TEV粒子物理实验暑期学校小组展示

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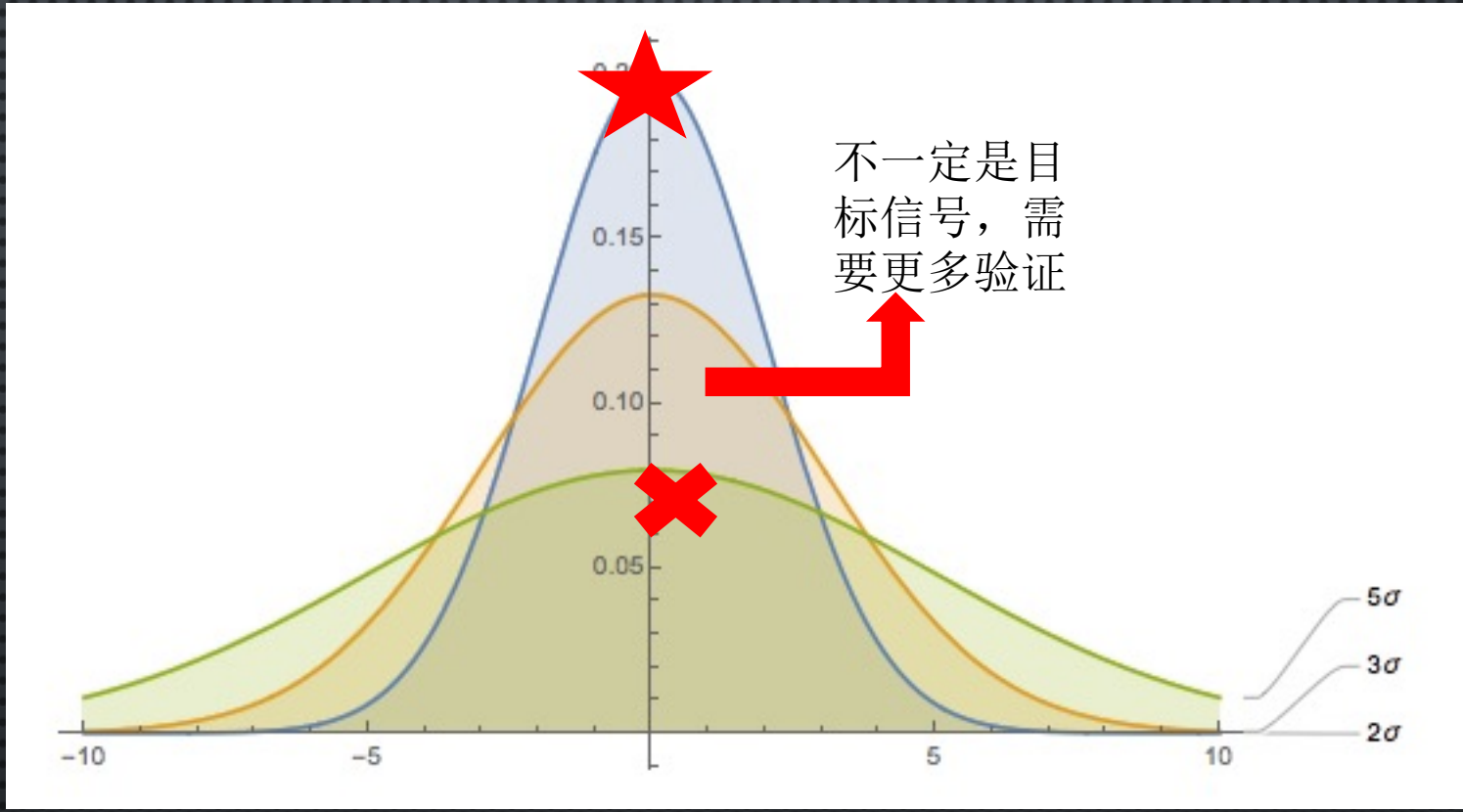
TASK

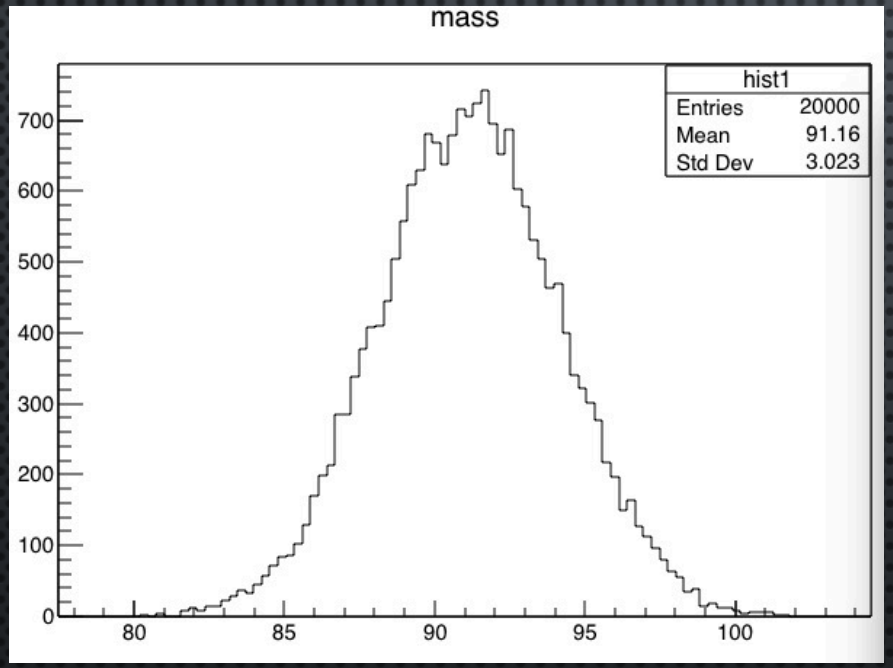


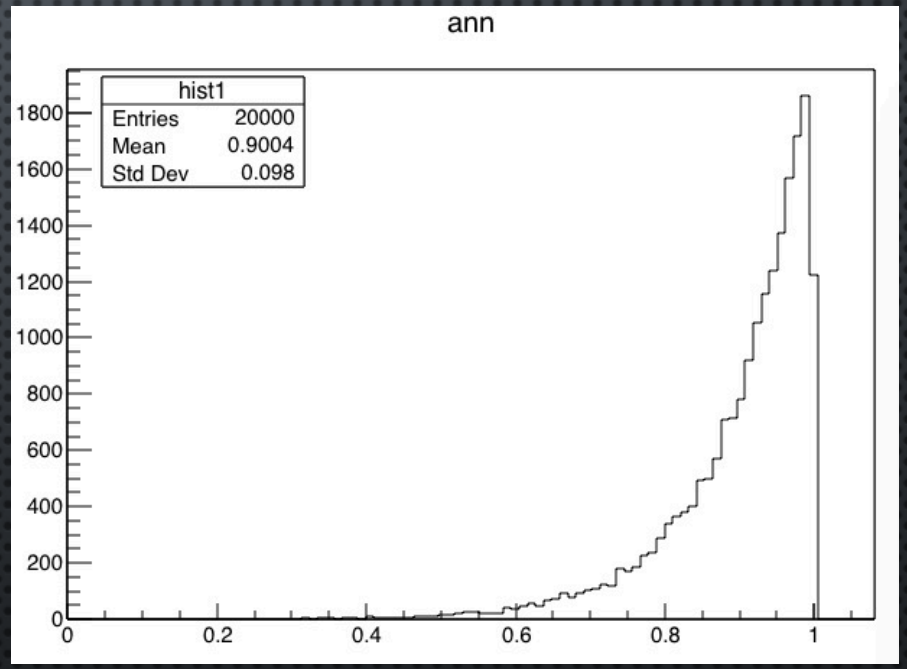
- 目的：在数据中找到一个质量信号的峰，判断是否为目标信号
  - Task1：用蒙特卡洛数据找到一个最佳的cut 数值
  - Task2：对实际数据进行筛选，拟合，分析结果

导入数据

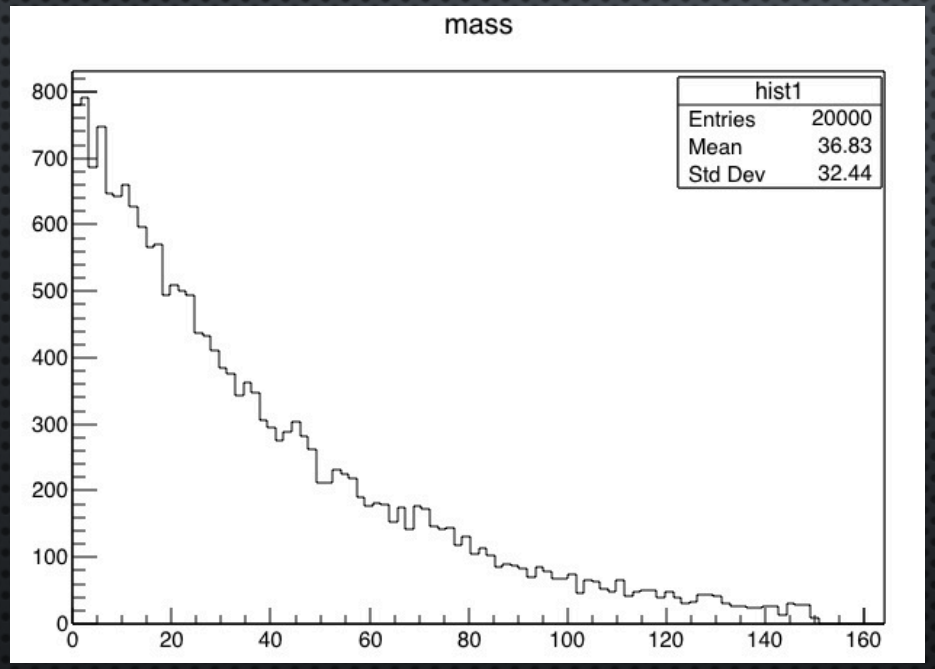
```
KEY: TTree    tree_mc_sig;1    MC Signal tree
KEY: TTree    tree_mc_bkg;1    MC Background tree
KEY: TTree    tree_data;1      Data
```

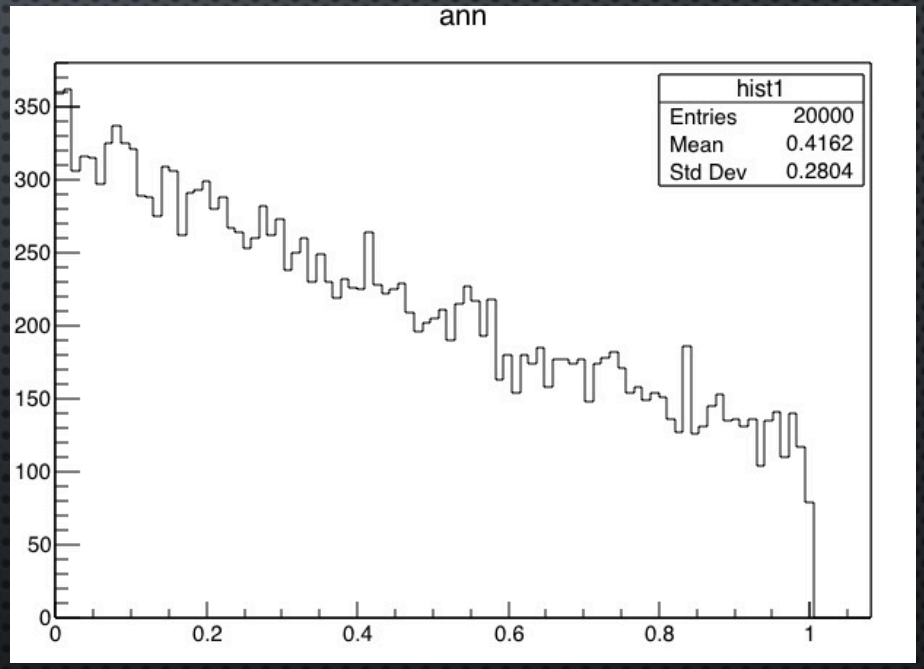
MC SIGNAL


mass
hist1
Entries 20000
Mean 91.16
Std Dev 3.023
700
600
500
400
300
200
100
0
80
85
90
95
100

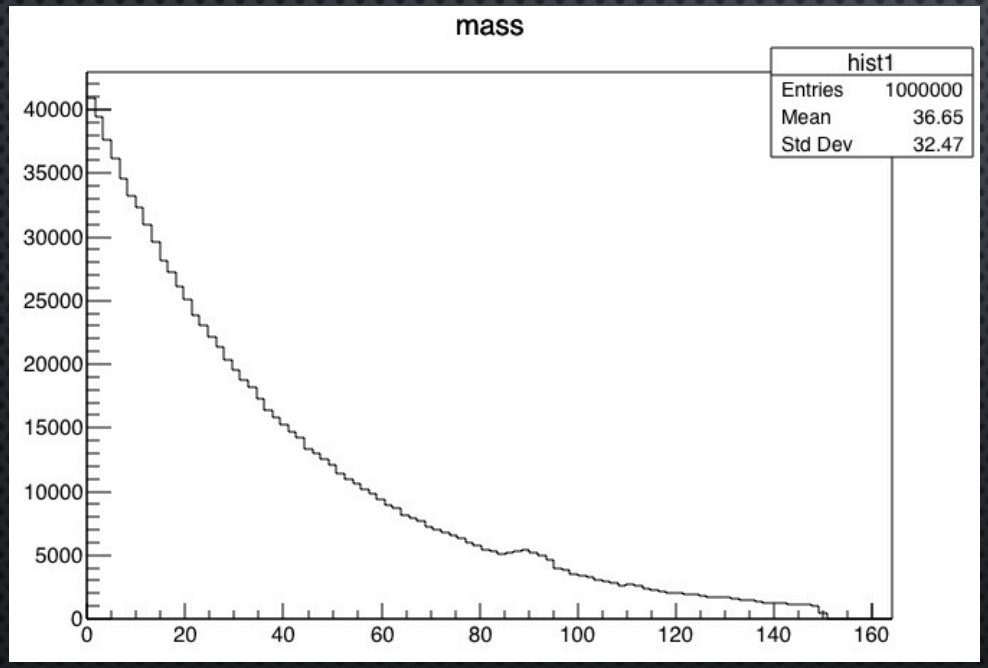

ann
hist1
Entries 20000
Mean 0.9004
Std Dev 0.098
1800
1600
1400
1200
1000
800
600
400
200
0
0
0.2
0.4
0.6
0.8
1

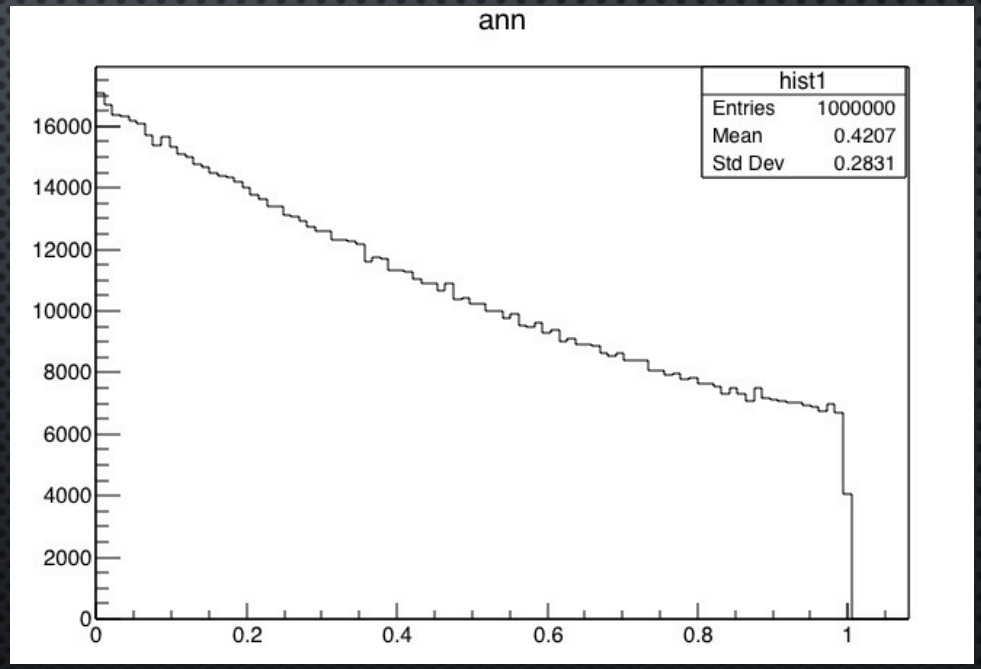
MC BACKGROUND



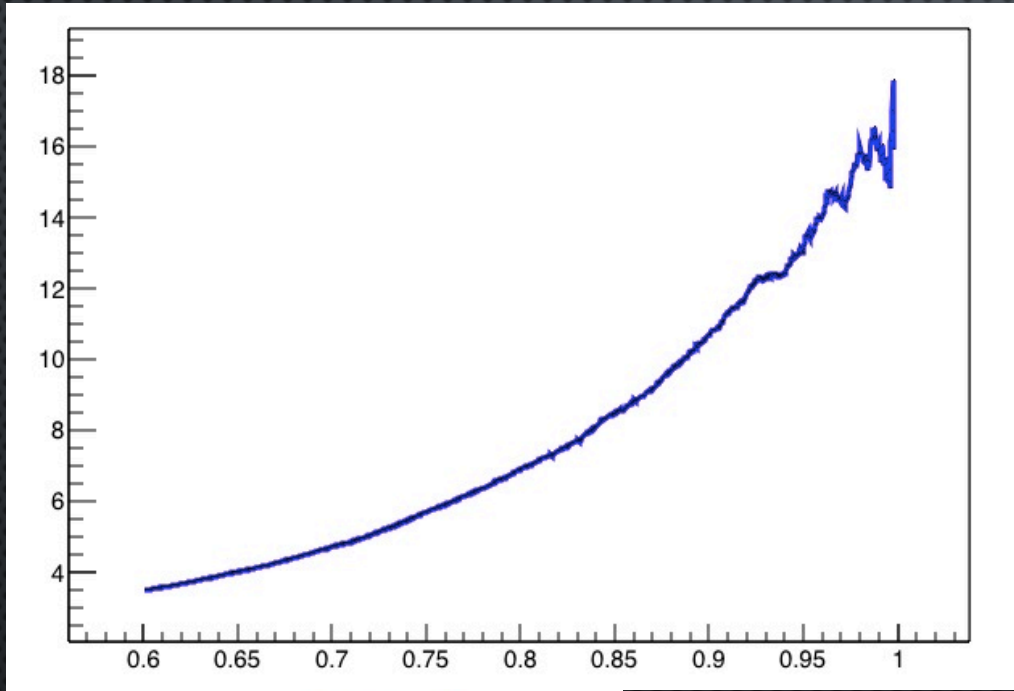


DATA


mass
hist1
Entries 1000000
Mean 36.65
Std Dev 32.47
40000
35000
30000
25000
20000
15000
10000
5000
0
0
20
40
60
80
100
120
140
160

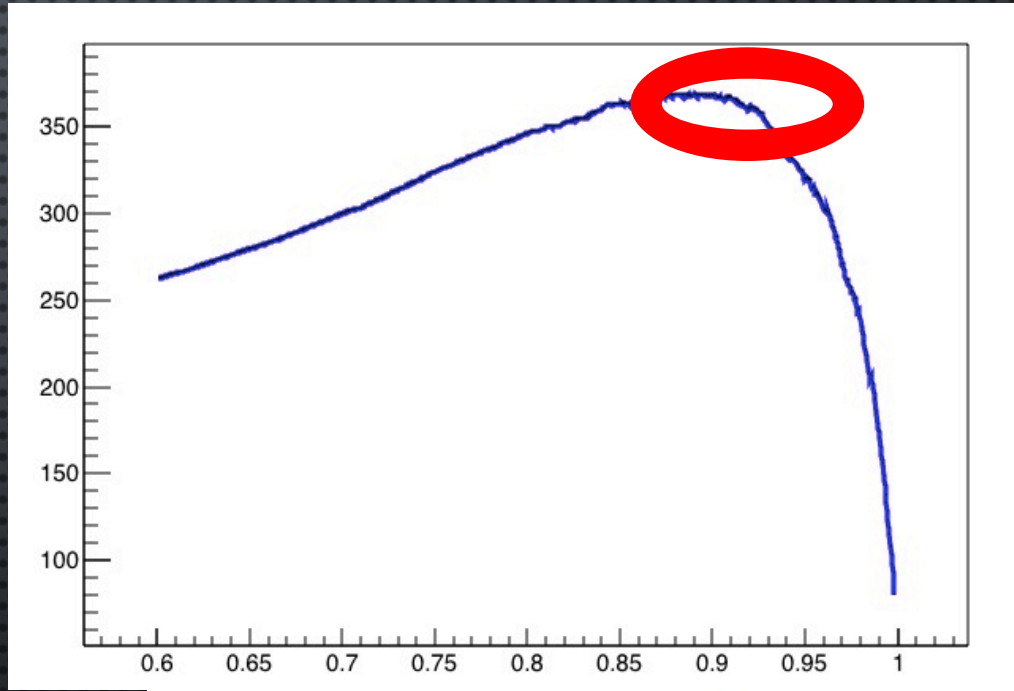

ann
hist1
Entries 1000000
Mean 0.4207
Std Dev 0.2831
16000
14000
12000
10000
8000
6000
4000
2000
0
0
0.2
0.4
0.6
0.8
1

CUT – METHOD 1



$$p = \frac{signal}{\sqrt{background}}$$

筛选依据可以有多种



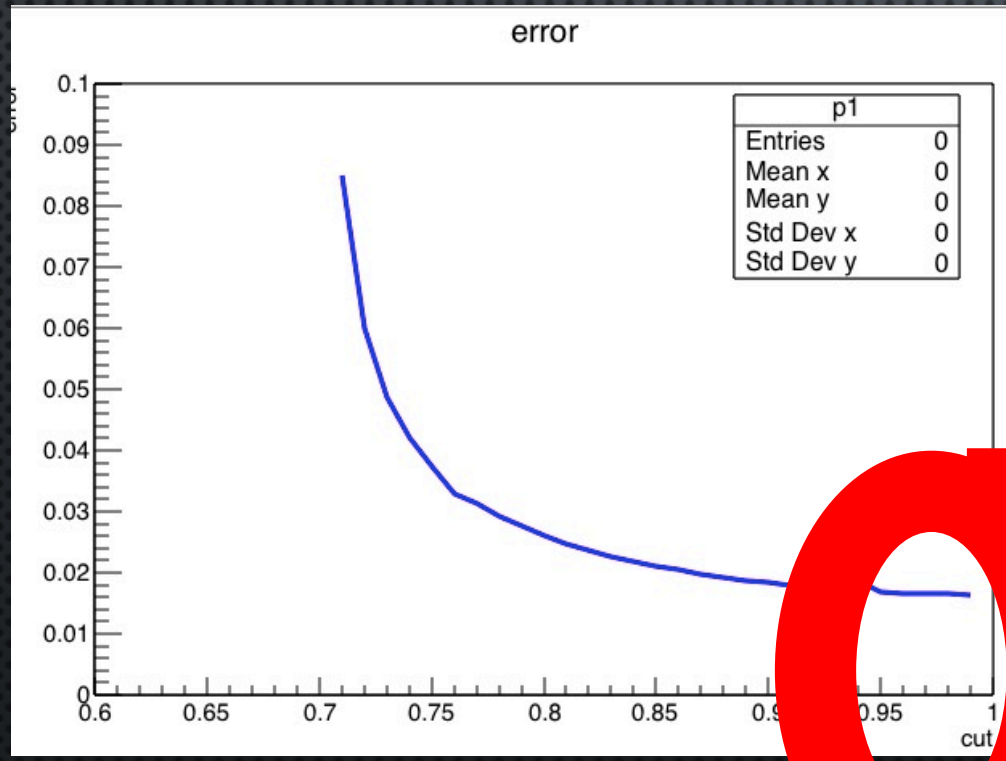
$$p = \frac{signal}{\sqrt{background + signal}}$$

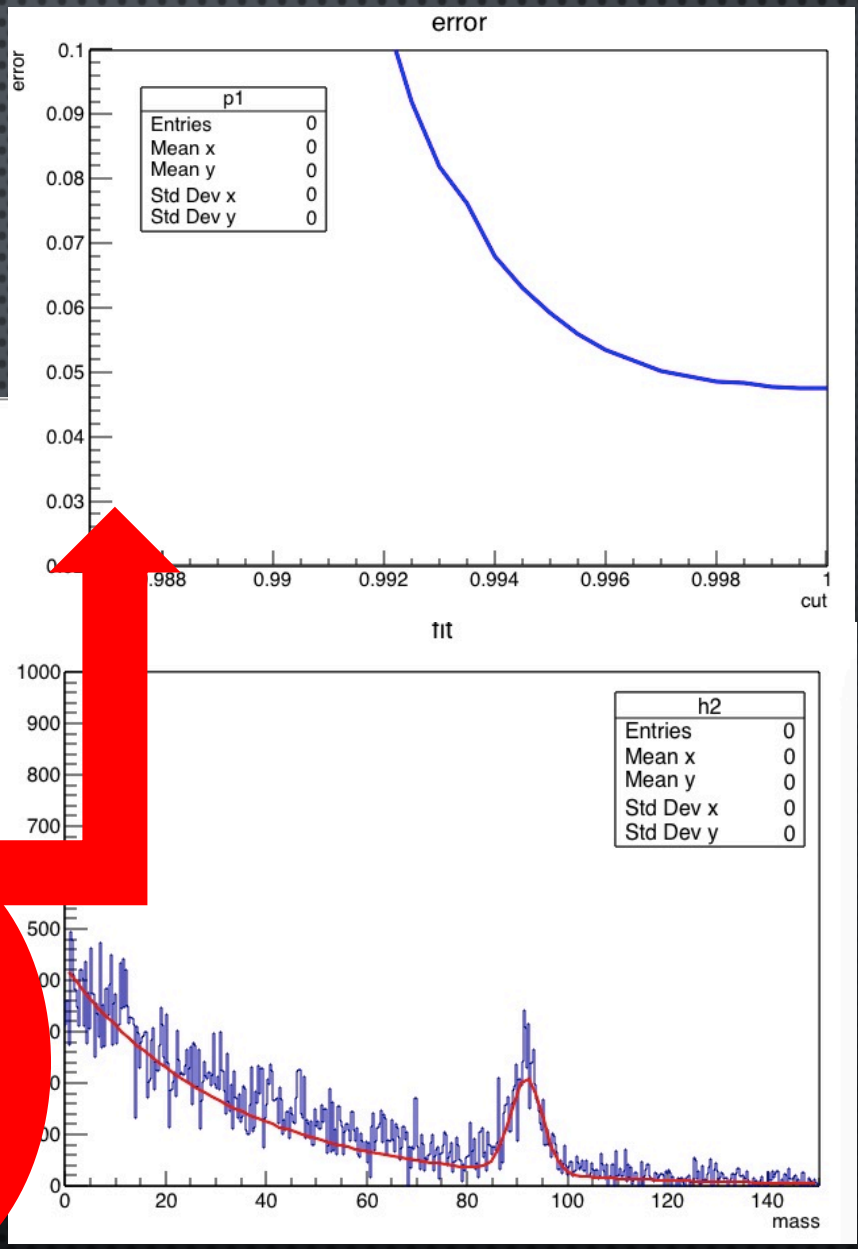
CUT – METHOD 2

NAME	VALUE	ERROR
p0	4.27857e+01	1.12272e+00
p1	9.12881e+01	8.02353e-02
p2	-3.08897e+00	7.89815e-02
p3	1.19584e+01	3.63548e-02
p4	3.03835e+00	4.37168e-03
p5	-2.56614e-02	9.32602e-05

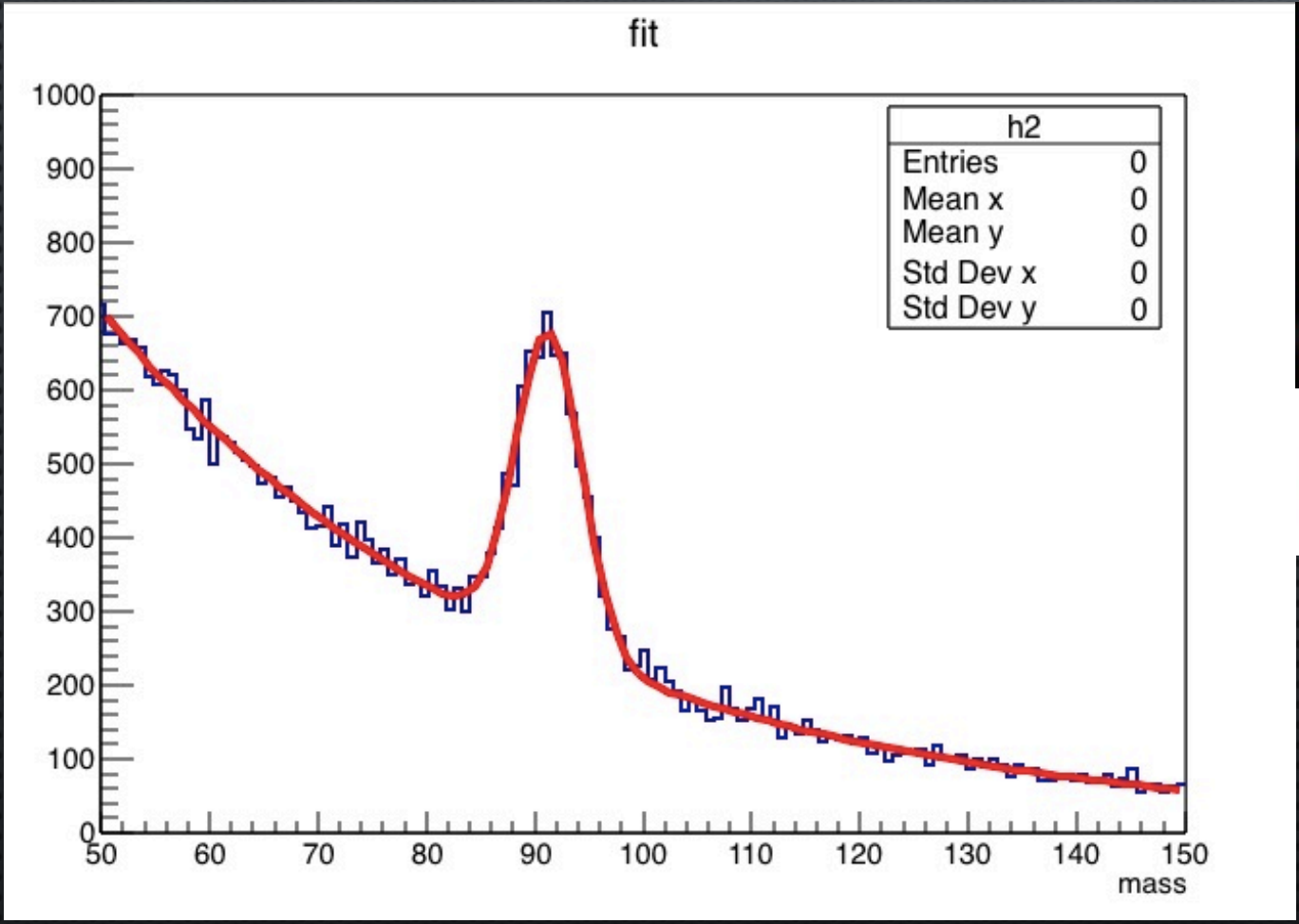
计算不同cut 数值对应的误差大小
找误差较小时的 cut

CUT – METHOD 2


error
p1
Entries 0
Mean x 0
Mean y 0
Std Dev x 0
Std Dev y 0
cut


error
p1
Entries 0
Mean x 0
Mean y 0
Std Dev x 0
Std Dev y 0
cut
fit
h2
Entries 0
Mean x 0
Mean y 0
Std Dev x 0
Std Dev y 0
mass

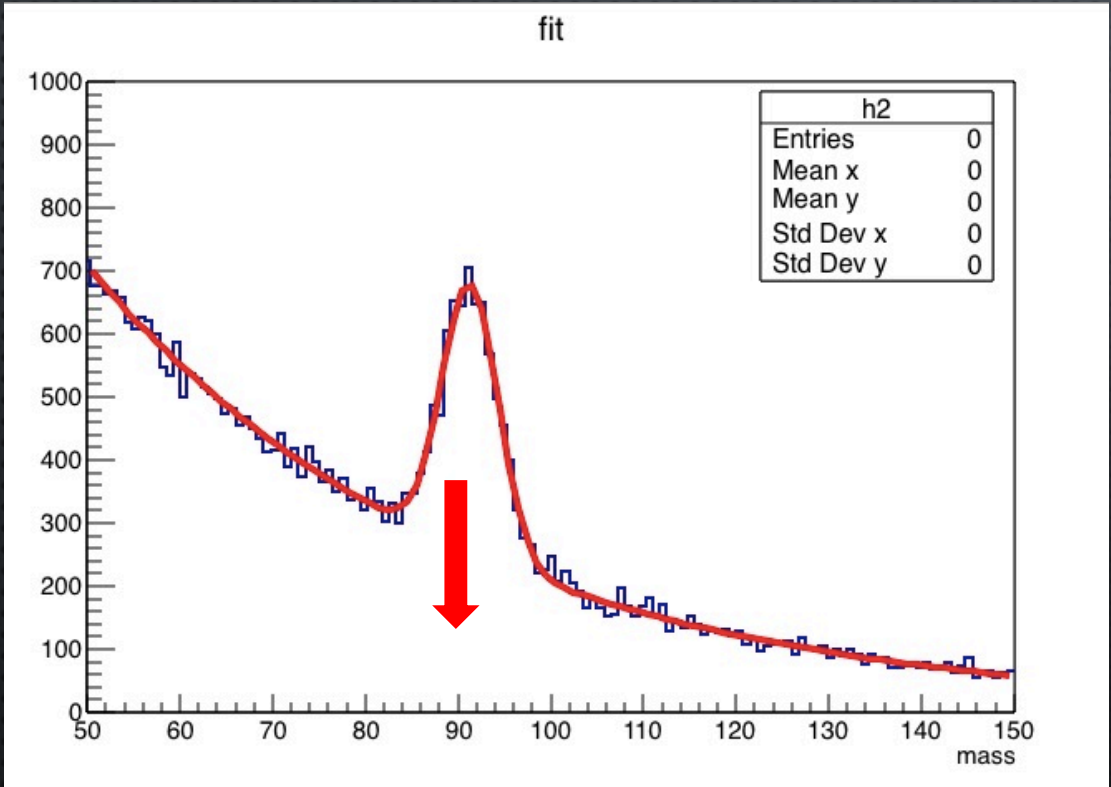
FIT



PARAMETER NAME	VALUE	ERROR
p0	4.26572e+02	1.07694e+01
p1	9.13124e+01	8.01149e-02
p2	3.06430e+00	7.71788e-02
p3	1.42999e+01	7.97913e-01
p4	5.15491e+00	5.32573e-02
p5	-2.50488e-02	9.15802e-05

$$p_0 * Gaus(p_1 + p_2) + p_3 e^{p_4 * x + p_5}$$

CONCLUSION



在91处有3σ的峰
可能是信号
也有可能是涨落

谢谢