A_\nu (W_\mu^+ W_\nu^- - W_\mu^- W_\nu^+) - A_\mu (W_\mu^+ \partial_\nu W_\nu^- - W_\mu^- \partial_\nu W_\nu^+) + A_\mu (W_\nu^+ \partial_\mu W_\nu^- - \\
& W_\nu^- \partial_\mu W_\nu^+)) - \frac{1}{2} W_\mu^+ W_\mu^- W_\nu^+ W_\nu^- + \frac{1}{2} W_\mu^+ W_\mu^- W_\nu^- W_\nu^+ + \phi^\dagger \phi (Z_\mu^0 Z_\mu^0 W_\nu^+ W_\nu^- - \\
& Z_\mu^0 Z_\mu^0 W_\nu^- W_\nu^+) + \phi^\dagger \phi (\partial_\mu A_\nu \partial_\mu A_\nu - A_\mu \partial_\nu \partial_\mu A_\nu) + \phi^\dagger \phi \omega (\partial_\mu Z_\nu^0 (W_\mu^+ W_\nu^- - \\
& W_\mu^- W_\nu^+) - 2 A_\mu Z_\mu^0 W_\nu^+ W_\nu^-) - \frac{1}{2} \partial_\mu H \partial_\mu H - 2 M^2 \omega H^2 - \partial_\mu \phi^\dagger \partial_\mu \phi - \frac{1}{2} \partial_\mu \phi^\dagger \partial_\mu \phi - \\
& \Delta \left(\frac{M^2}{2} + \frac{M^2}{2} H + \frac{1}{2} (H^2 + \phi^\dagger \phi + 2 \phi^\dagger \phi) \right) + \frac{M^2}{2} \omega - \\
& g_2 \omega M (H^2 + H \phi^\dagger \phi + 2 H \phi^\dagger \phi) - \\
& \frac{1}{2} g^2 \omega (H^4 + (\phi^\dagger)^4 + 4 \phi^\dagger \phi H^2 + 4 \phi^\dagger \phi \phi^\dagger \phi + 4 H^2 \phi^\dagger \phi + 2 \phi^\dagger \phi H^2) - \\
& g M W_\mu^+ W_\mu^- H - \frac{1}{2} g \frac{M^2}{2} Z_\mu^0 Z_\mu^0 H - \\
& \frac{1}{2} g (W_\mu^+ (\phi^\dagger \partial_\mu \phi - \phi^\dagger \partial_\mu \phi) - W_\mu^- (\phi^\dagger \partial_\mu \phi - \phi^\dagger \partial_\mu \phi)) + \\
& \frac{1}{2} g (W_\mu^+ (H \partial_\mu \phi - \phi^\dagger \partial_\mu H) + W_\mu^- (H \partial_\mu \phi - \phi^\dagger \partial_\mu H)) + \frac{1}{2} g \frac{1}{2} (Z_\mu^0 (H \partial_\mu \phi - \phi^\dagger \partial_\mu H) + \\
& M (\frac{1}{2} Z_\mu^0 \partial_\mu \phi + W_\mu^+ \partial_\mu \phi + W_\mu^- \partial_\mu \phi) - i g \frac{M^2}{2} Z_\mu^0 (W_\mu^+ \phi - W_\mu^- \phi) + i g_2 \omega M A_\mu (W_\mu^+ \phi - \\
& W_\mu^- \phi) - i g \frac{1}{2} Z_\mu^0 Z_\mu^0 (\phi^\dagger \partial_\mu \phi - \phi^\dagger \partial_\mu \phi) + i g_2 \omega A_\mu (\phi^\dagger \partial_\mu \phi - \phi^\dagger \partial_\mu \phi) - \\
& \frac{1}{2} g^2 W_\mu^+ W_\mu^- (H^2 + (\phi^\dagger)^2 + 2 \phi^\dagger \phi) - \frac{1}{2} g^2 \frac{1}{2} Z_\mu^0 Z_\mu^0 (H^2 + (\phi^\dagger)^2 + 2 \phi^\dagger \phi) - \\
& \frac{1}{2} g^2 \frac{M^2}{2} Z_\mu^0 Z_\mu^0 (W_\mu^+ \phi + W_\mu^- \phi) - \frac{1}{2} g^2 \frac{M^2}{2} Z_\mu^0 H (W_\mu^+ \phi - W_\mu^- \phi) + \frac{1}{2} g^2 \omega A_\mu \partial_\mu (W_\mu^+ \phi + \\
& W_\mu^- \phi) + \frac{1}{2} i g^2 \omega A_\mu H (W_\mu^+ \phi - W_\mu^- \phi) - g^2 \frac{M^2}{2} (2 \phi_\mu^2 - 1) Z_\mu^0 A_\mu \phi^\dagger \phi - \\
& \phi^\dagger \phi \partial_\mu A_\mu \phi^\dagger \phi + \frac{1}{2} i g \frac{M^2}{2} (\phi^\dagger \phi \phi^\dagger \phi - \phi^\dagger (\gamma \partial + m_\phi^2) \phi - \phi^\dagger (\gamma \partial + m_\phi^2) \phi - \phi^\dagger (\gamma \partial + \\
& m_\phi^2) \phi - \phi^\dagger (\gamma \partial + m_\phi^2) \phi) + i g_2 \omega A_\mu (-\phi^\dagger \gamma^\mu \phi) + \frac{1}{2} (i \phi^\dagger \gamma^\mu \phi) - \frac{1}{2} (i \phi^\dagger \gamma^\mu \phi) + \\
& \frac{M^2}{2} Z_\mu^0 ((\phi^\dagger \gamma^\mu (1 + \gamma^5) \phi) + (\phi^\dagger \gamma^\mu (4 \phi_\mu^2 - 1 - \gamma^5) \phi) + (i \phi^\dagger \gamma^\mu (\frac{1}{2} \phi_\mu^2 - 1 - \gamma^5) \phi) + \\
& (i \phi^\dagger \gamma^\mu (1 - \frac{1}{2} \phi_\mu^2 + \gamma^5) \phi)) + \frac{M^2}{2} W_\mu^+ ((\phi^\dagger \gamma^\mu (1 + \gamma^5) U^{ab} \phi) + (i \phi^\dagger \gamma^\mu (1 + \gamma^5) C_{ab} \phi)) + \\
& \frac{M^2}{2} W_\mu^- ((\phi^\dagger U^{ab} \gamma^\mu (1 + \gamma^5) \phi) + (i \phi^\dagger C_{ab} \gamma^\mu (1 + \gamma^5) \phi)) + \\
& \frac{M^2}{2} \phi^\dagger (-m_\phi^2 (\phi^\dagger U^{ab} \phi (1 - \gamma^5) \phi) + m_\phi^2 (\phi^\dagger U^{ab} \phi (1 + \gamma^5) \phi) + \\
& \frac{M^2}{2} \phi^\dagger (m_\phi^2 (\phi^\dagger U^{ab} \phi (1 + \gamma^5) \phi) - m_\phi^2 (\phi^\dagger U^{ab} \phi (1 - \gamma^5) \phi) - \frac{1}{2} \frac{M^2}{2} H (\phi^\dagger \phi) - \\
& \frac{1}{2} \frac{M^2}{2} H (\phi^\dagger \phi) + \frac{M^2}{2} \phi^\dagger (\phi^\dagger \gamma^\mu \phi) - \frac{M^2}{2} \phi^\dagger (\phi^\dagger \gamma^\mu \phi) - \frac{1}{2} \mu_1 M_{\mu\nu}^2 (1 - \gamma) \phi_\mu - \\
& \frac{1}{2} \mu_1 M_{\mu\nu}^2 (1 - \gamma) \phi_\mu + \frac{M^2}{2} \phi^\dagger (-m_\phi^2 (i \phi^\dagger C_{ab} (1 - \gamma^5) \phi) + m_\phi^2 (i \phi^\dagger C_{ab} (1 + \gamma^5) \phi) + \\
& \frac{M^2}{2} \phi^\dagger (m_\phi^2 (i \phi^\dagger C_{ab} (1 + \gamma^5) \phi) - m_\phi^2 (i \phi^\dagger C_{ab} (1 - \gamma^5) \phi) - \frac{1}{2} \frac{M^2}{2} H (i \phi^\dagger \phi) - \\
& \frac{1}{2} \frac{M^2}{2} H (i \phi^\dagger \phi) + \frac{M^2}{2} \phi^\dagger (i \phi^\dagger \gamma^\mu \phi) - \frac{M^2}{2} \phi^\dagger (i \phi^\dagger \gamma^\mu \phi) + G^\dagger \partial^\mu G^\mu + \partial_\mu G^\mu \partial^\mu G^\mu + \\
& X^\dagger (\partial^\mu - M^2) X^\mu + X^\dagger (\partial^\mu - M^2) X^\mu + X^\dagger (\partial^\mu - \frac{M^2}{2}) X^\mu + \bar{Y} \partial^\mu Y + i g_2 \omega W_\mu^+ (\partial_\mu X^0 X^\mu - \\
& \partial_\mu X^\mu X^0) + i g_2 \omega W_\mu^- (\partial_\mu X^0 X^\mu - \partial_\mu X^\mu X^0) + i g_2 \omega W_\mu^+ (\partial_\mu X^\mu X^0 - \\
& \partial_\mu X^0 X^\mu) + i g_2 \omega W_\mu^- (\partial_\mu X^\mu X^0 - \partial_\mu X^0 X^\mu) + i g_2 \omega Z_\mu^0 (\partial_\mu X^0 X^\mu - \\
& \partial_\mu X^\mu X^0) + i g_2 \omega A_\mu (\partial_\mu X^0 X^\mu - \\
& \partial_\mu X^\mu X^0) - \frac{1}{2} g M (X^0 X^\mu H + X^\mu X^0 H + \frac{1}{2} X^0 X^\mu H) + \frac{1}{2} g M (X^0 X^\mu \phi - X^\mu X^0 \phi) + \\
& \frac{1}{2} g M (X^0 X^\mu \phi - X^\mu X^0 \phi) + i g M \omega (X^0 X^\mu \phi - X^\mu X^0 \phi) + \\
& \frac{1}{2} g M (X^0 X^\mu \phi - X^\mu X^0 \phi)
\end{aligned}$$



