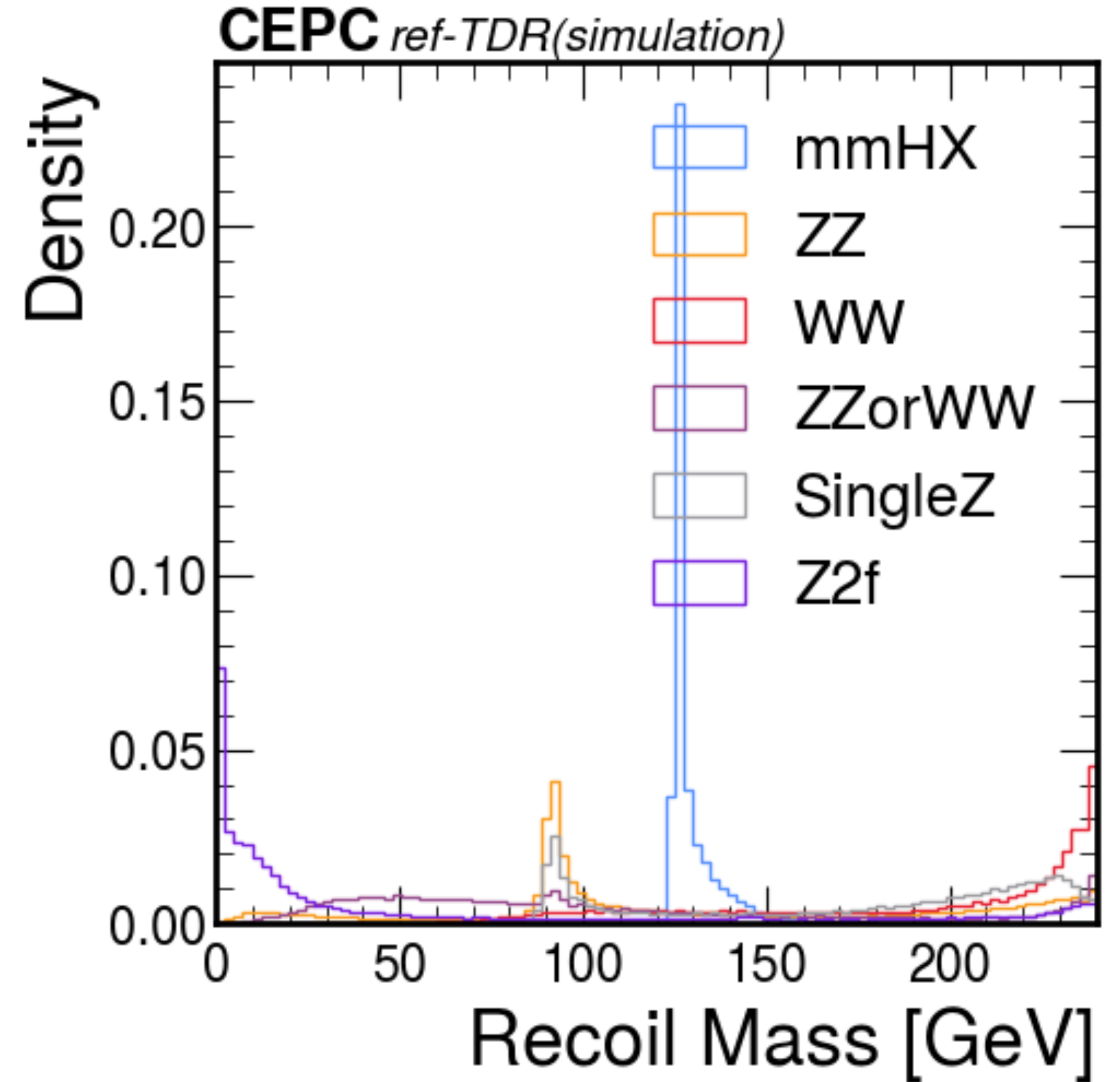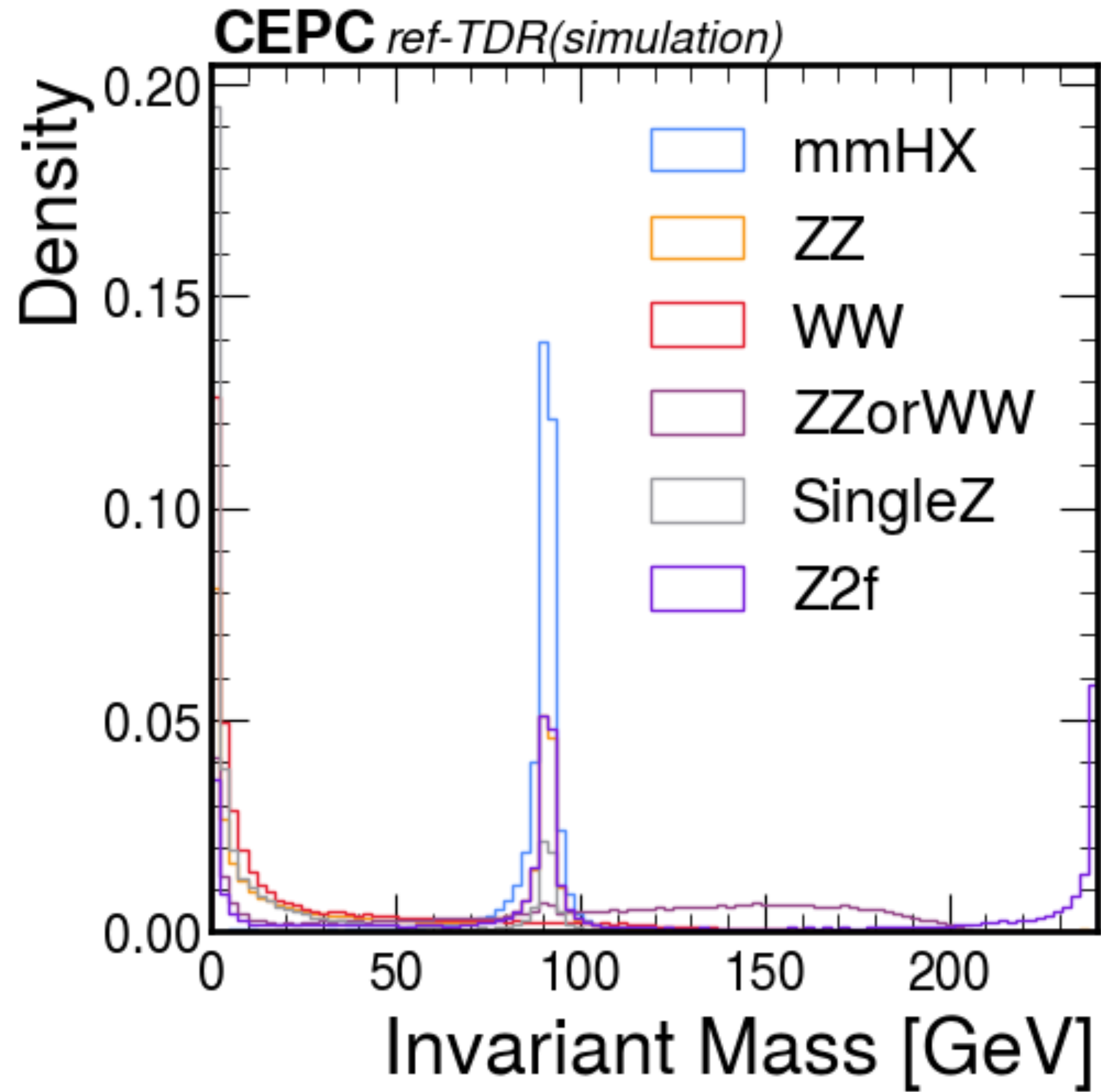# Recoil mass; Comparison with CDR
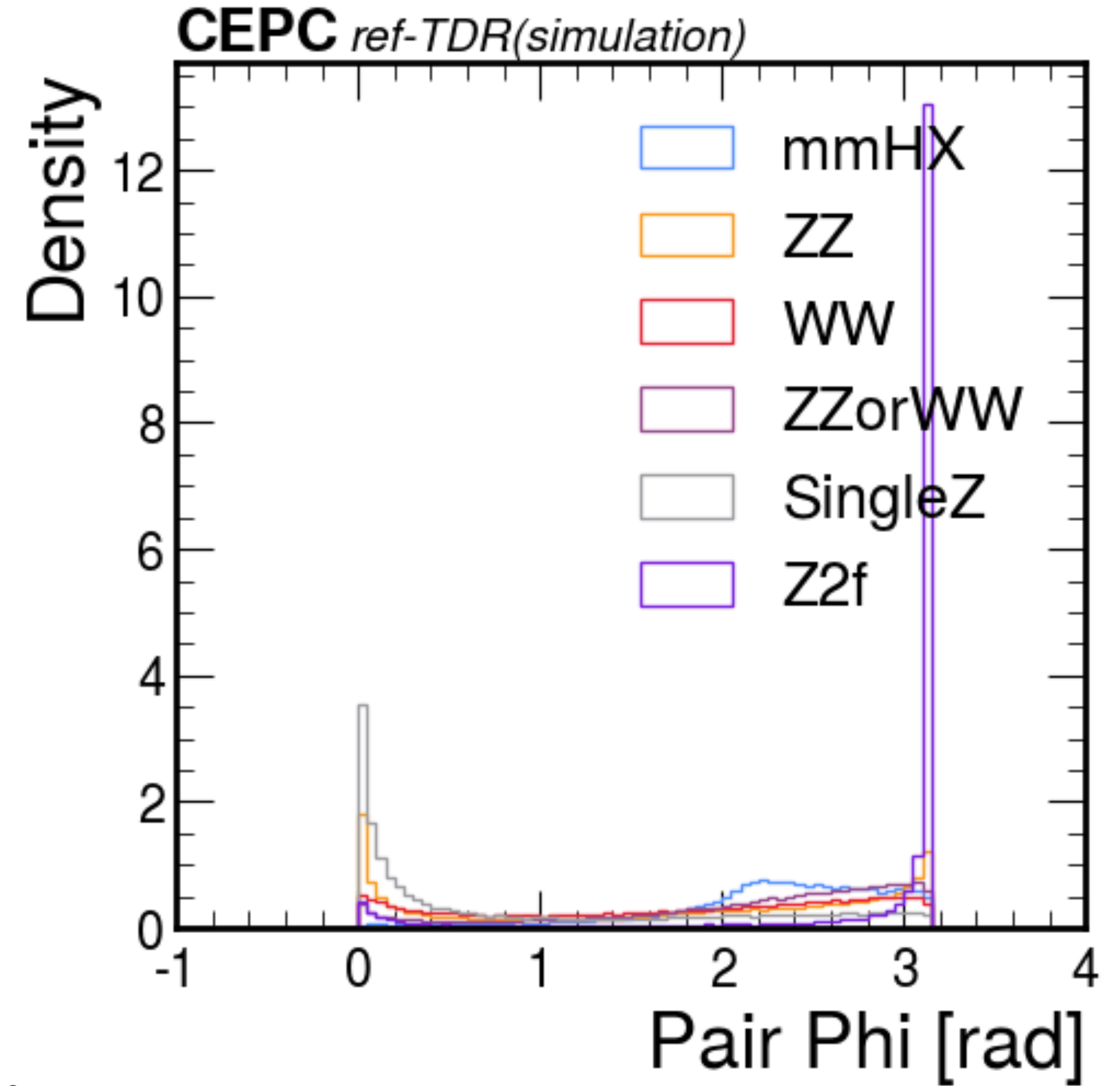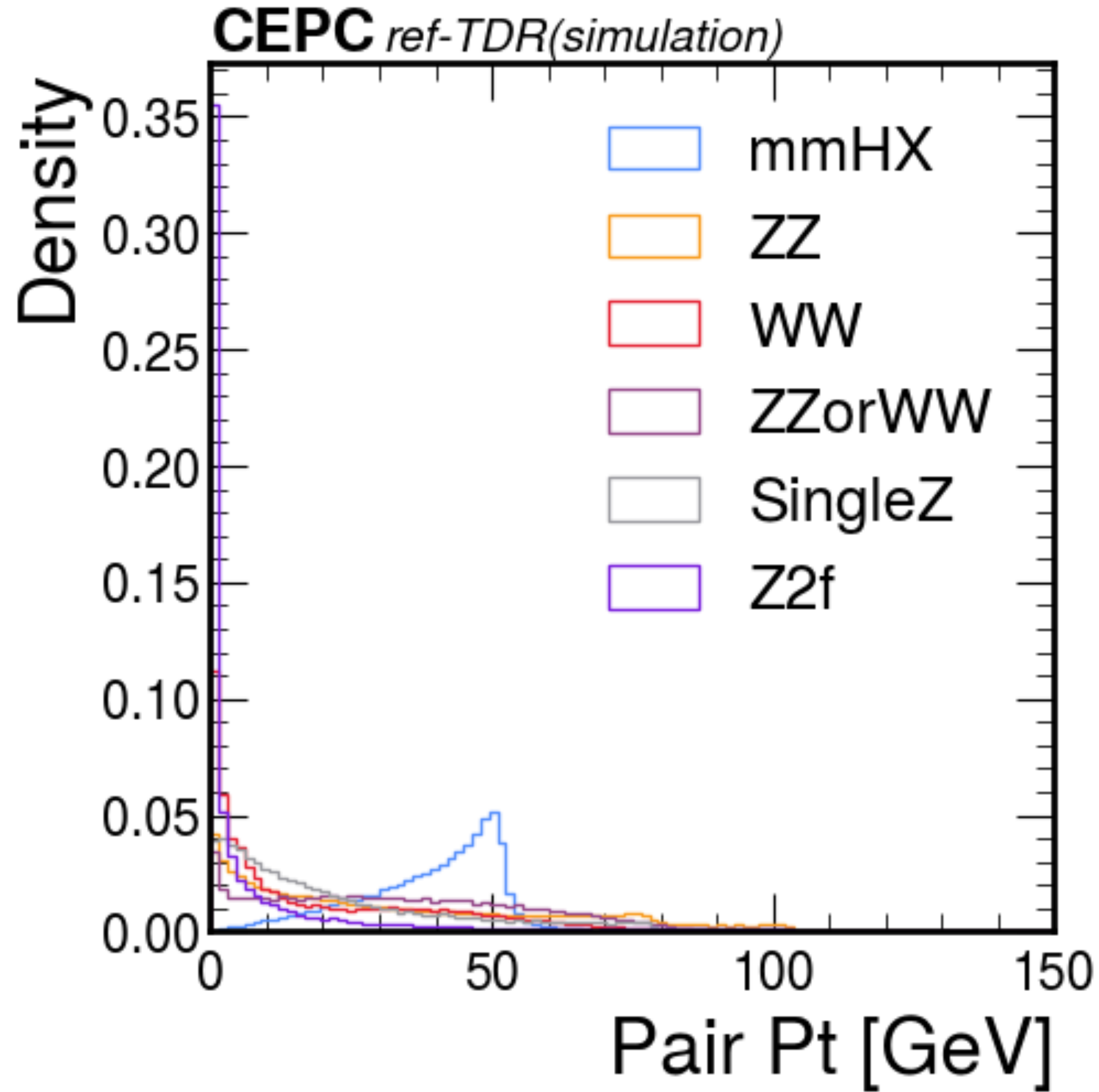
C.Zhang/09Mar2025

Kinematics

Kinematics

Cut-flow

Table 2. Efficiencies of signal and background in the model-independent analysis

	$Z(\mu^+\mu^-)H$	ZZ	WW	ZZ or WW	single Z	$Z(2f)$	$\gamma\gamma$
total generated	35247	5347053	44180832	17801222	7809747	418595861	161925000
$N_{\mu^+} \geqslant 1$, $N_{\mu^-} \geqslant 1$	95.7%	11.95%	0.65%	3.92%	9.75%	1.64%	17.31%
$120\ \mathrm{GeV} < M_{\mathrm{recoil}} < 150\ \mathrm{GeV}$	93.2%	1.71%	0.23%	0.70%	1.93%	0.17%	3.06%
$80\ \mathrm{GeV} < M_{\mu^+\mu^-} < 100\ \mathrm{GeV}$	85.5%	0.68%	0.06%	0.22%	0.22%	0.10%	0.11%
$p_{\mathrm{T}\mu^+\mu^-} > 20\ \mathrm{GeV}$	80.2%	0.57%	0.06%	0.17%	0.16%	0.02%	0.04%
$\Delta\phi < 175°$	77.8%	0.51%	0.05%	0.17%	0.15%	0.01%	0.04%
BDT cut	63.0%	0.25%	0.01%	0.05%	0.06%	0.01%	0.01%
fit window	62.8%	0.25%	0.01%	0.05%	0.05%	0.01%	0.01%

process	mmHX	ZZ	WW	ZZorWW	SingleZ	Z2f	OtherHX
GenN	66112	889030	476400	238083	591904	292716	267001
QEff.	0.9482	0.2677	0.1009	0.2751	0.0928	0.2296	0.0765
pairEff.	0.9482	0.2677	0.1009	0.2751	0.0928	0.2296	0.0765
recoilEff.	0.9059	0.0234	0.0110	0.0249	0.0085	0.0083	0.0018
invmassEff.	0.8416	0.0091	0.0021	0.0085	0.0024	0.0042	0.0006
PTEff.	0.7639	0.0060	0.0019	0.0060	0.0019	0.0007	0.0005
PhiEff.	0.7356	0.0056	0.0017	0.0059	0.0018	0.0005	0.0005
passWindow	47329	4307	698	1143	928	104	95
WindowEff.	0.7159	0.0048	0.0015	0.0048	0.0016	0.0004	0.0004

Modelling
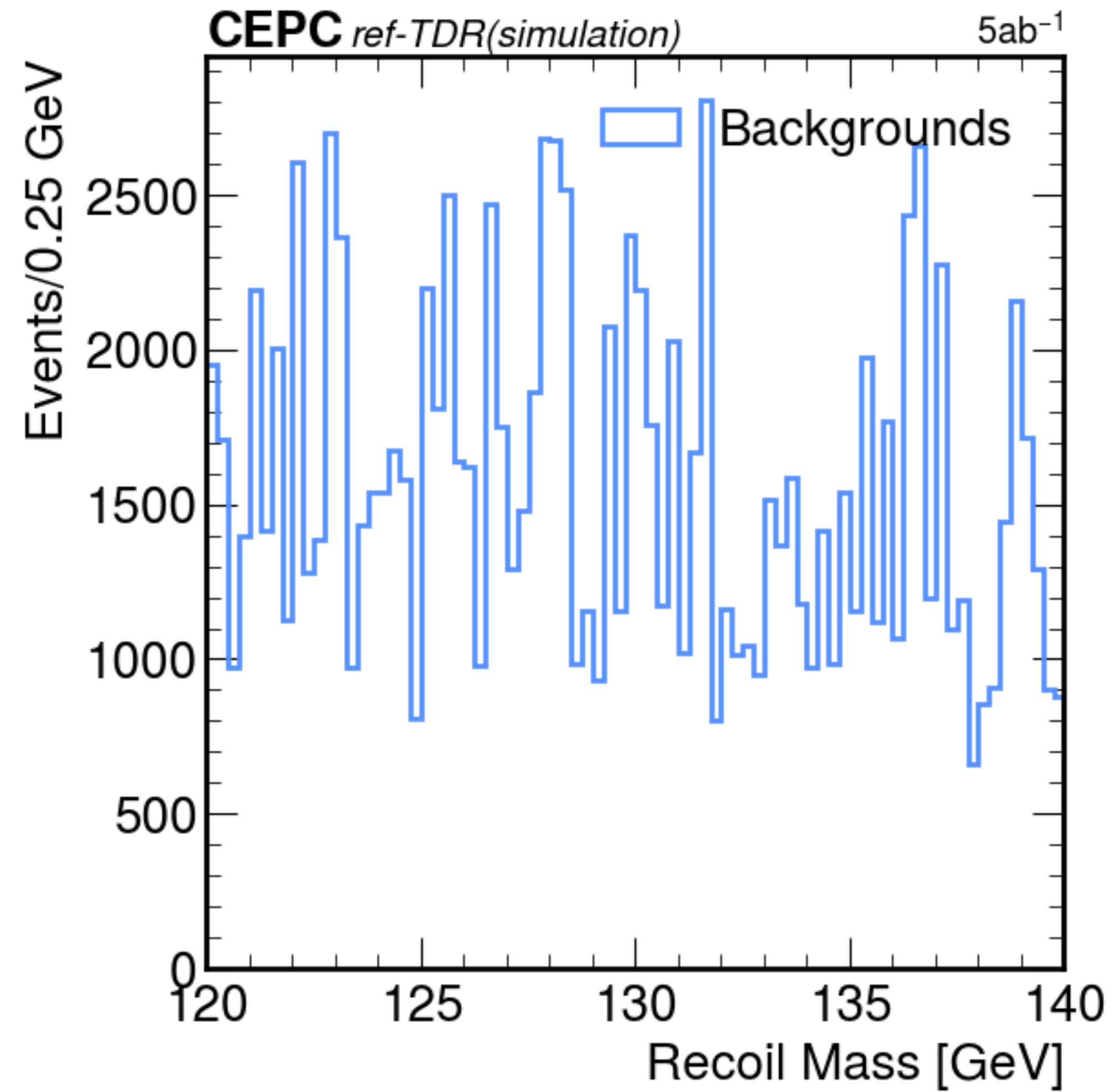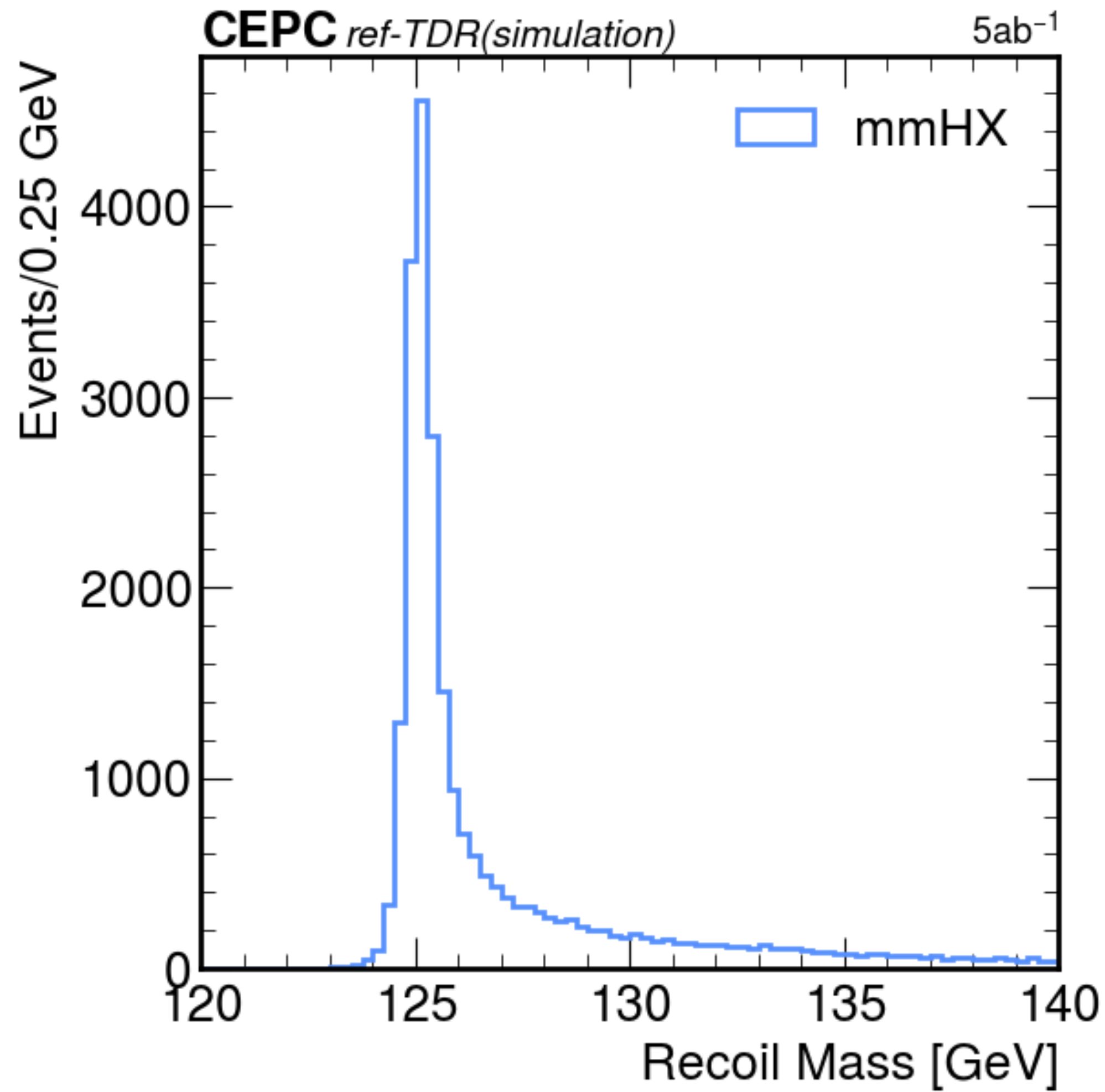
Modelling
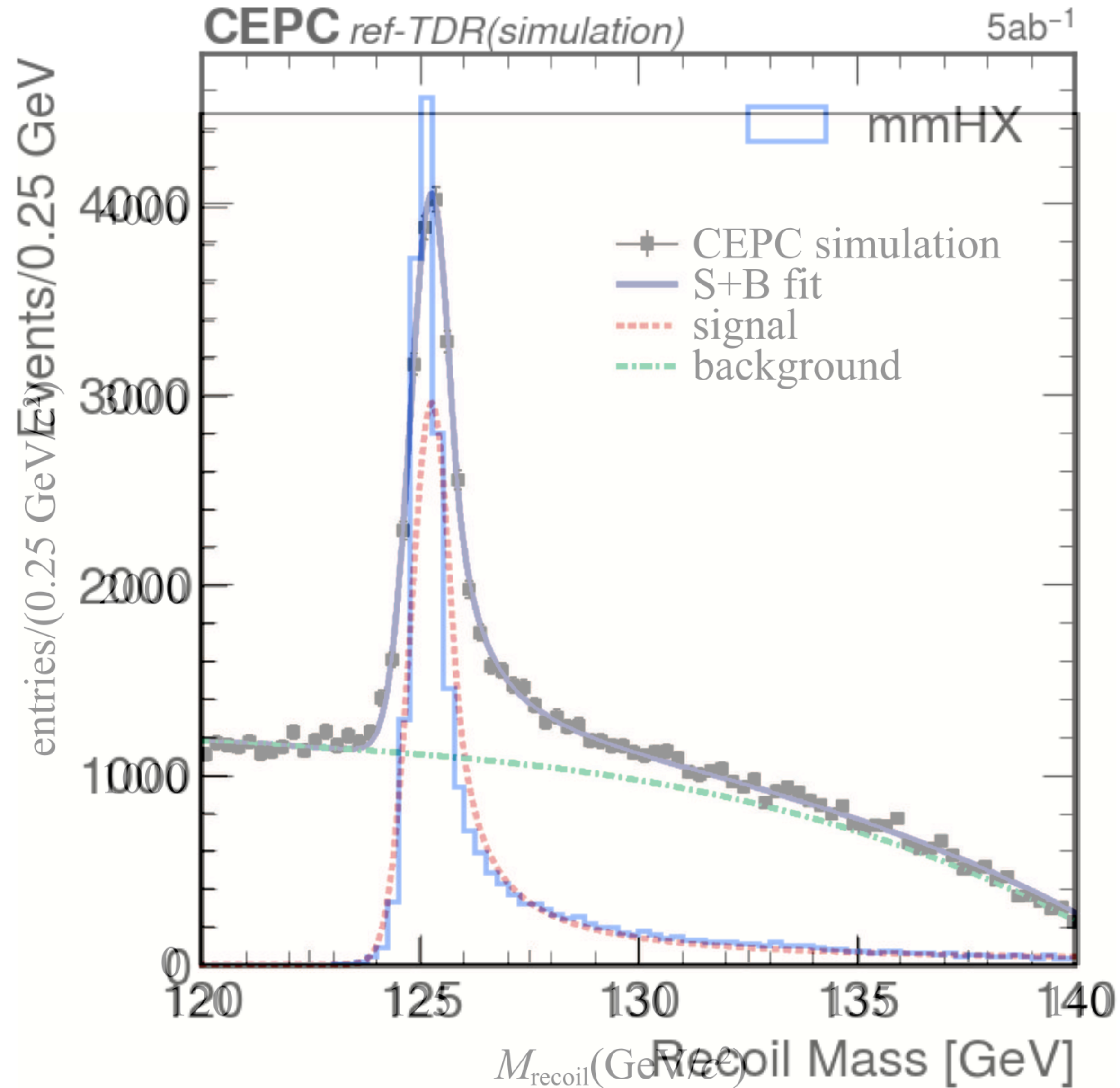
- $\Delta m_{\mathrm{H}} = 6.9$ MV in CDR (5/ab)

- The peak is higher than CDR
  - Without BDT cut, 10% higher efficiency
  - Without beam energy spread, the peak may be slightly narrower than in the CDR

- Working on sample generation including beam energy spread, and it may not be finished by next Monday