

signal

$$B^{\pm} \rightarrow K^{*\pm} l^+ l^-$$

- branching fraction: 1.11×10^{-6}
- objective: search for new physics by measuring direct CP asymmetries

$$A_{CP}^{K^{(*)}} \equiv \frac{\mathcal{B}(\bar{B} \rightarrow \bar{K}^{(*)} l^+ l^-) - \mathcal{B}(B \rightarrow K^{(*)} l^+ l^-)}{\mathcal{B}(\bar{B} \rightarrow \bar{K}^{(*)} l^+ l^-) + \mathcal{B}(B \rightarrow K^{(*)} l^+ l^-)}$$

$$B^{\pm} \rightarrow K^{*\pm} e^+ e^-$$

generate from pythia 8: 10000 event
number of B:12810

reconstruct $K^{*\pm}$ candidate

$$K^{*\pm} \rightarrow K^{\pm} \pi^0 \quad K^{*\pm} \rightarrow K_s^0 \pi^{\pm} \quad K^{*\pm} \rightarrow K_L^0 \pi^{\pm}$$

for K_s^0 branching fraction: 99.91%

$$K_s^0 \rightarrow \pi^0 \pi^0 \quad \text{branching fraction: 30.69\%}$$

$$K_s^0 \rightarrow \pi^+ \pi^- \quad \text{branching fraction: 69.20\%}$$

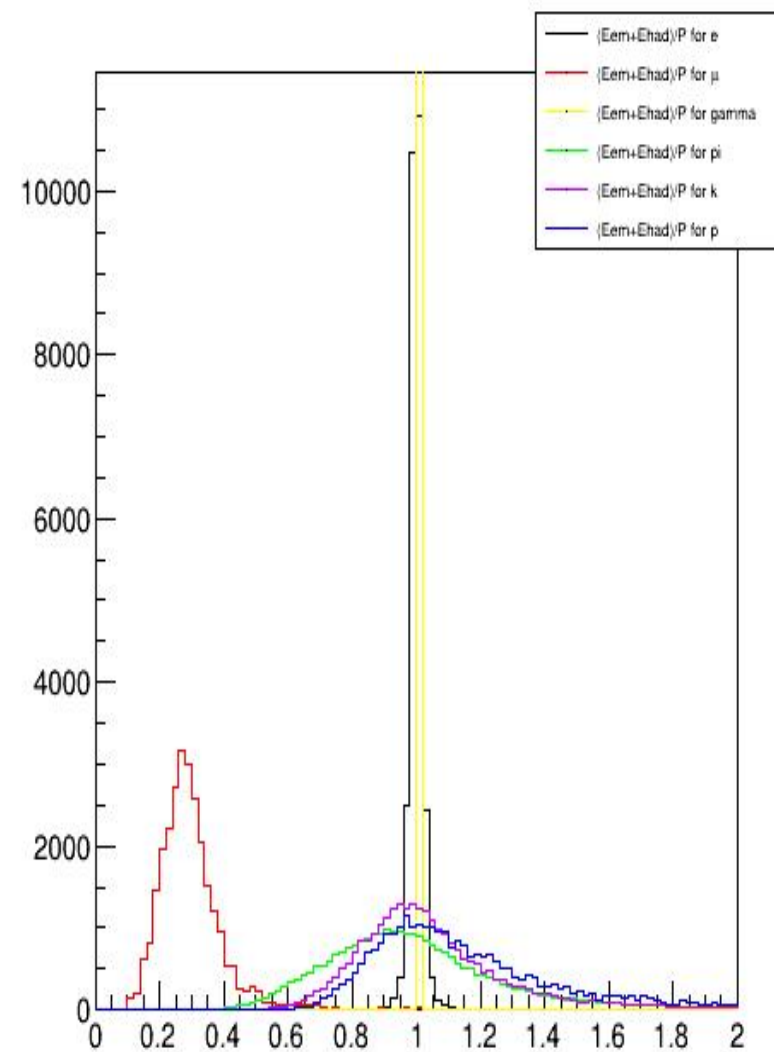
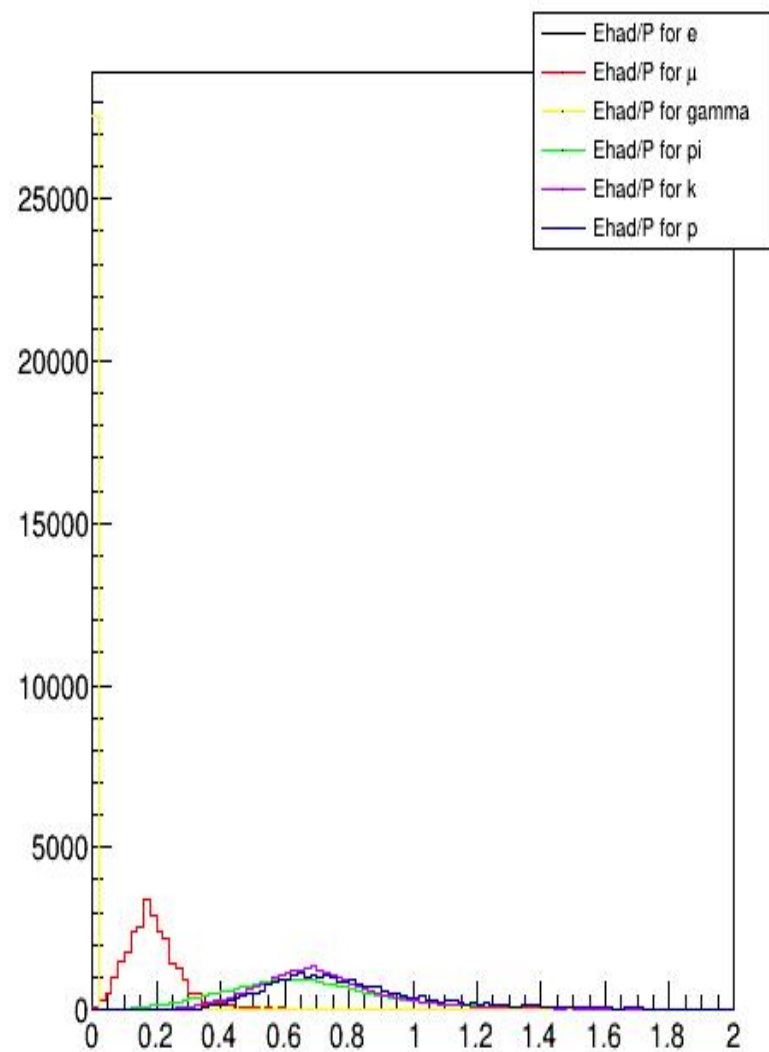
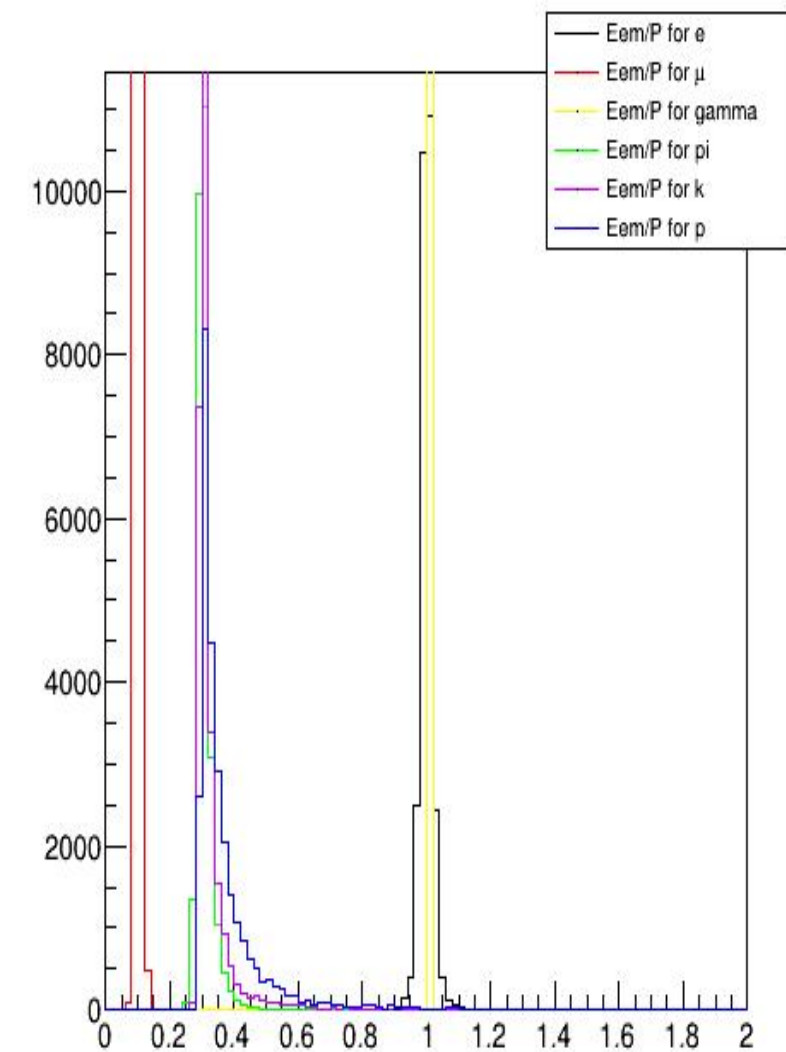
for π^0

$$\pi^0 \rightarrow 2\gamma \quad \text{branching fraction: 98.82\%}$$

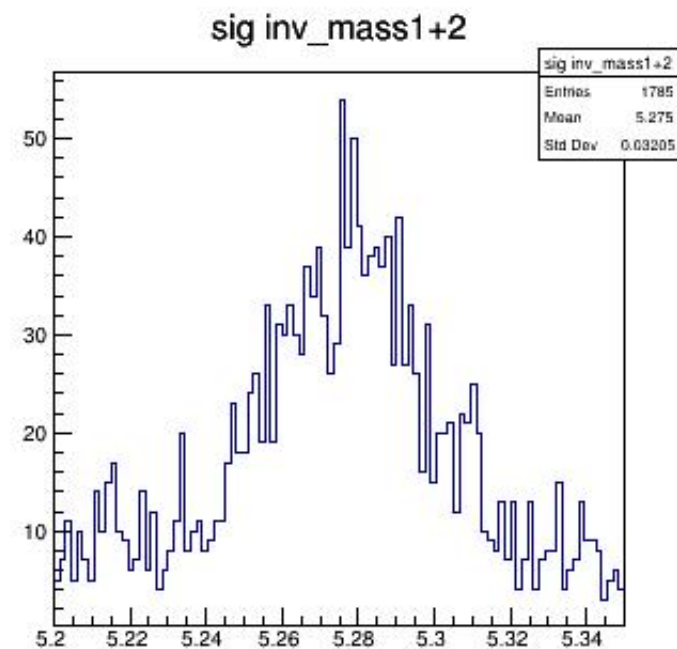
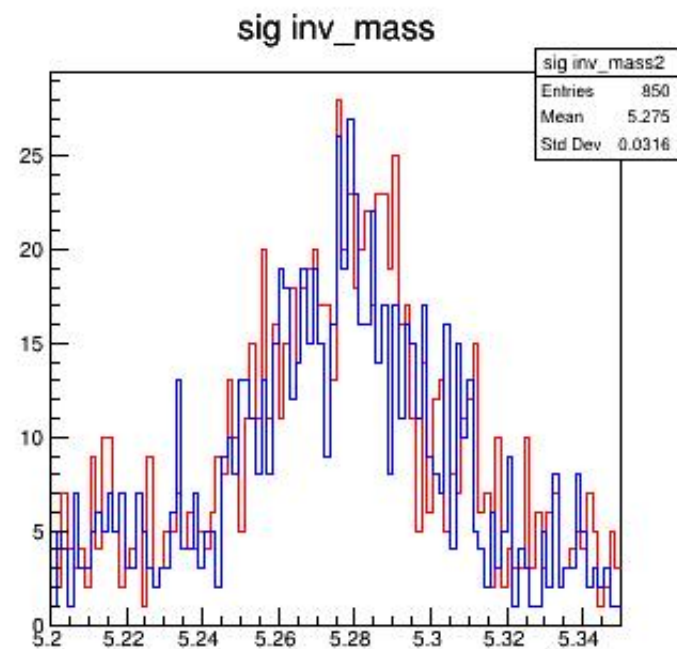
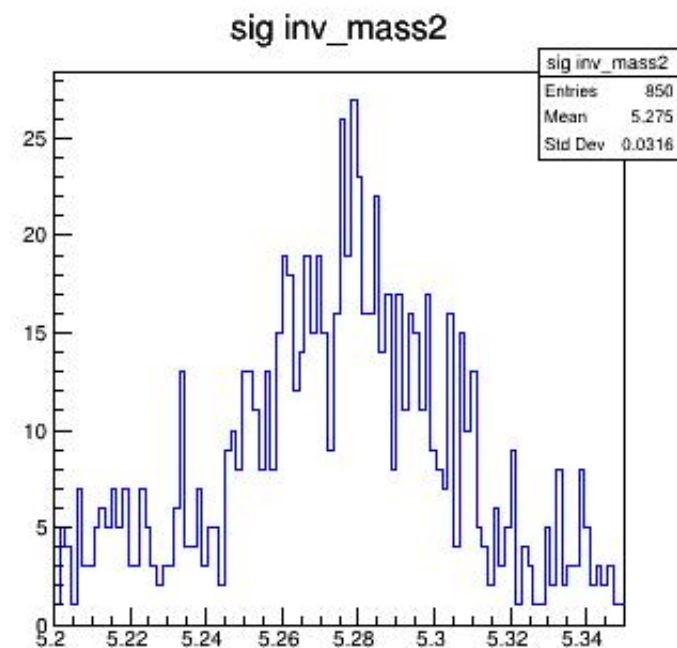
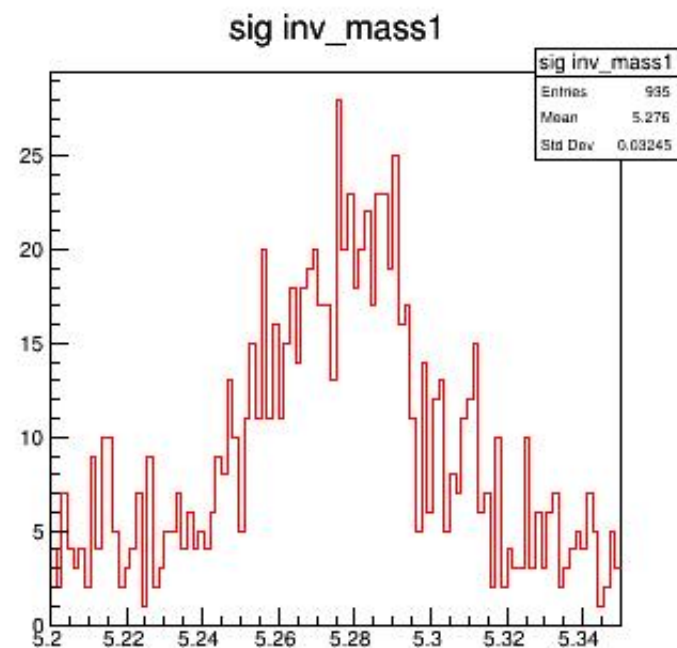
$$\pi^0 \rightarrow e^+ e^- \gamma \quad \text{branching fraction: 1.17\% (neglect)}$$

reconstruct candidates

candidate	invariant mass(GeV/c ²)	mass window(GeV/c ²)
$K^{*\pm}$	0.89167	0.82~0.96
K_s^0	0.49761	0.42~0.57
π^0	0.13498	0.115~0.155
$B^\pm$	5.27934	5.1



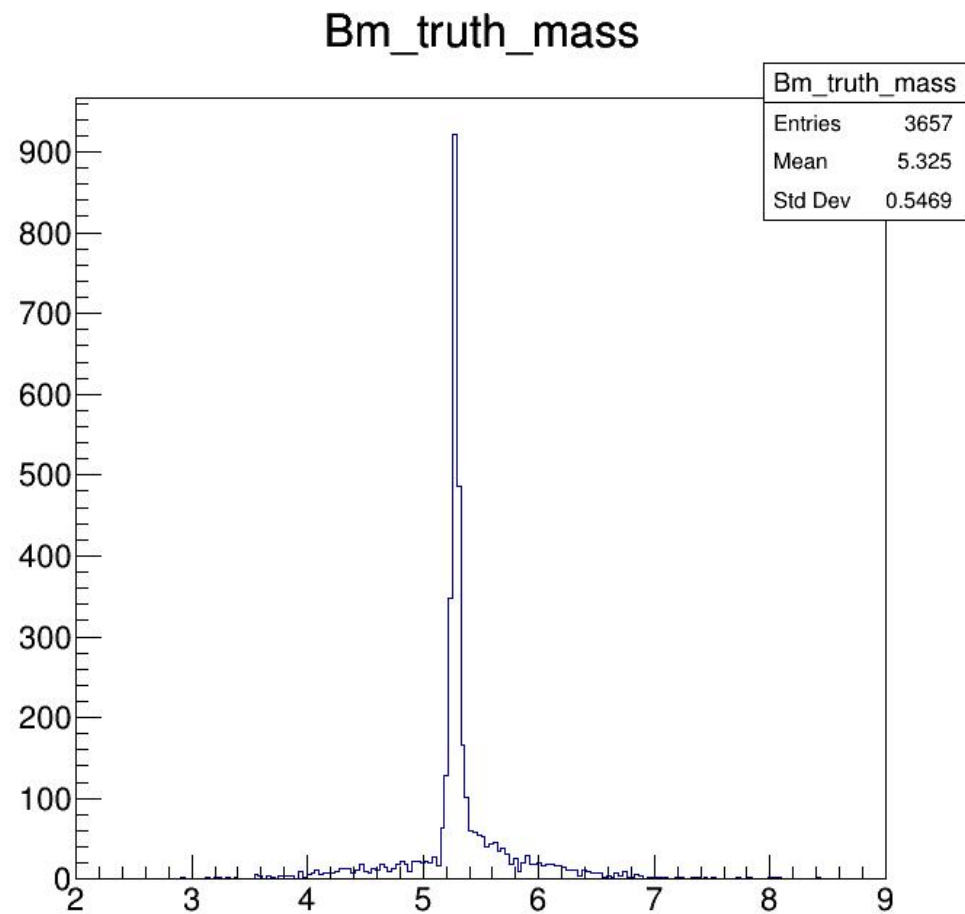
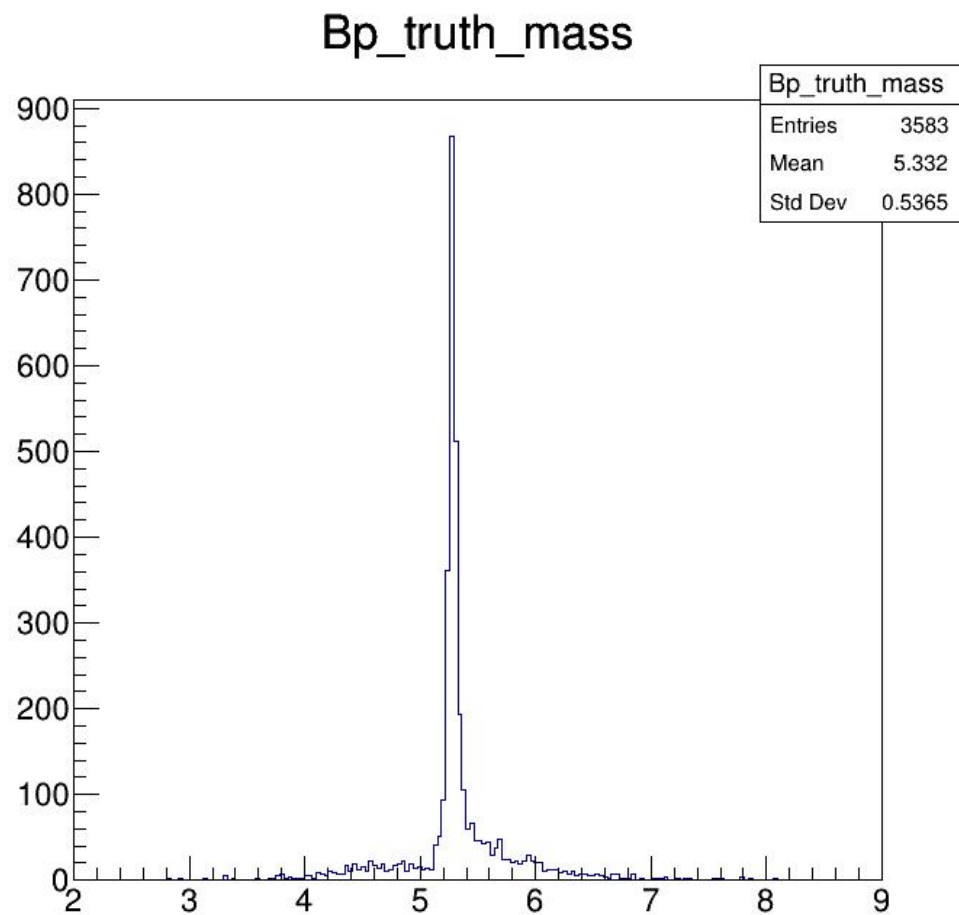
B+ 935
B- 850
 $B^\pm$ 1785



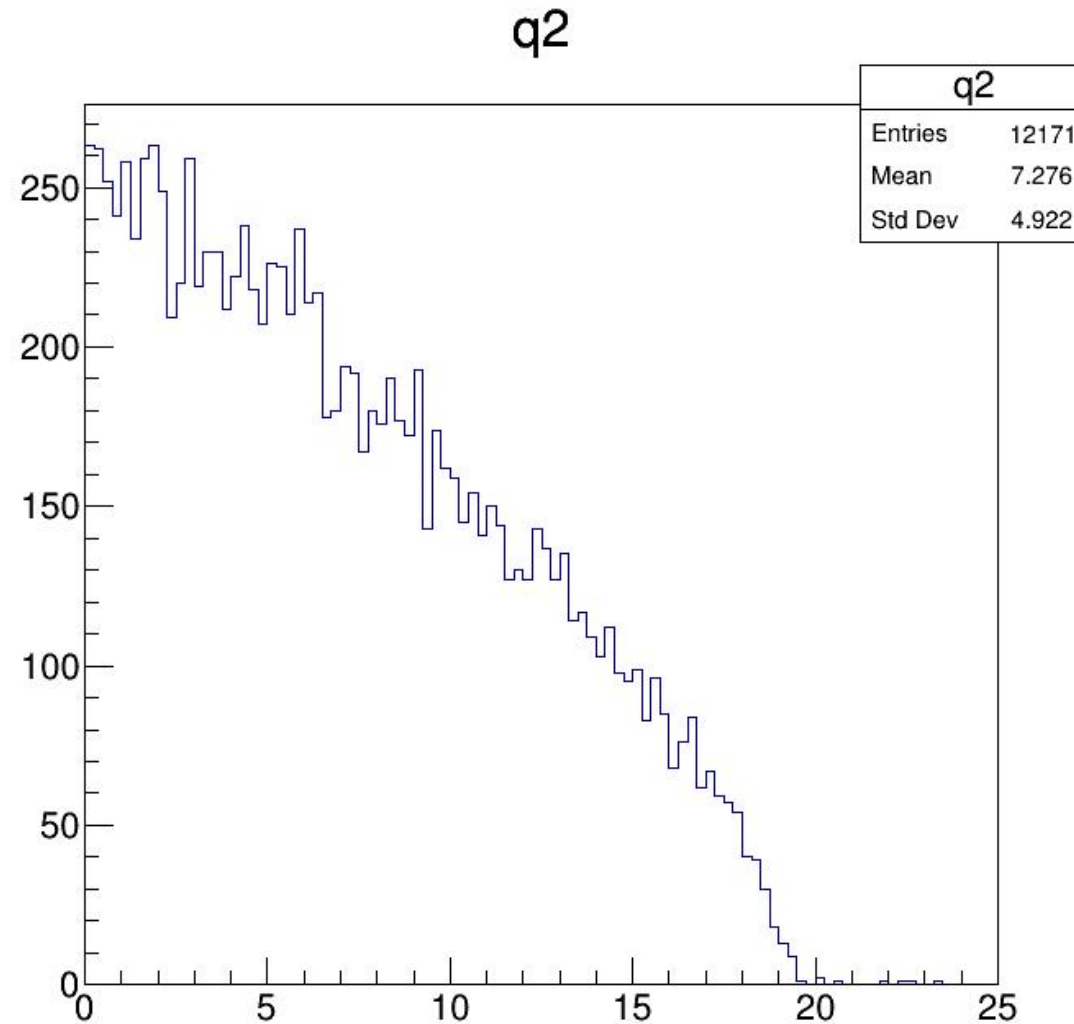
truth

- Bp_num = 6411 Kstarp_num = 6411
ep_num = 6306 em_num = 6299 q2 = 6089
K0_num = 4245 Kp_num = 2476
pi0_K_num = 2160 pip_K_num = 4587
Ks_num = 2095 Kl_num = 2150
r_pi0 = 1188 pi0_2 = 861 pip_pim = 1151
integral = 3566
Bm_num = 6399 Kstarm_num = 6399
ep_num = 6289 em_num = 6313 q2 = 6082
K0_num = 4195 Km_num = 2487
pi0_K_num = 2195 pim_K_num = 4502
Ks_num = 2092 Kl_num = 2103
r_pi0 = 1236 pi0_2 = 88 pip_pim = 1147
integral = 3641

truth mass



dielectron mass squared (truth)



integral = 12166

background

- $b\bar{b}$ 10W

