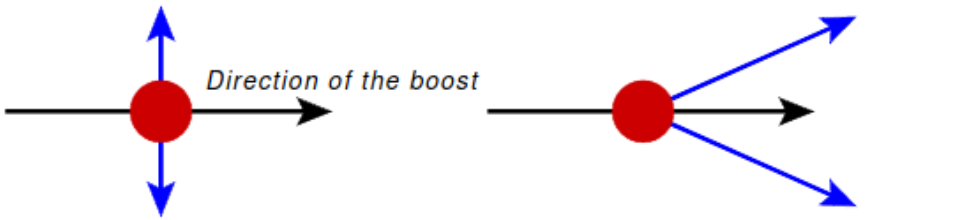
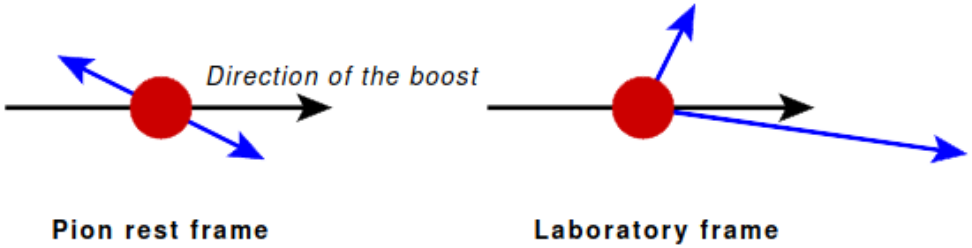
Pi0 CONTAMINATION SUBTRACTION



Symmetric decay

No contamination for DVCS events



Asymmetric decay

Contamination for DVCS events

Need to subtract Pi0 events with only one photon detected

Method

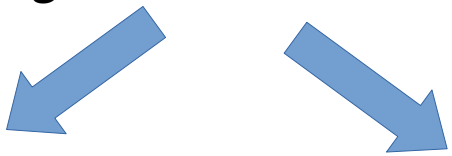
- **3 Main criteria for the Pi0 events selected:**

  - No edge block clusters

  - Energy of the photons is above the trigger threshold

  - A correct invariant mass

- **Simulate the decay by randomizing the angle of it 10000 times**



cos θ [-1, 1]
(θ= decay angle)

Azimuthal angle
[0, 2π]

- **Divide the decays by number of photons generated:**

N0= events with no γ detected
N1= events with 1 γ detected
N3= events with 2 γ detected

Method

- Each event with N1 is subtracted from the DVCS events and before hand multiplied by 2 factors:

- a1 = 1/10000 → Take in account the large number of 2 γ events generated in the simulation

- a2 = 10000/N2 → To account for the fact that we used only 2 γ clusters events

$W = a1*a2 = 1/N2$ → Total weighting factor

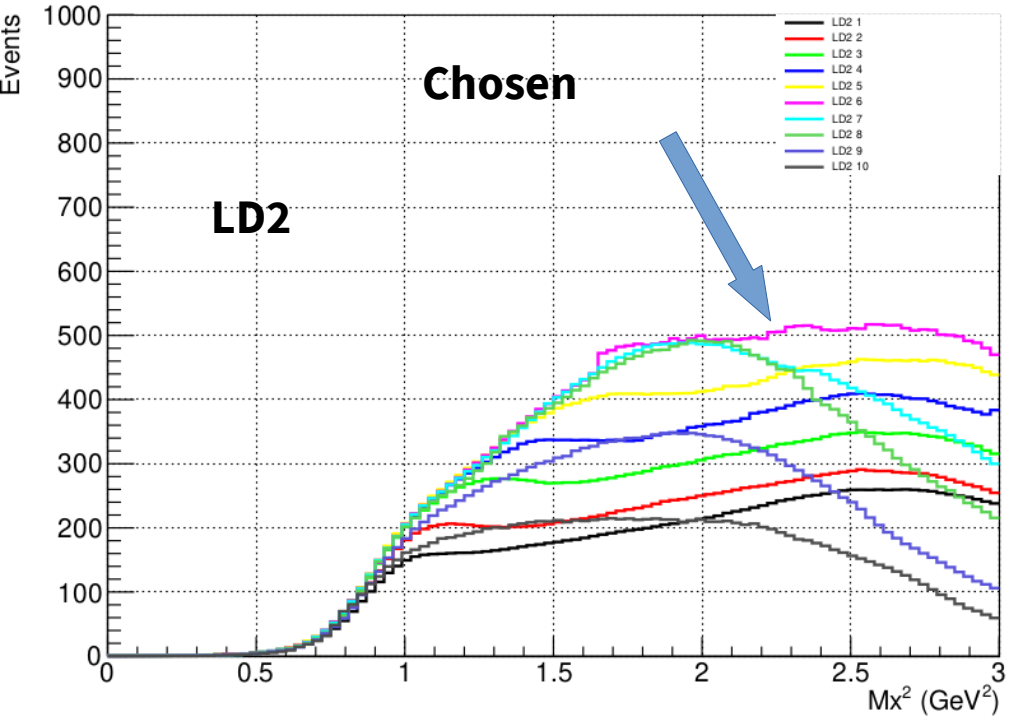
- Systematic errors: (didn't take it in account in this study)

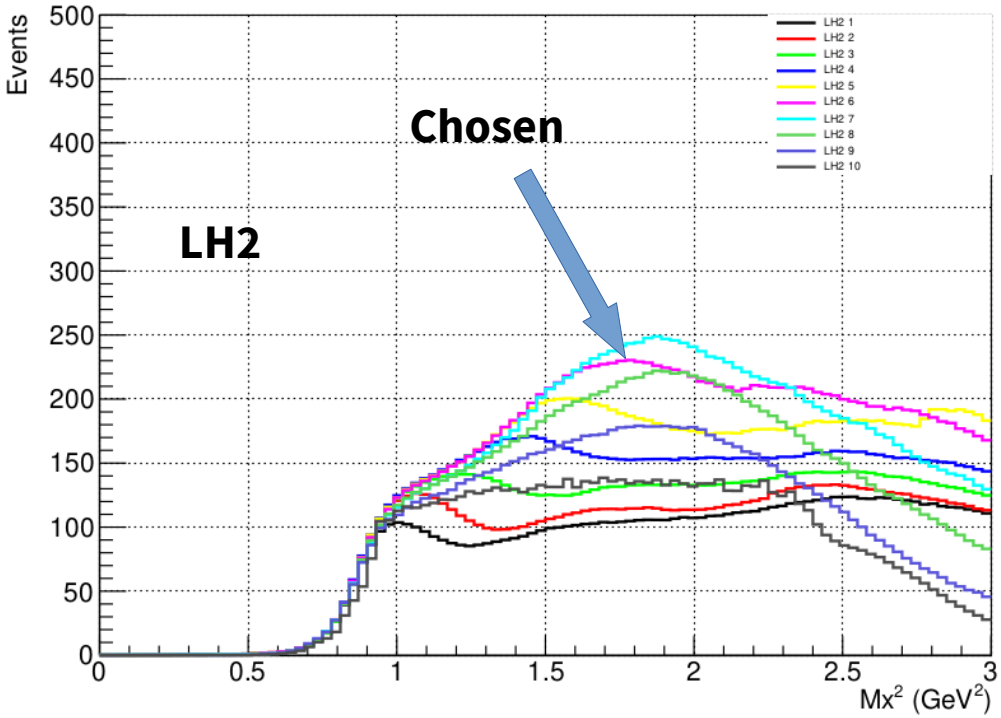
→ Edge effects (events where only 1 photon is detected from a symmetric decay)

→ Threshold of the calorimeter (direct effect on N1 and N2 used)

Pi0 CONTAMINATION (Threshold Scan)

- Steps of 0.2 GeV for the Pi0 threshold from 0.2 GeV (black plot) to 2 GeV (Grey plot)

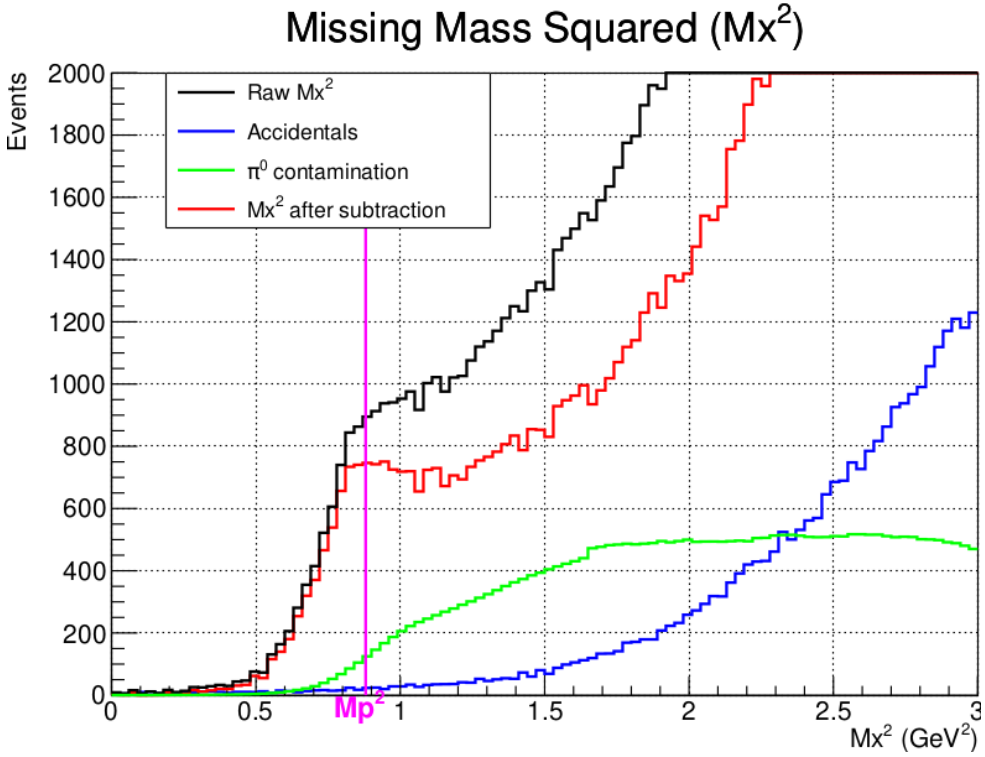




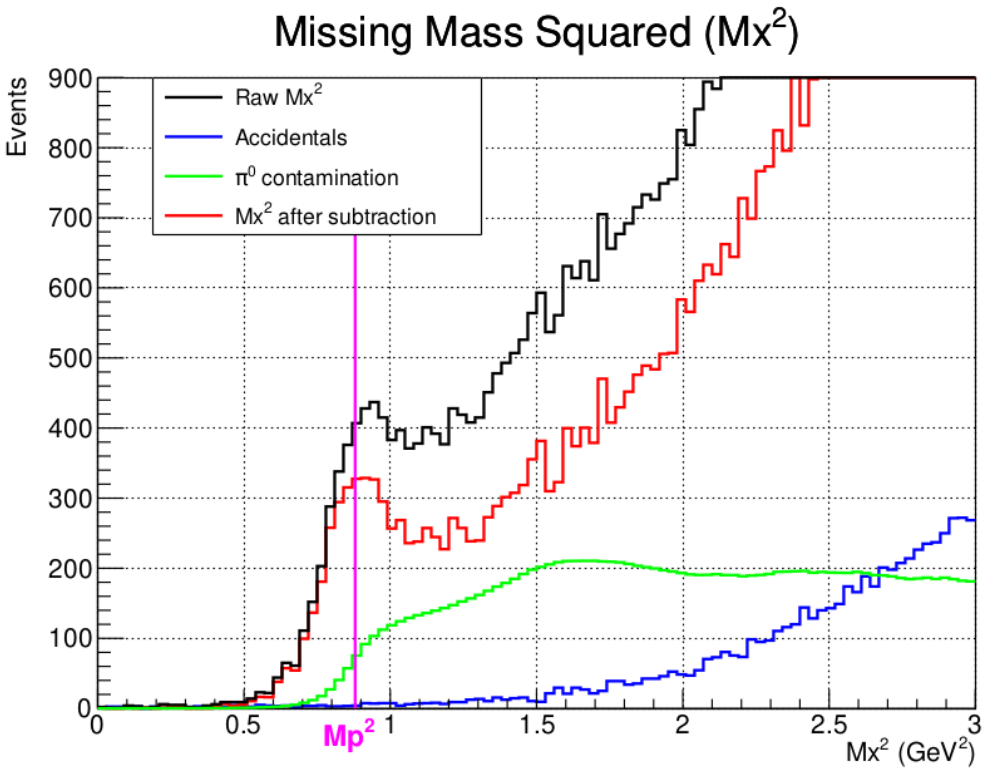
- Chose the 1.2 GeV Threshold for both since it's stable in [0.5, 1.5] GeV2
- LH2 trigger threshold: 0.75 GeV
- LD2 trigger threshold: 0.14 GeV (very low!)

RESULTS

LD2



LH2



Only region of interest in contamination contribution is between 0.5 and 1.5 GeV2