

# **Long-lived Stau**

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# Background

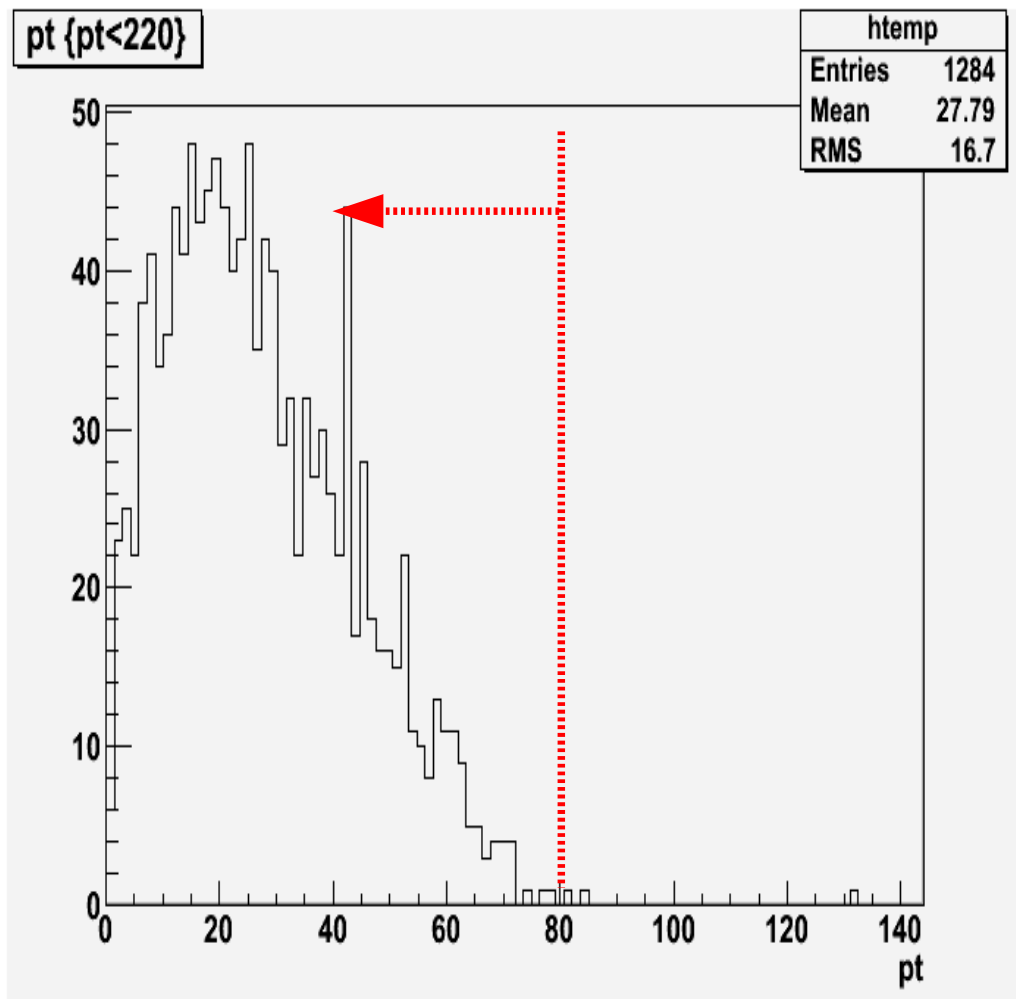
Regarded background



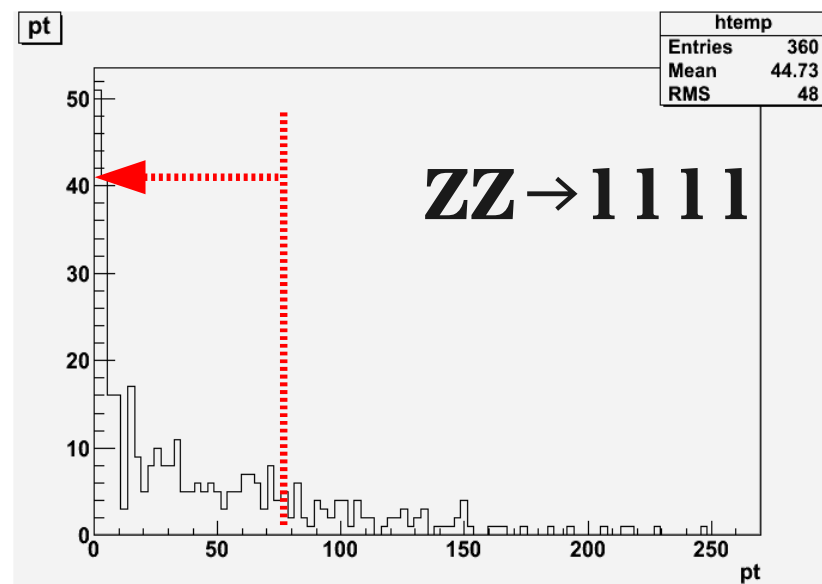
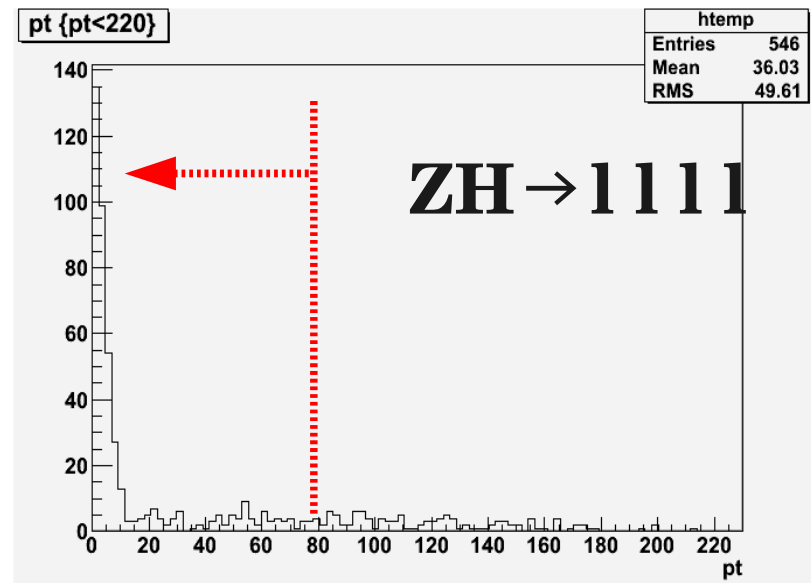
If ZZ or ZH cross section is smaller, BG is ignored  
Calculate for ZZ mode and ZH mode  
with MC simulation.

		Generated numbers at $200 \text{ fb}^{-1}$
$\mathbf{e^+e^- \rightarrow ZZ \rightarrow llll}$	(6.47 fb)	$\longrightarrow$ 1294 event
$\mathbf{e^+e^- \rightarrow ZH \rightarrow llll}$	(7.94 fb)	$\longrightarrow$ 1588 event
<b>Neutralino mode</b>	<b>7.62 fb</b>	$\longrightarrow$ <b>1525 event</b>

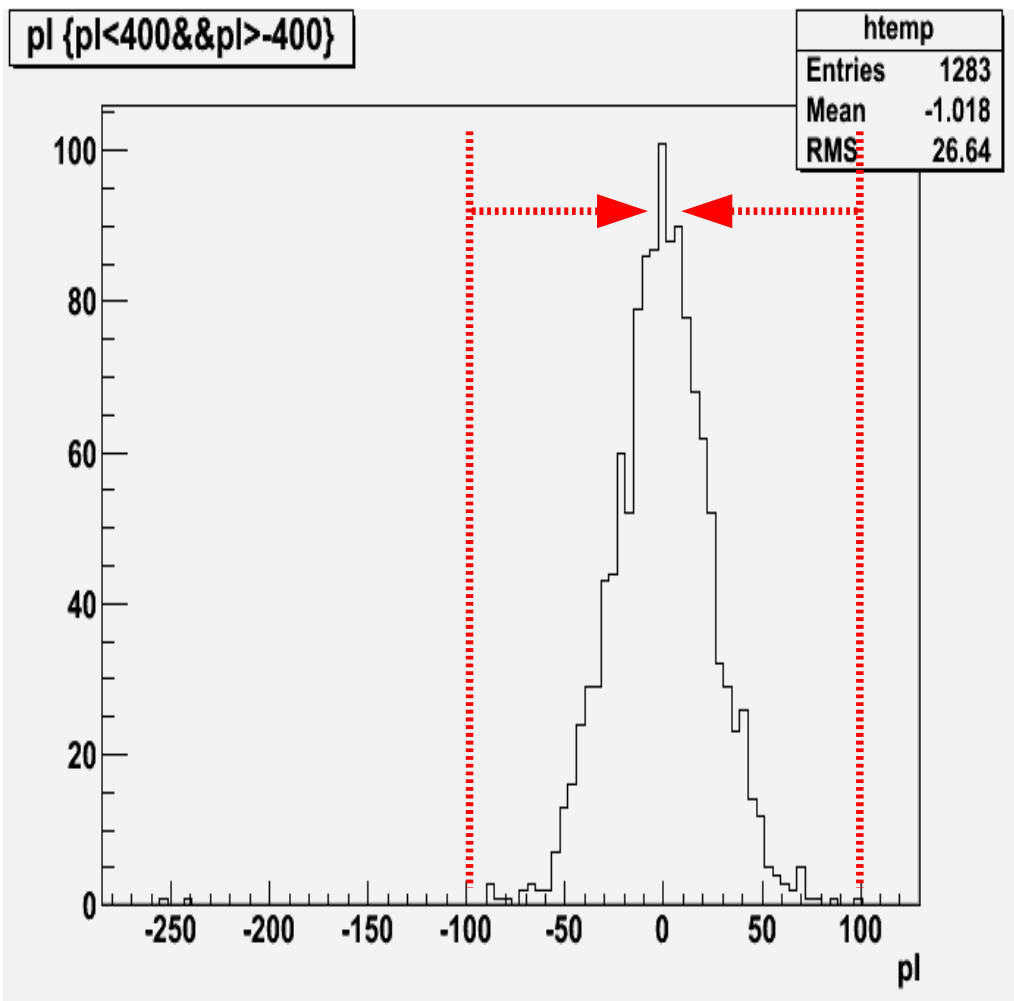
# Pt Cut



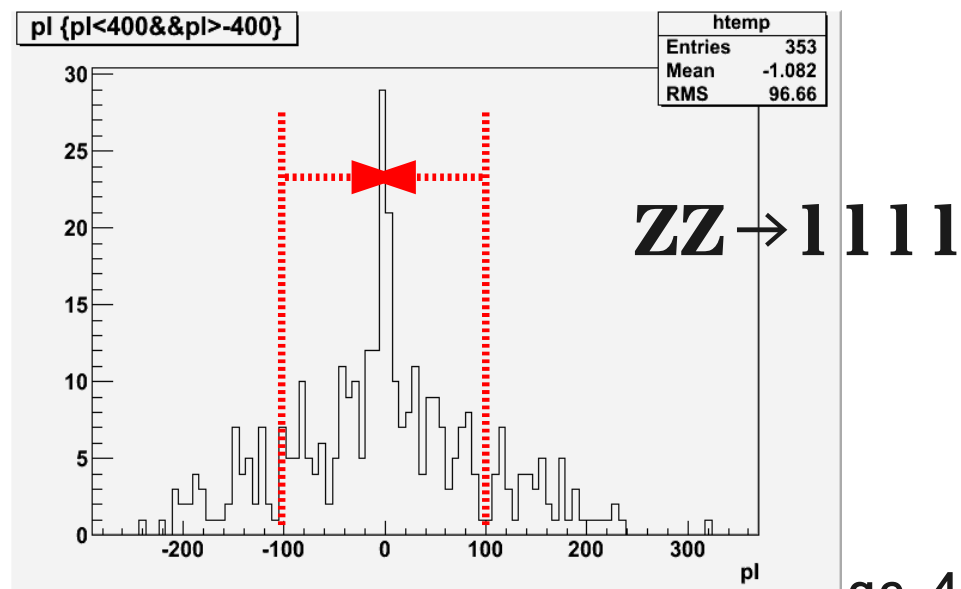
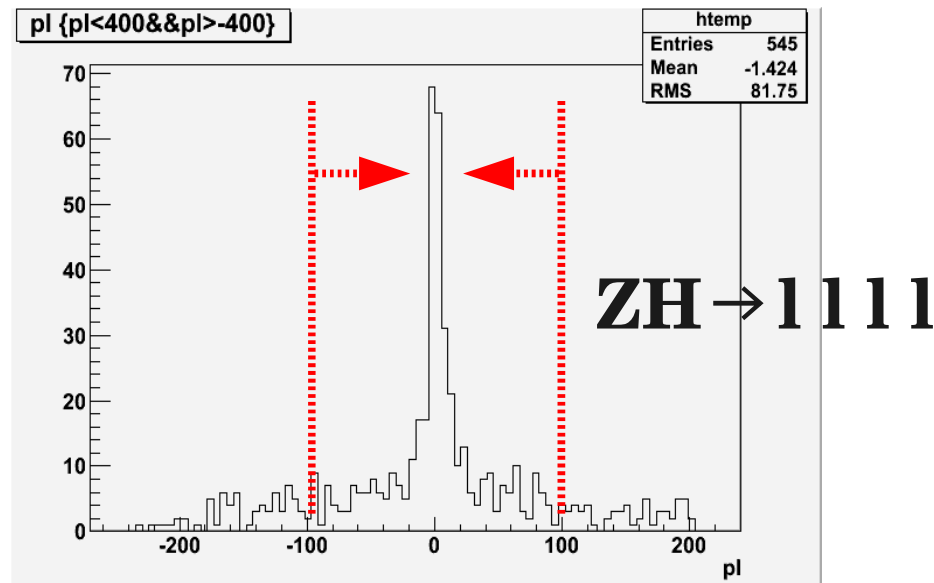
pt < 80 GeV



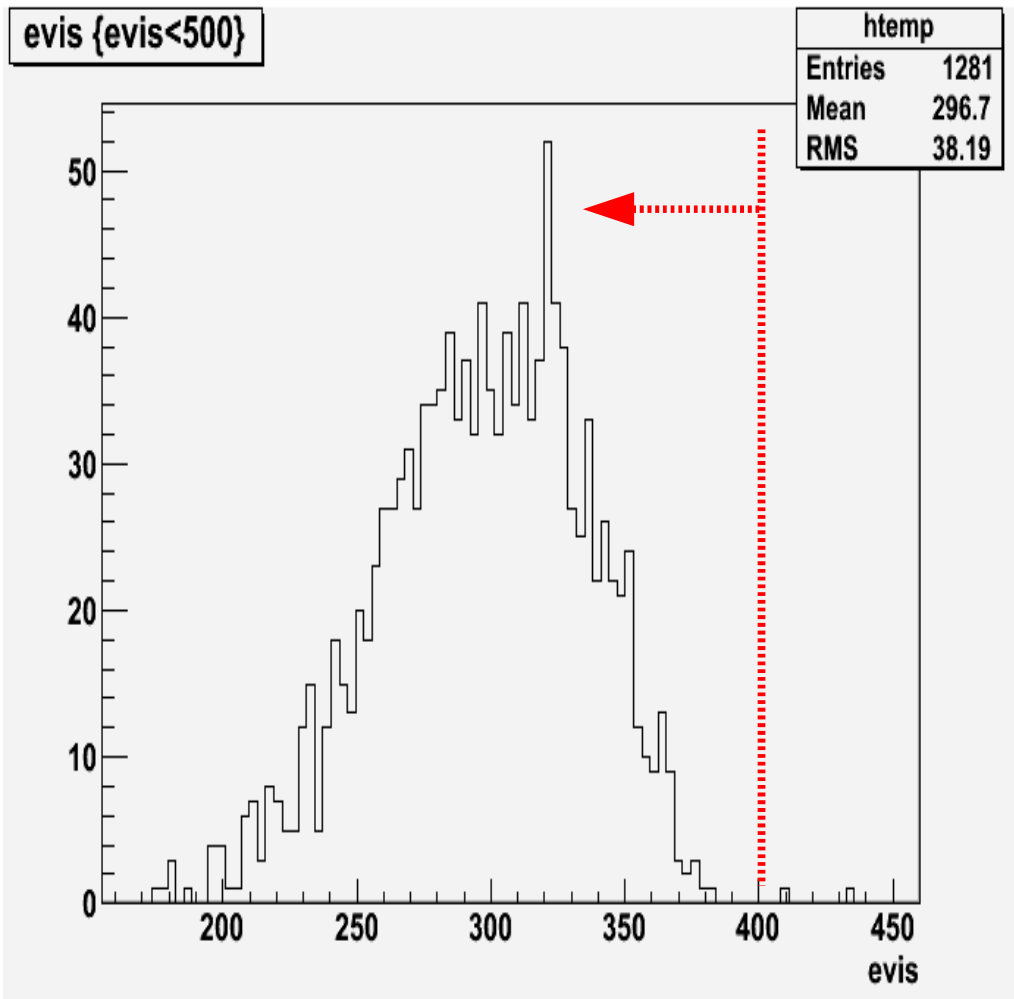
# Pl Cut



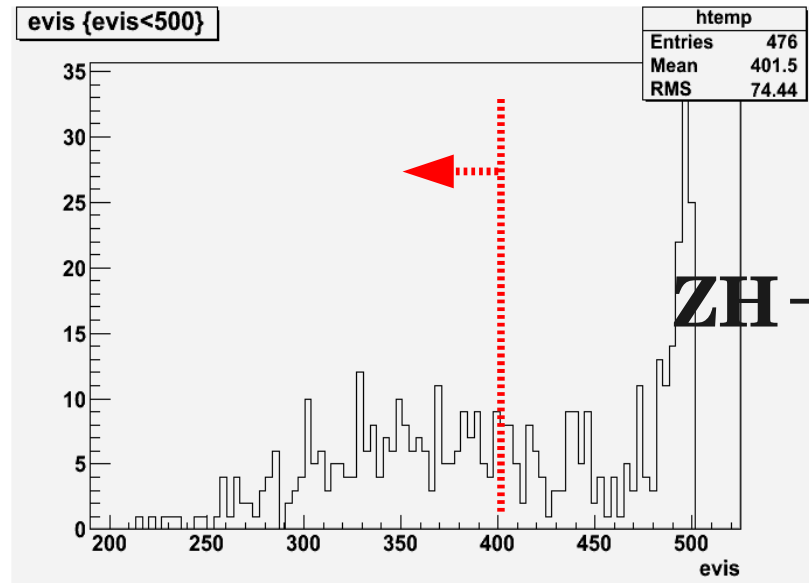
$|pl| < 100 \text{ GeV}$



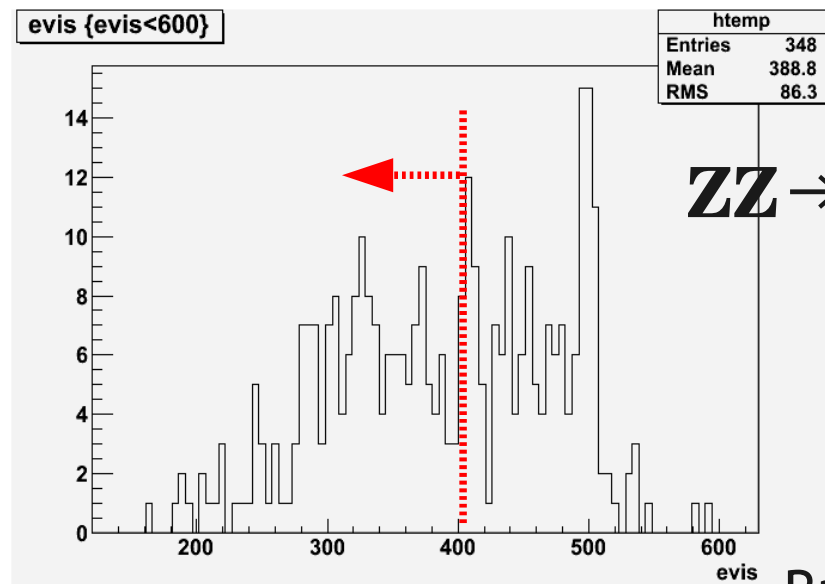
# Energy Cut



**evis<400GeV**

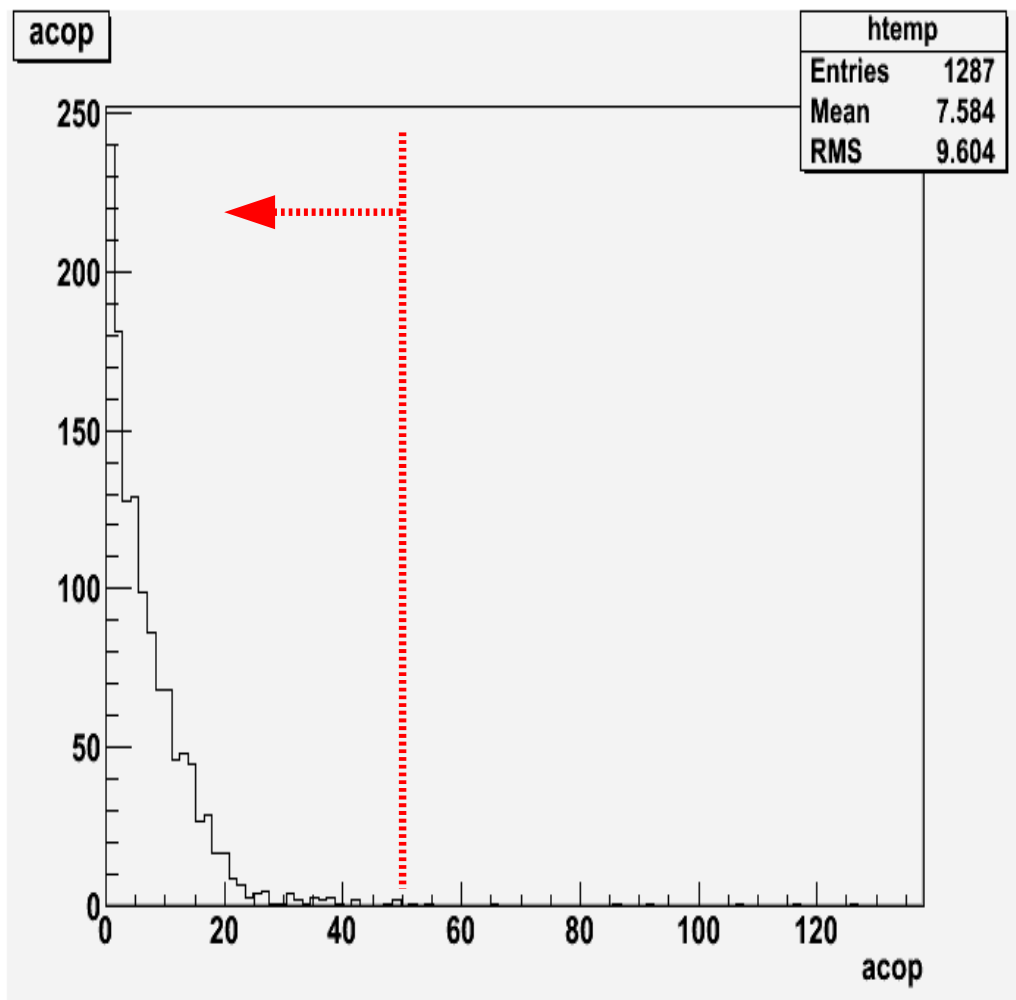


**ZH → 1111**

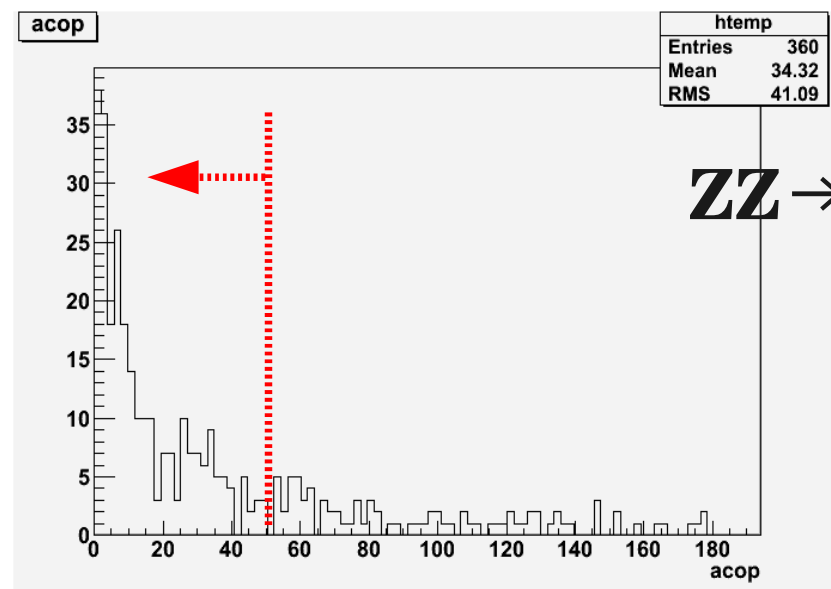
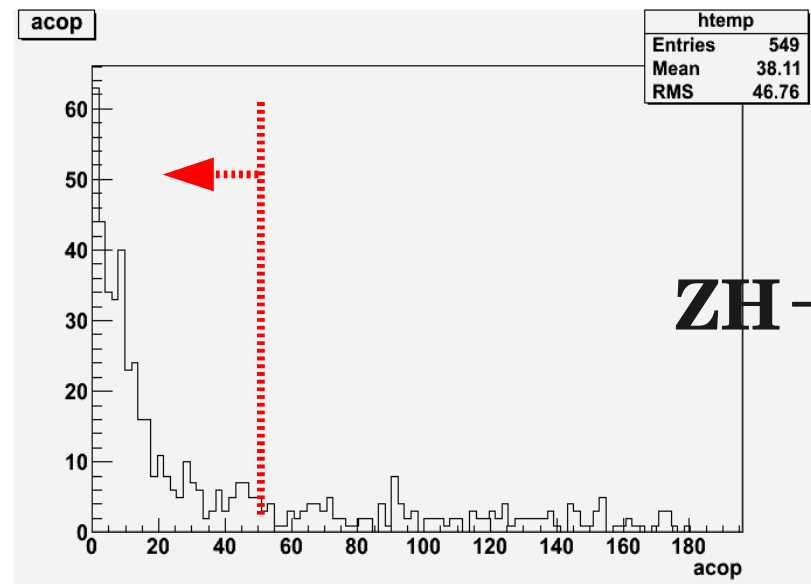


**ZZ → 1111**

# Acoplanarity Cut



**acop < 50**



# Event selection

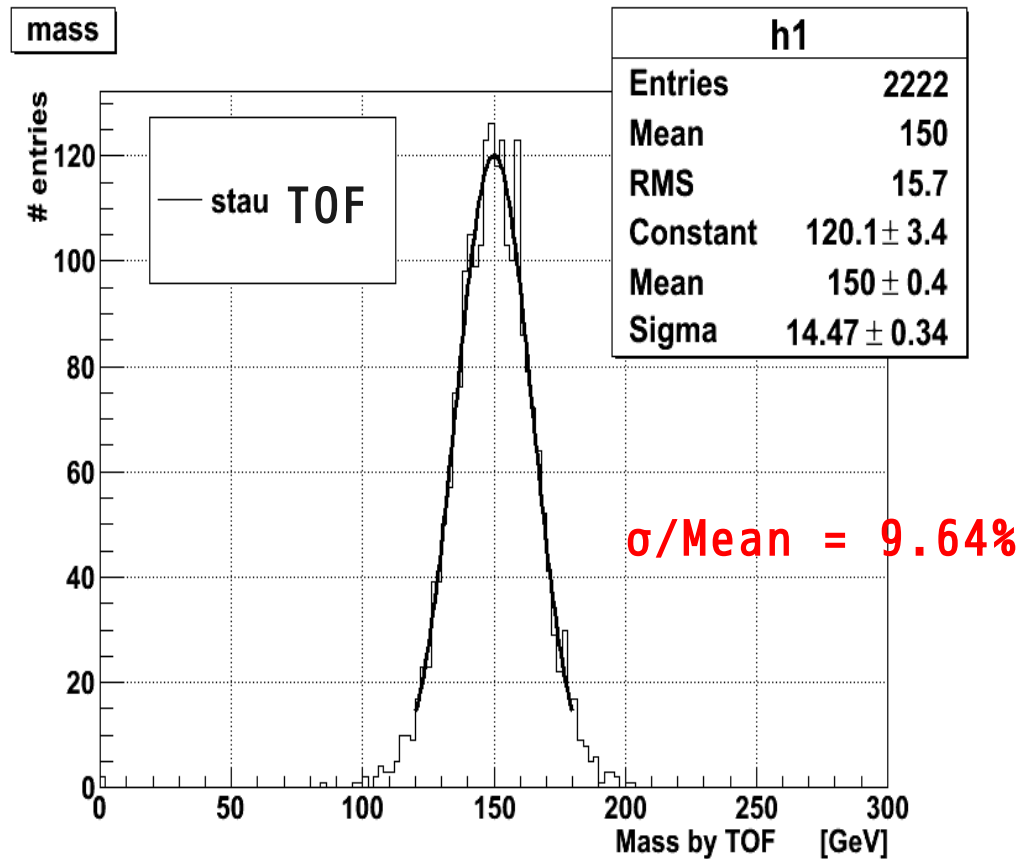
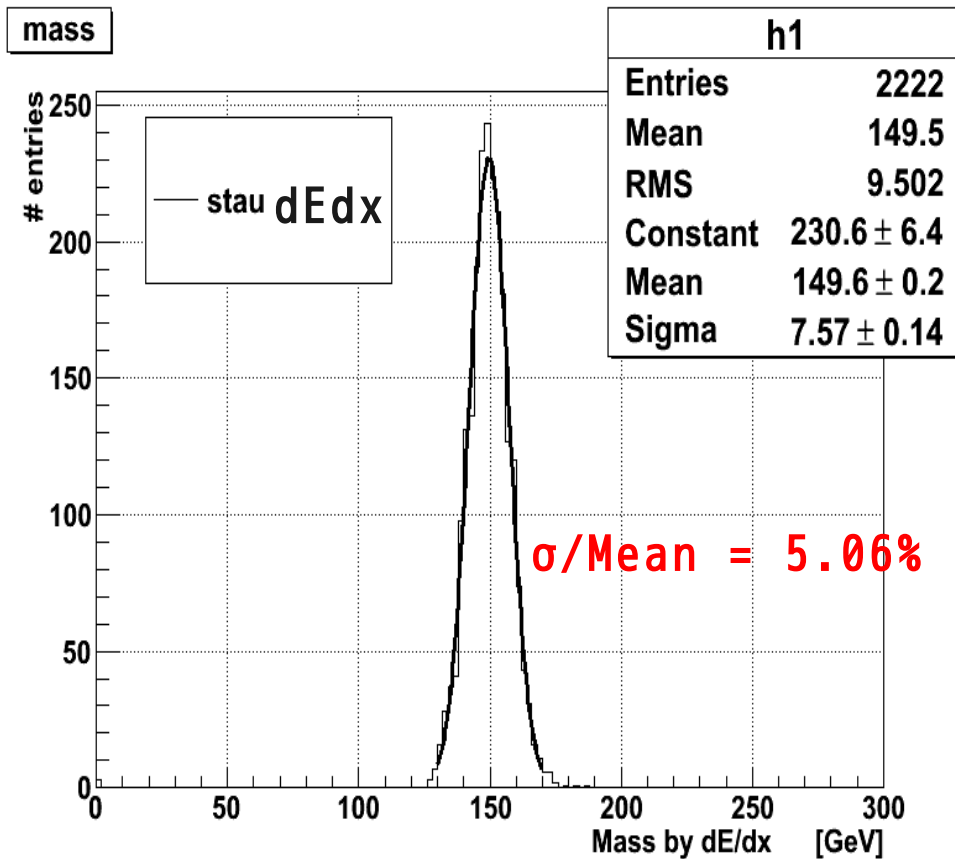
Electron polarisation is -0.8

	No Cut	evis	pt	p <sub>l</sub>	slptrk	Njets	ejets	Fluct $\chi_1^0$ mass
$\chi_1^0 \chi_1^0 \rightarrow \tilde{\tau} \tilde{\tau} \tau \tau$	1525	1515	1513	1493	1331	1275	1115	1115
ZH->l <sub>1</sub> l <sub>1</sub> l <sub>1</sub> l <sub>1</sub>	1588	605	370	93	11	8	6	6
ZZ->l <sub>1</sub> l <sub>1</sub> l <sub>1</sub> l <sub>1</sub>	1294	738	584	270	21	14	12	12

	acop	acceptance
$\chi_1^0 \chi_1^0 \rightarrow \tilde{\tau} \tilde{\tau} \tau \tau$	1111	72.8%
ZH->l <sub>1</sub> l <sub>1</sub> l <sub>1</sub> l <sub>1</sub>	4	0.25%
ZZ->l <sub>1</sub> l <sub>1</sub> l <sub>1</sub> l <sub>1</sub>	11	0.85%

Slptrk → number of tracks == 2  
 Njets → number of jets == 2  
 Ejets → energy of jet > 5 GeV  
 Fluct $\chi_1^0$  mass →  $|M_{j_\tau \tilde{\tau}} - m_{\chi_1^0}| < 50 \text{ GeV}$

# Precision of measurement of stau mass



measurement of stau mass by dE/dx is more precise than that of TOF.



# Summary & Plan

Try to fix an measurement of mass by  $dE/dx$  and TOF.

Try to fix an event selection

- $dE/dx$  cut
- TOF cut