

$$S_{\text{Trans}} = \int \frac{a^3 d^3 k dt}{(2\pi)^3} \frac{1}{2a^2} \left(|\partial_t \vec{A}_T|^2 - \left(\frac{k^2}{a^2} + m^2 \right) |\vec{A}_T|^2 \right)$$