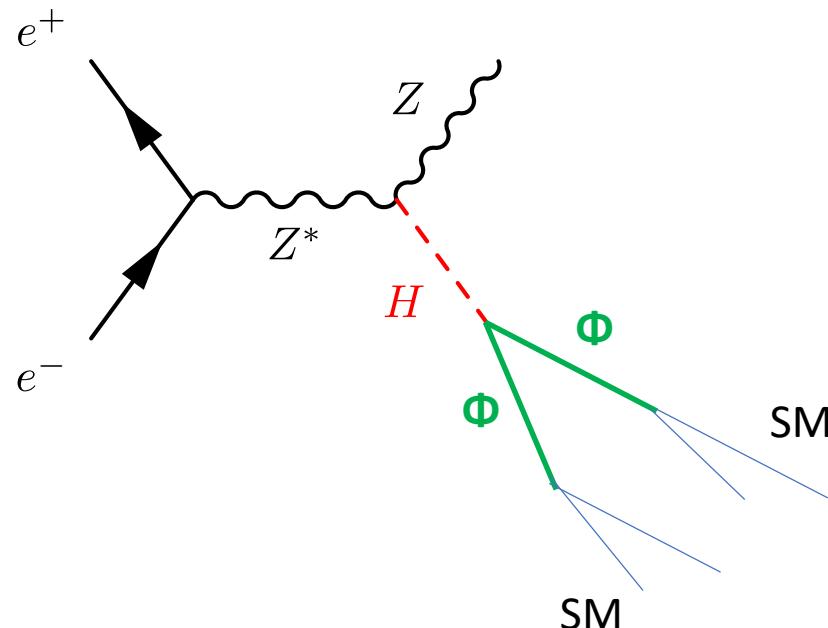


# Work this week

- Busy on some secret stuff...
- I didn't show eeh case in general physics meeting, so I will show some

# Introduction

- We have to explore the possibility of BSM
- Dark matter is one of the big topic to access BSM
- WIMP is one candidate
  - This should be singlet
  - To bridge SM world and WIMP world, additional (bosonic) mediator is necessary
  - Mixing of  $H$  and  $\Phi$ ,  $H\text{-}\Phi$  interaction and  $\Phi\text{-SM}$  particle interaction possible
  - So, we can search using  
 $\text{@}\sqrt{s}=250\text{GeV}$

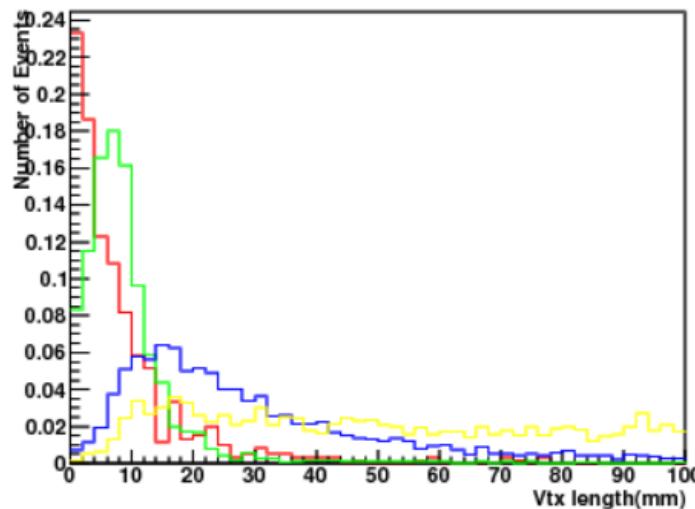
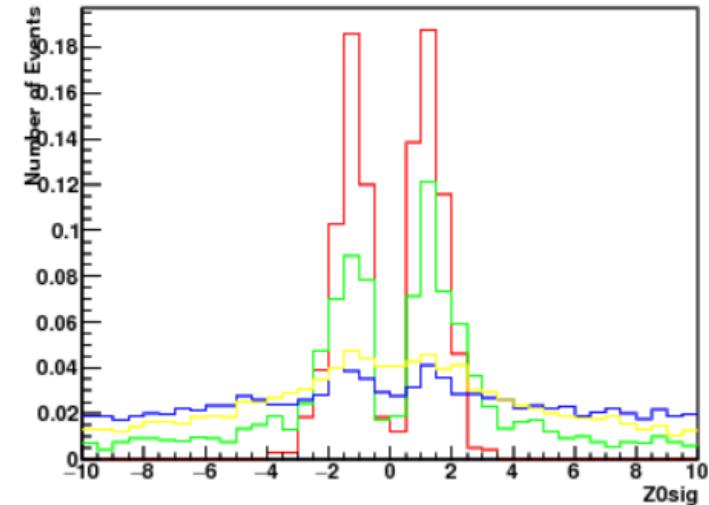
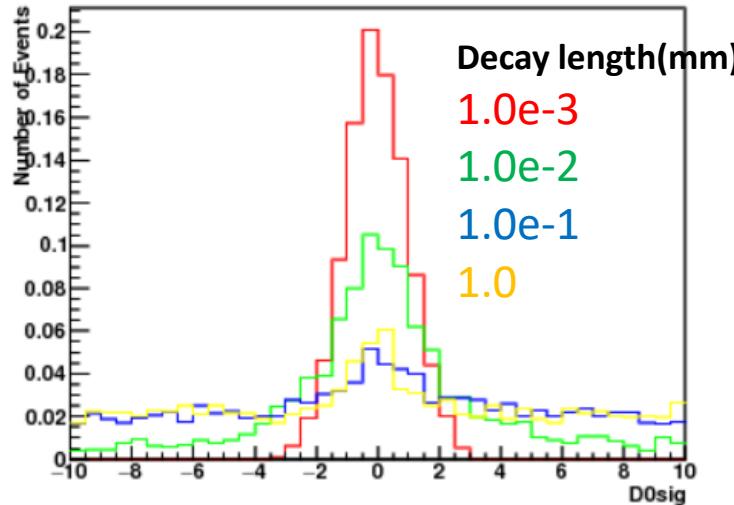


# Event selection

- Choose Isolated muon and electron
  - $|d0| < 0.05 \text{ \&\& } |z0| < 0.05$
- Reconstruct Z using Isolated muon and electron
- Other particles are regarded as daughter coming from mediator
  - Charged  $N_{\text{pfo}} \geq 4$
  - Solve combination  
Just minimize  $|m_{12} - m_{34}|$ ,  $E_{12} > E_{34}$
- So far do not impose any other cuts
- Check some variables

# Track variables

- Particles coming from mediator
- $m_\Phi = 0.25\text{GeV}/c^2$

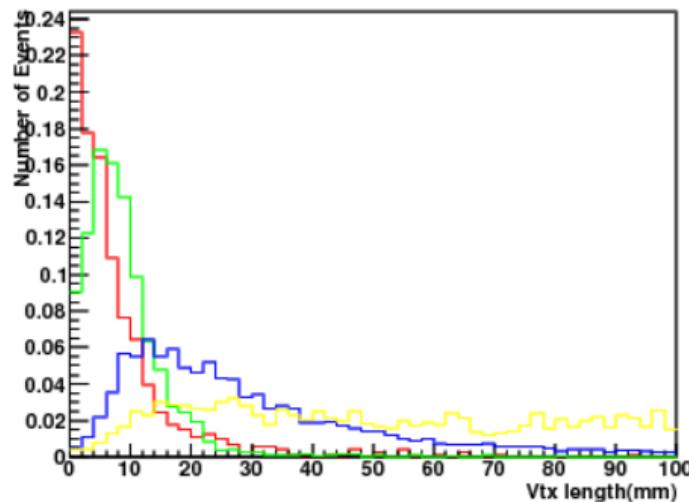
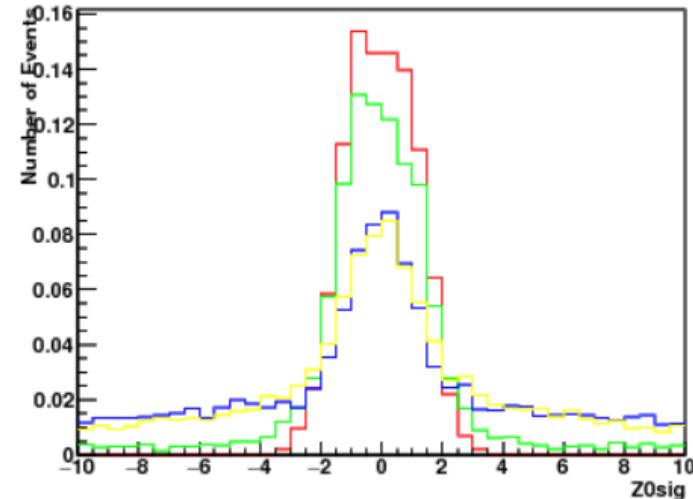
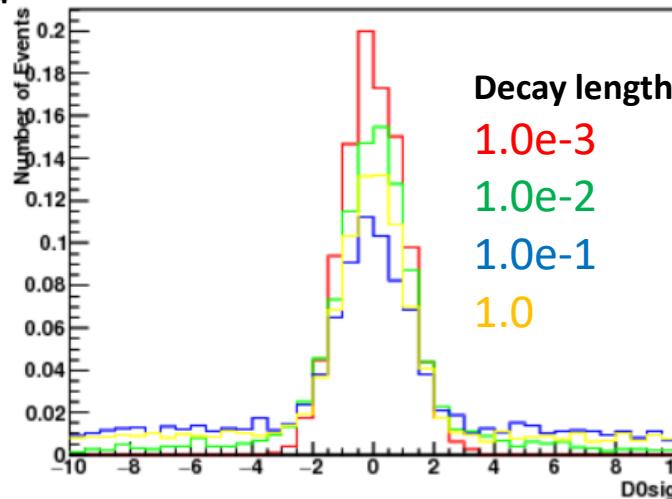


$\Phi \rightarrow \mu\mu$   
 $ZH \rightarrow (\mu\mu)(\mu\mu\mu\mu)$

- Hard to identify muon from mediator?
  - 1.0e-3
  - 1.0e-2

# Track variables

- Particles coming from mediator
- $m_\phi = 0.25\text{GeV}/c^2$

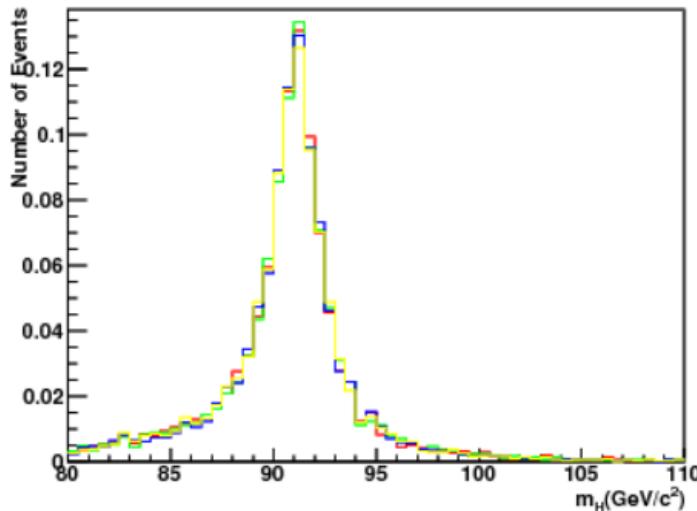
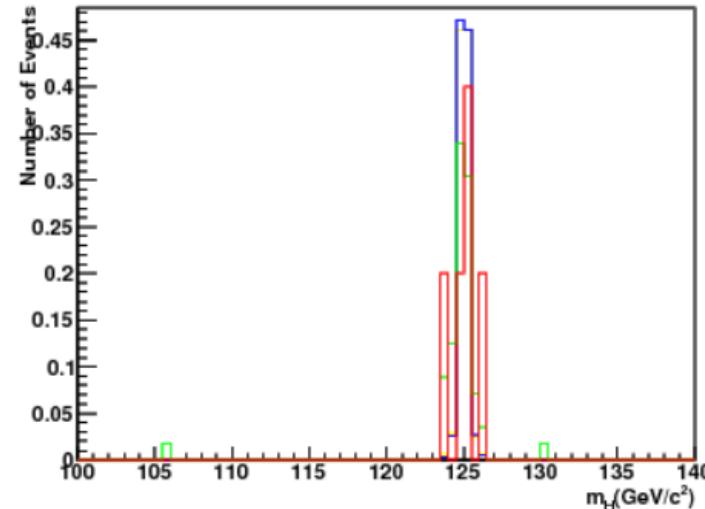
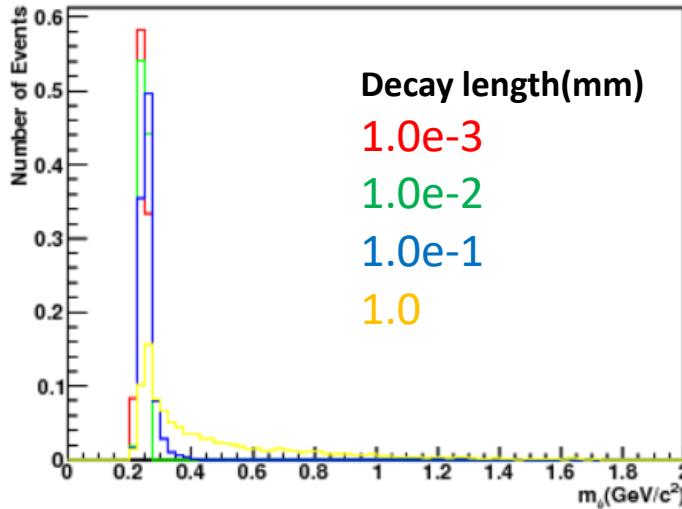


$\Phi \rightarrow \mu\mu$   
 $ZH \rightarrow (ee)(\mu\mu\mu\mu)$

- Same tendency as mmh

# Resonance

- $m_\Phi = 0.25 \text{ GeV}/c^2$



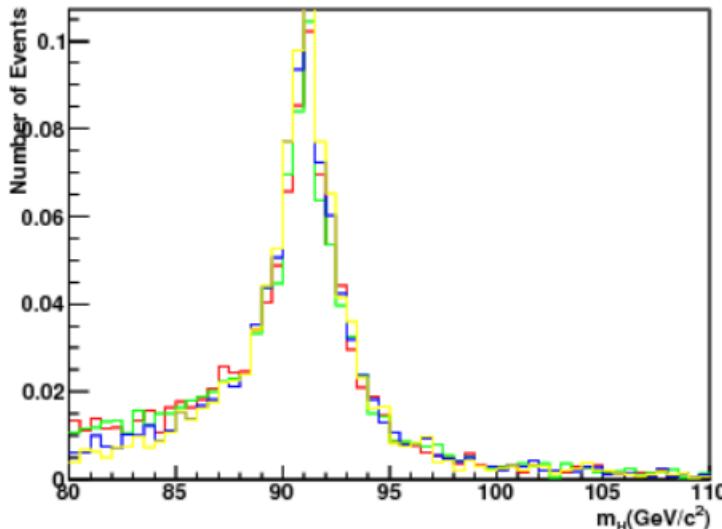
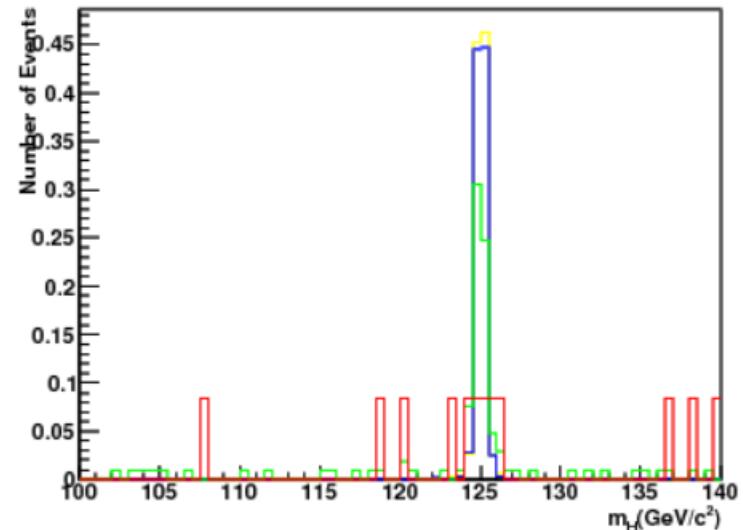
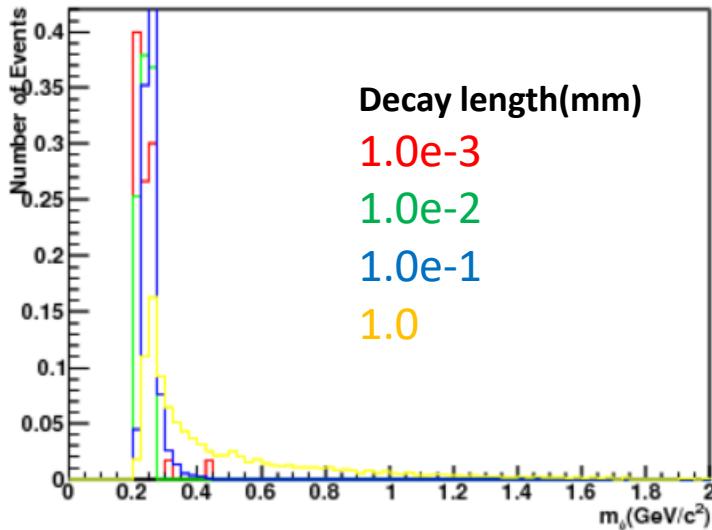
$\Phi \rightarrow \mu\mu$

$ZH \rightarrow (\mu\mu)(\mu\mu\mu\mu)$

- Few events...
  - 1.0e-3
  - 1.0e-2
- Need to change selection

# Resonance

- $m_\Phi = 0.25 \text{ GeV}/c^2$



$\Phi \rightarrow \mu\mu$

$ZH \rightarrow (ee)(\mu\mu\mu\mu)$

- Few events...
  - 1.0e-3
  - 1.0e-2
- No FSR recovery
- Need to change selection
  - Some muons are identified isolated muons