

## 1. Lagrangians

1) Charged Lepton Flavor Violation Lagrangian.

$$L_{CLFV} = \frac{m_\mu}{(1+\kappa)\Lambda^2} \bar{\mu}_R \sigma_{\mu\nu} e_L F^{\mu\nu} + \frac{\kappa}{(1+\kappa)} \bar{\mu}_L \gamma_\mu e_L \left( \sum_{q=u,d} \bar{q}_L \gamma^\mu q_L \right)$$

2) Lagrangian of ALP  $a$  with decay constant  $f_a$  including gauge boson couplings and fermion couplings.

$$L^a \supset -\frac{a}{f_a} \left[ \sum_{X=F,Z,W,G} c_X X \tilde{X} + \sum_{f,i,j} \bar{f}_i \left[ i(m_{f_j} - m_{f_i}) v_{ij}^f + i(m_{f_j} + m_{f_i}) a_{ij}^f \gamma_5 \right] f_j \right]$$

2.  $\mu \rightarrow e$  conversion interactions.