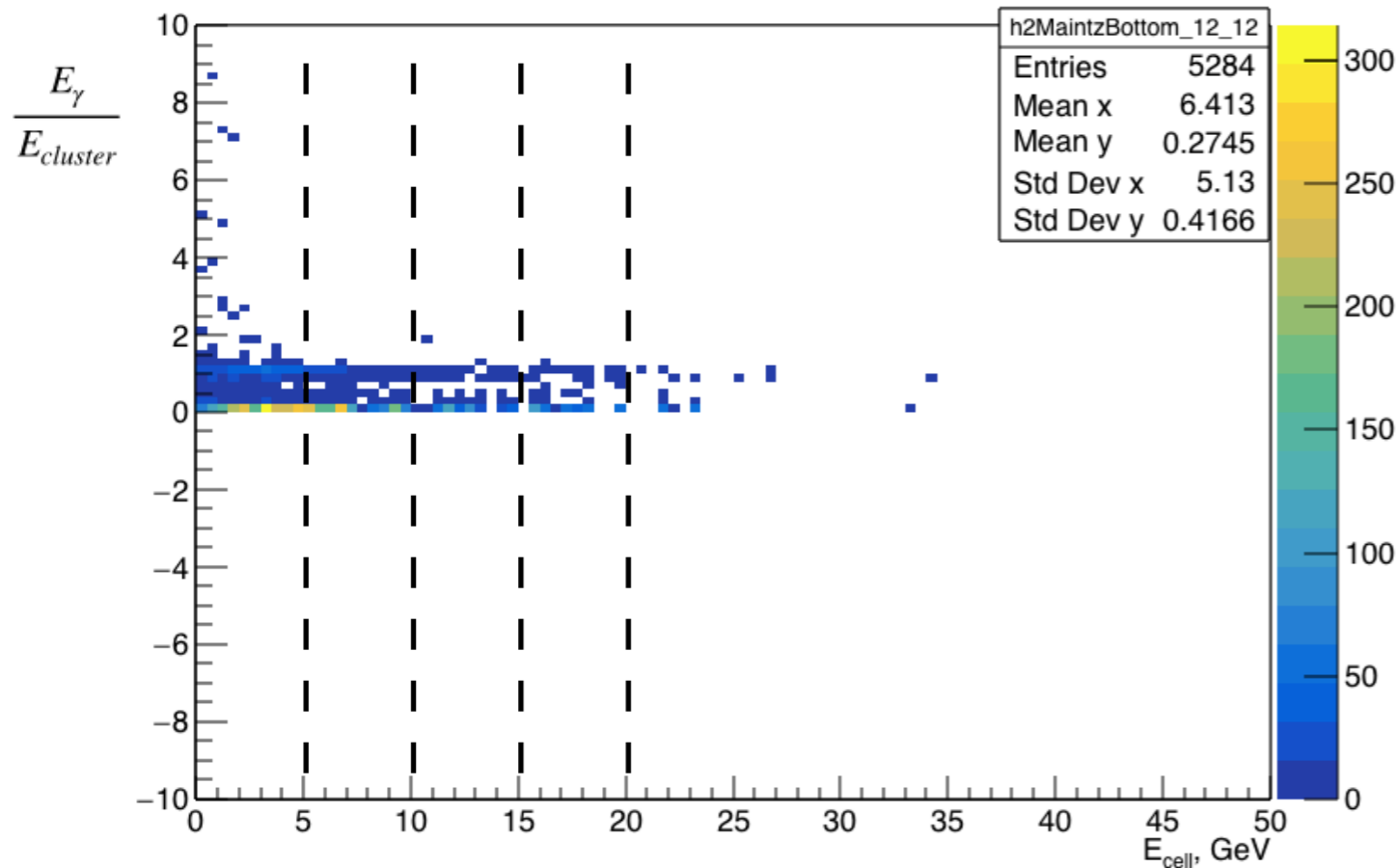


Update on ECAL calibration in 2016MC

Gridin Andrei (JINR)
COMPASS CW meeting
28.05.2021

Energy dependent ECAL calibration

h2MaintzBottom_12_12



Absorber material in ECAL module excluded from the sensitive material.

Each ECAL module has a set of calibration values in dependence of Ecell.

Calib values are extracted at low statistics with rough (preliminary) parameters.

The calibration file for MC has the same format as calibration file for RD.

UserEvent17 was used for cluster energy correction.

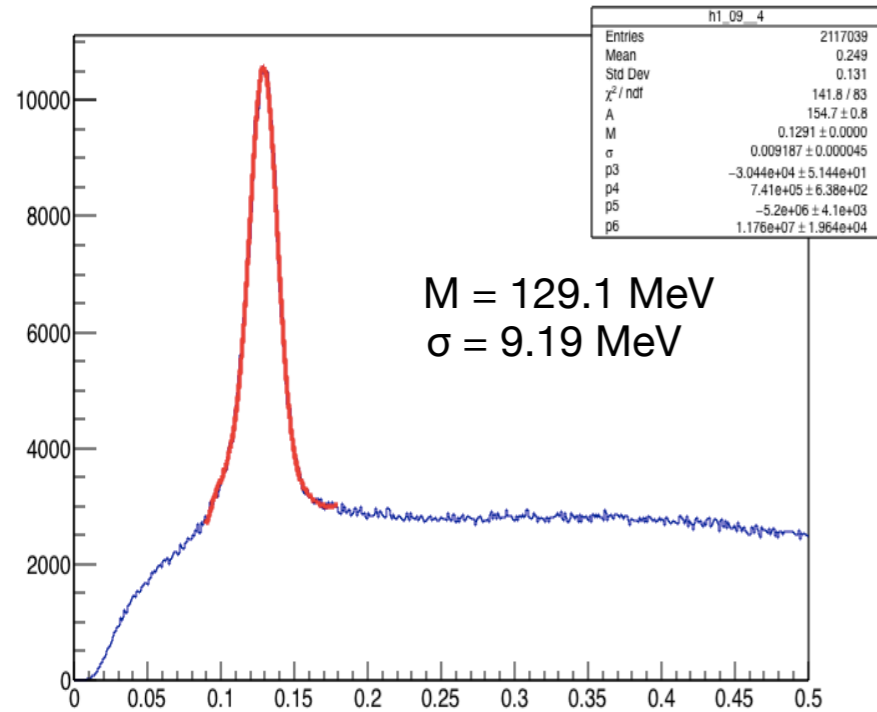
1092	MaintzBottom_12_12	10	
2.5	0.327	7.5	0.228
12.5	0.243	17.5	0.170
22.5	0.157	27.5	0.967
32.5	0.500	37.5	1.000
42.5	1.000	47.5	1.000

Energy dependent ECAL calibration

ECAL0

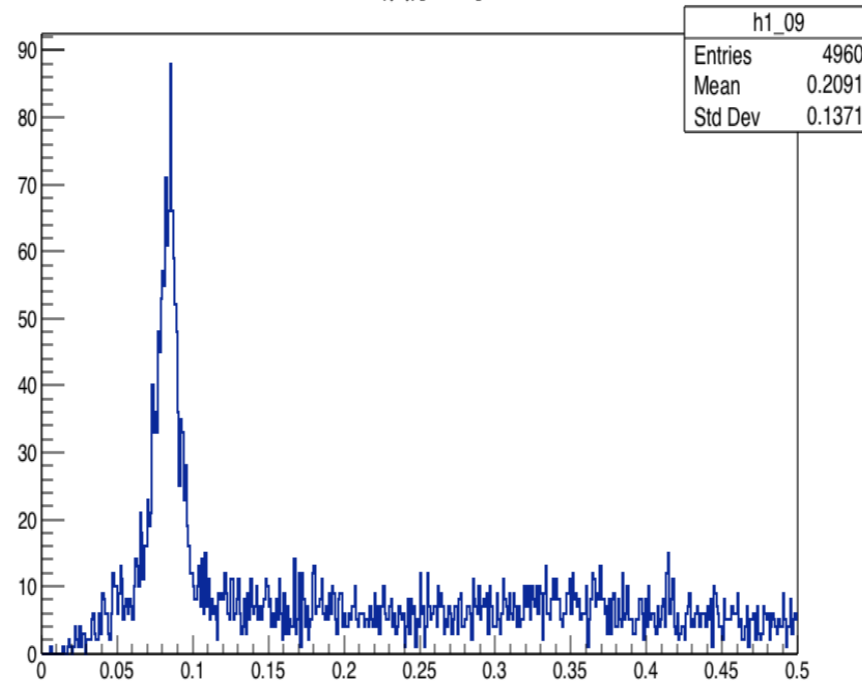
MC P09slot7.1

$M(\gamma,\gamma)[\text{GeV}]$



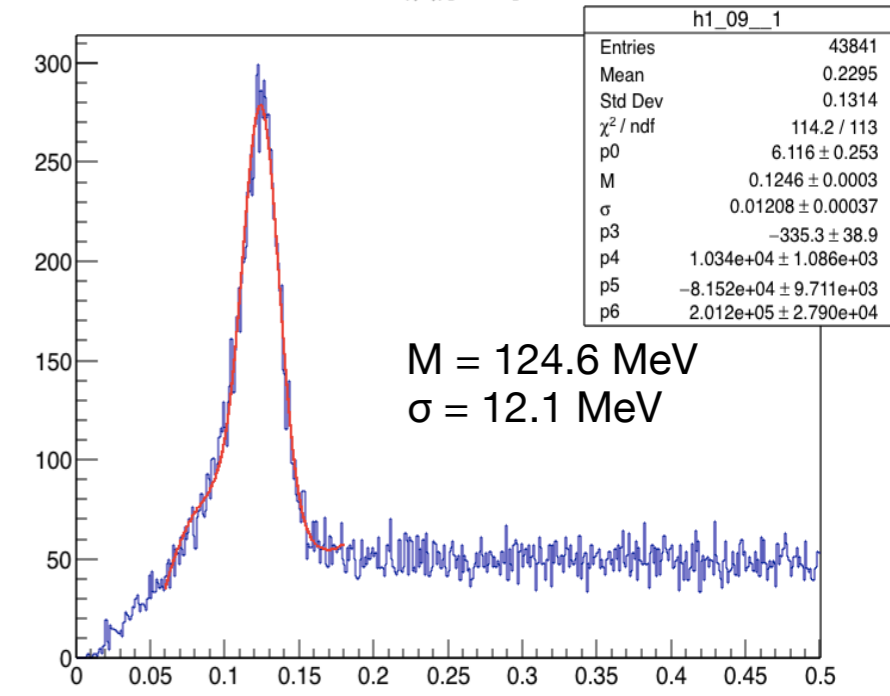
MC without calibration

$M(\gamma,\gamma)[\text{GeV}]$

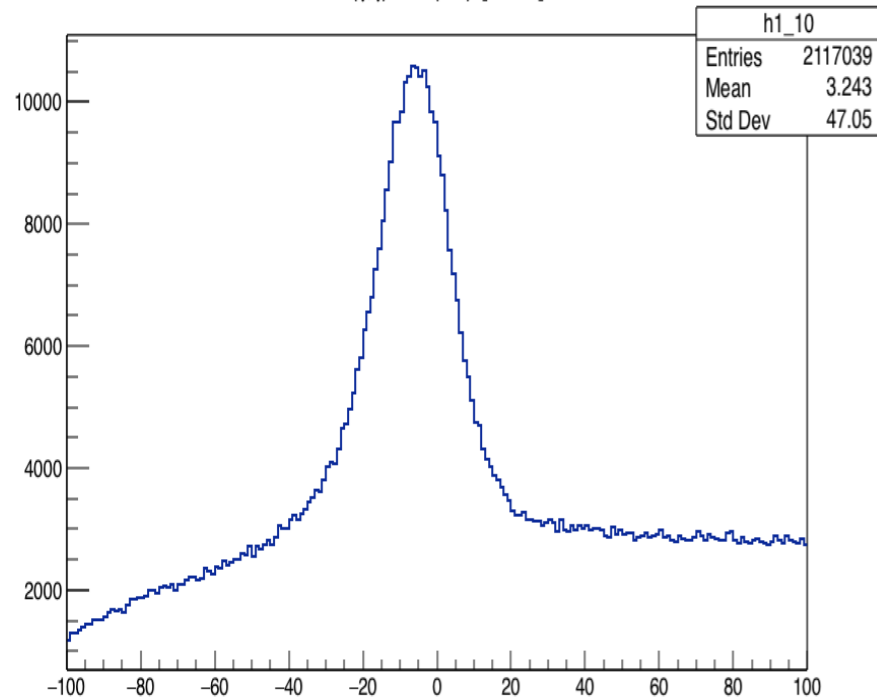


Edep calibration

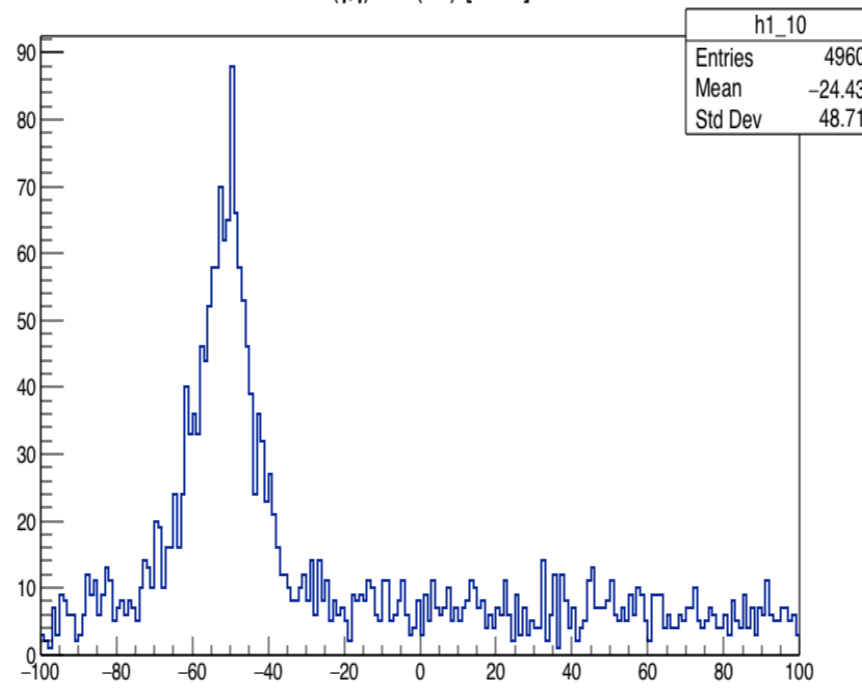
$M(\gamma,\gamma)[\text{GeV}]$



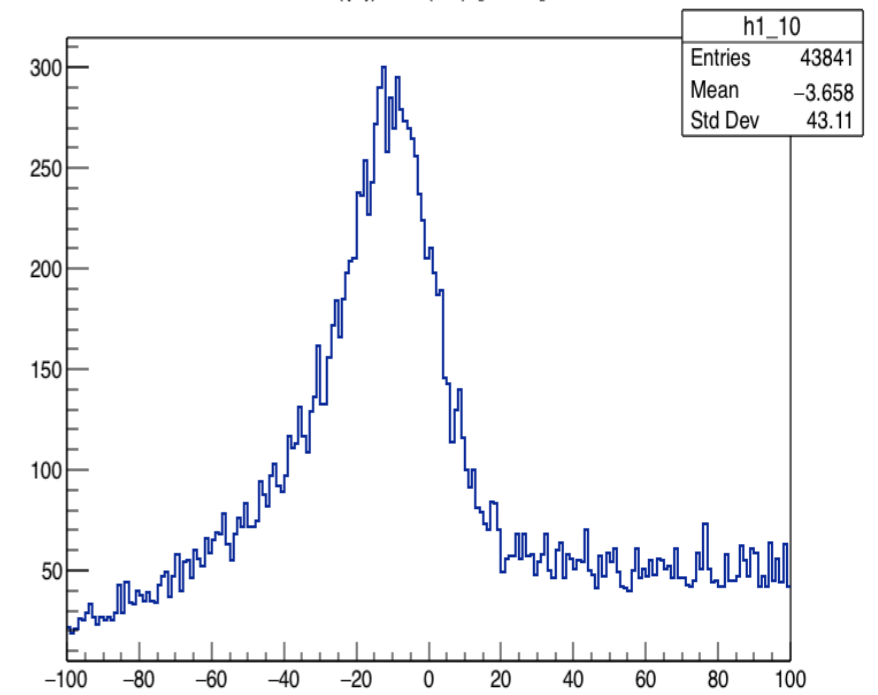
$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$



$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$



$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$

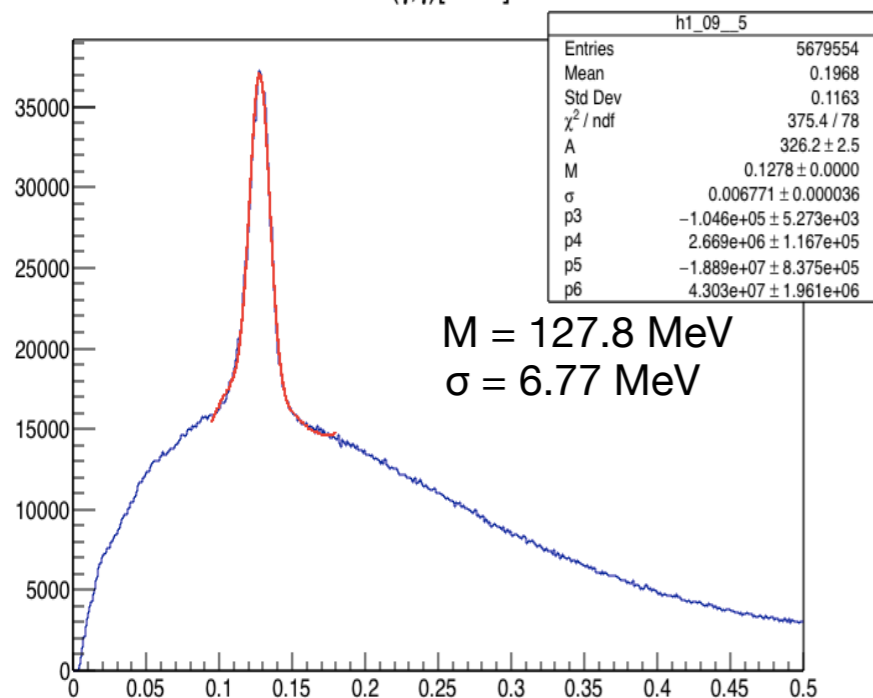


Energy dependent ECAL calibration

ECAL1

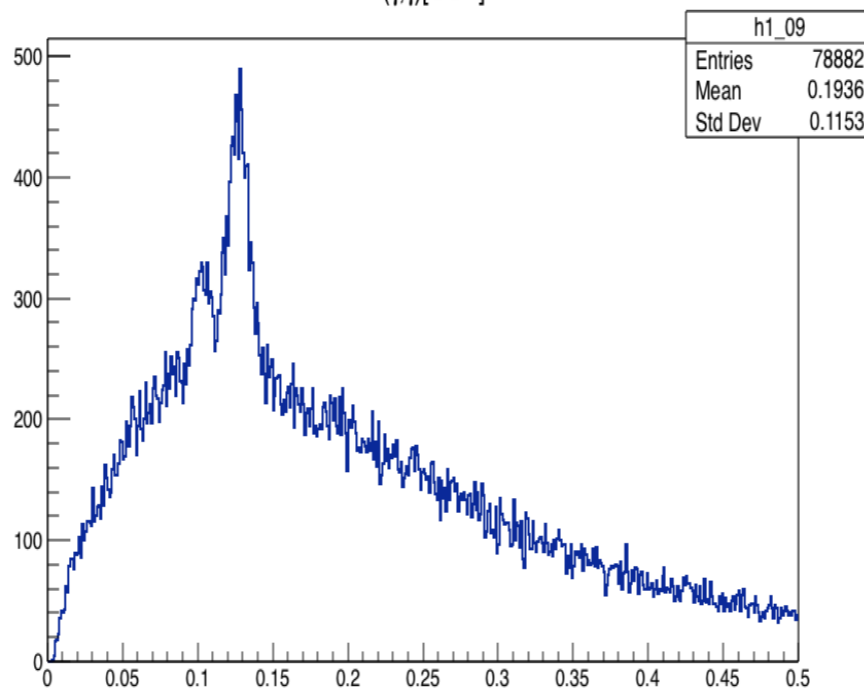
MC P09slot7.1

$M(\gamma,\gamma)$ [GeV]



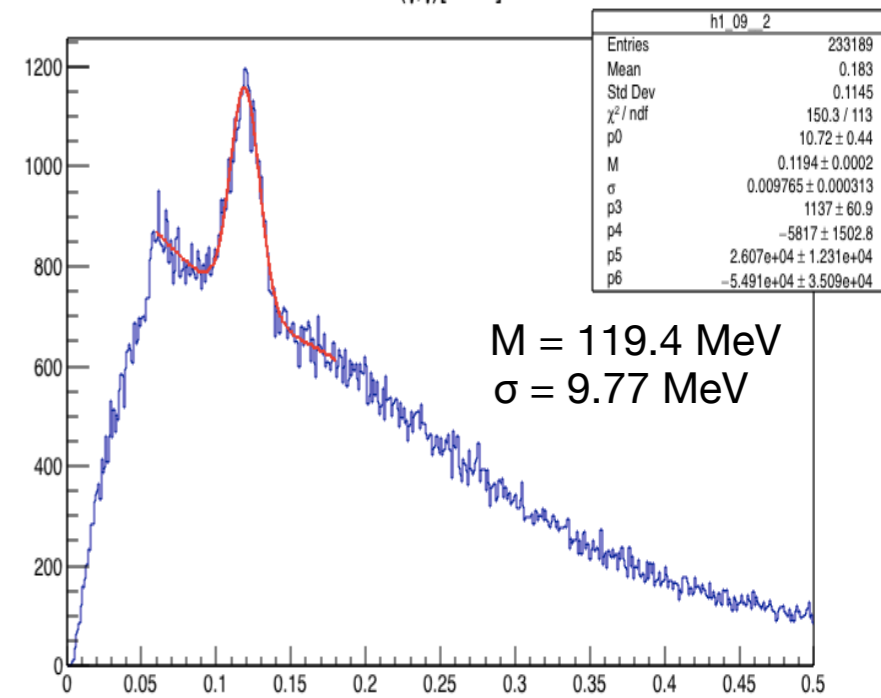
MC without calibration

$M(\gamma,\gamma)$ [GeV]

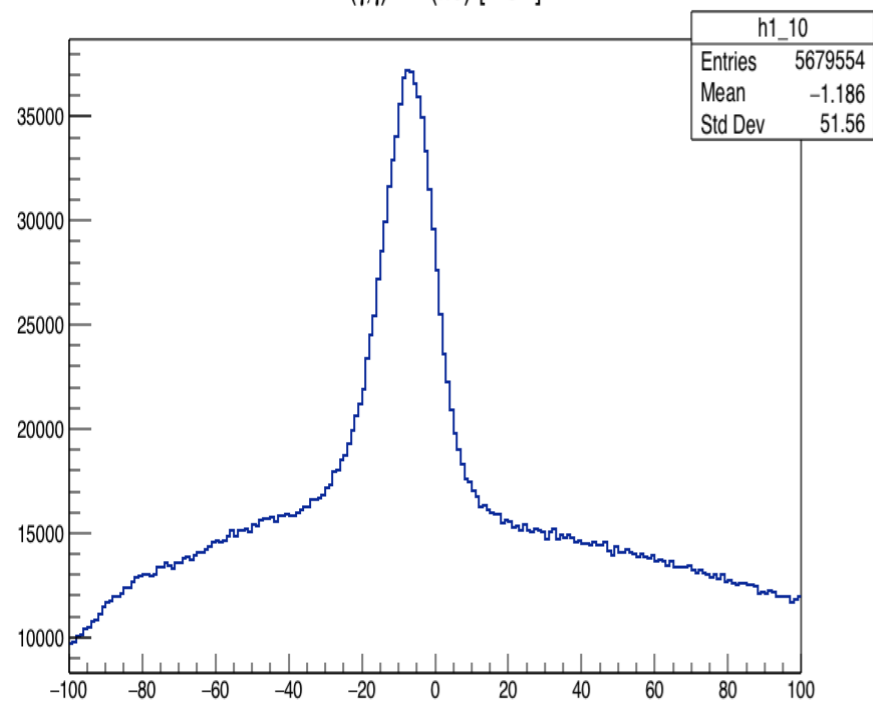


Edep calibration

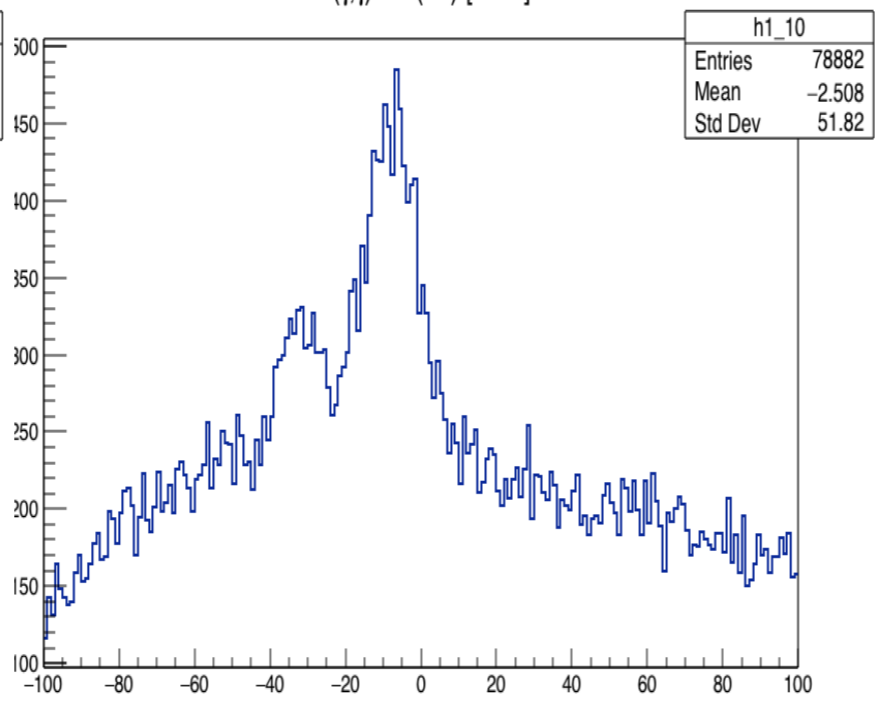
$M(\gamma,\gamma)$ [GeV]



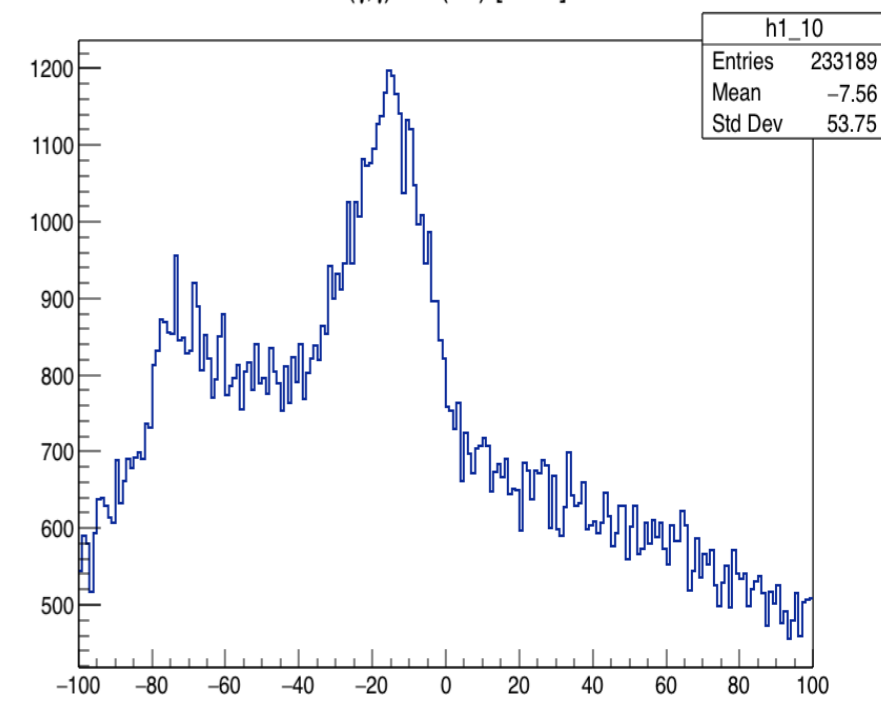
$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



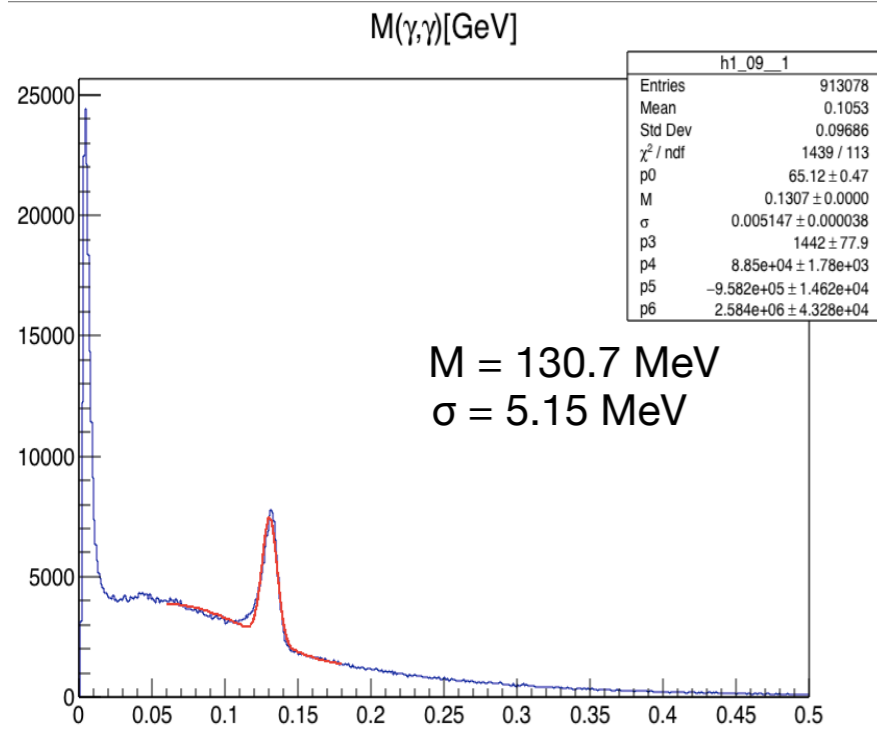
$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



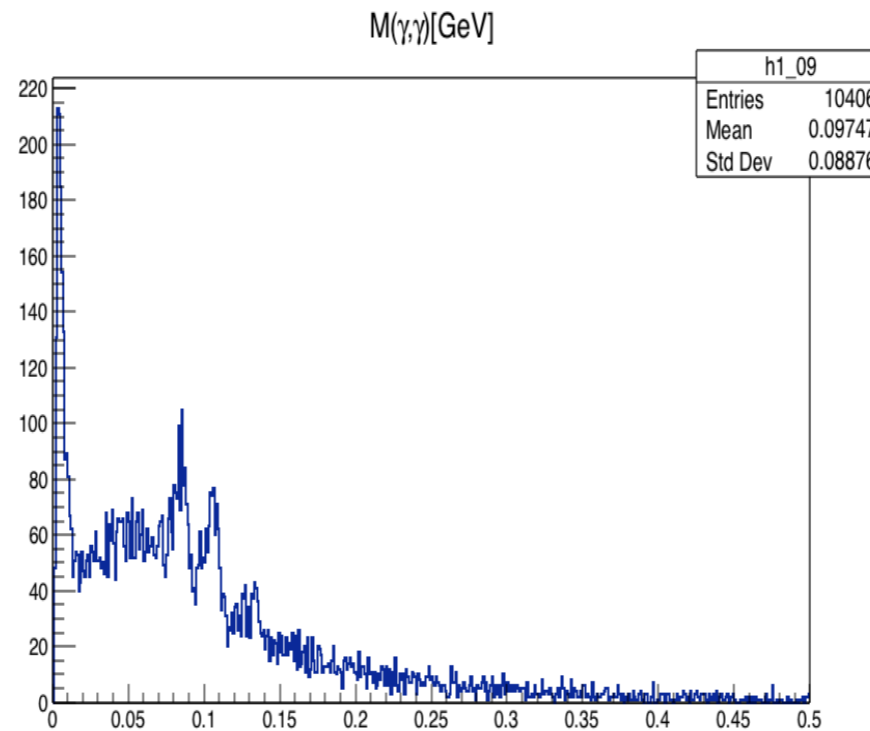
Energy dependent ECAL calibration

ECAL2

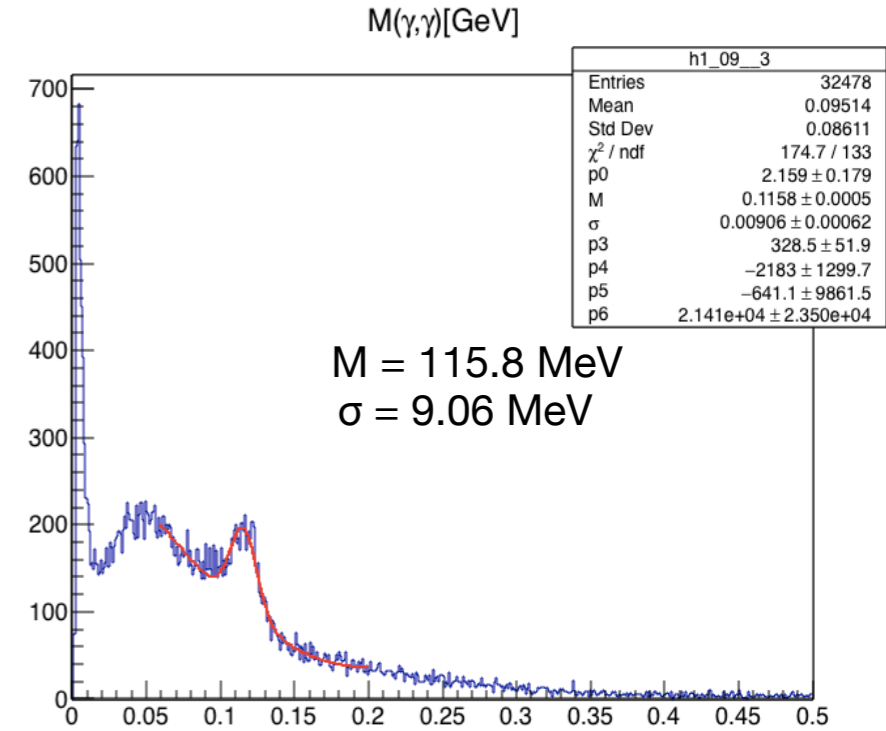
MC P09slot7.1



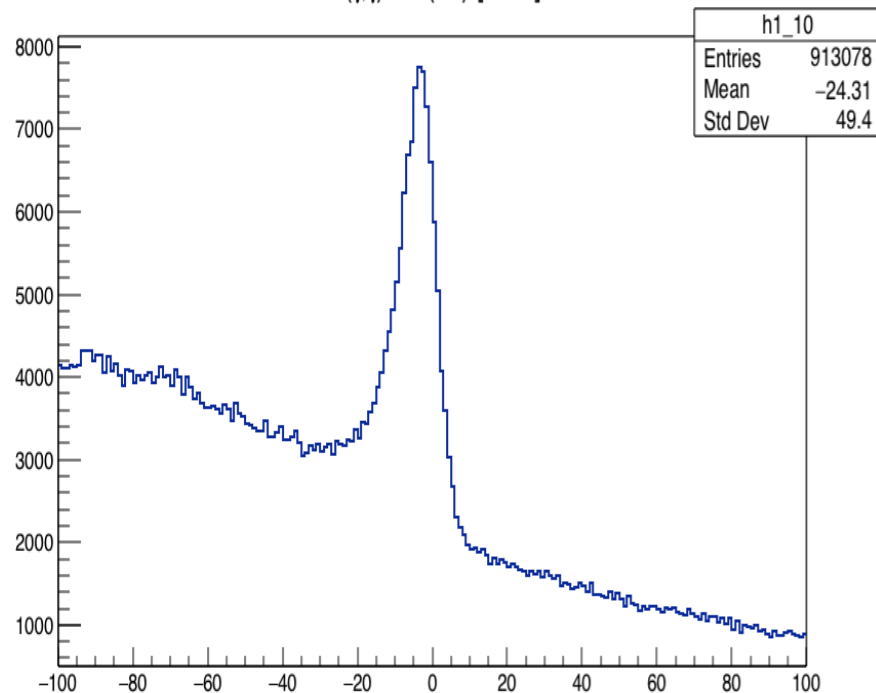
MC without calibration



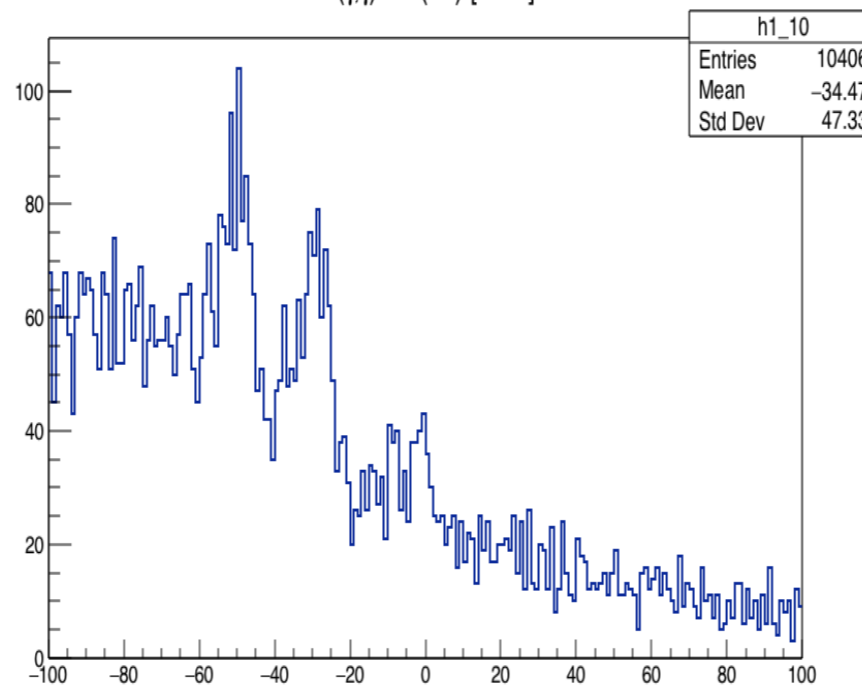
Edep calibration



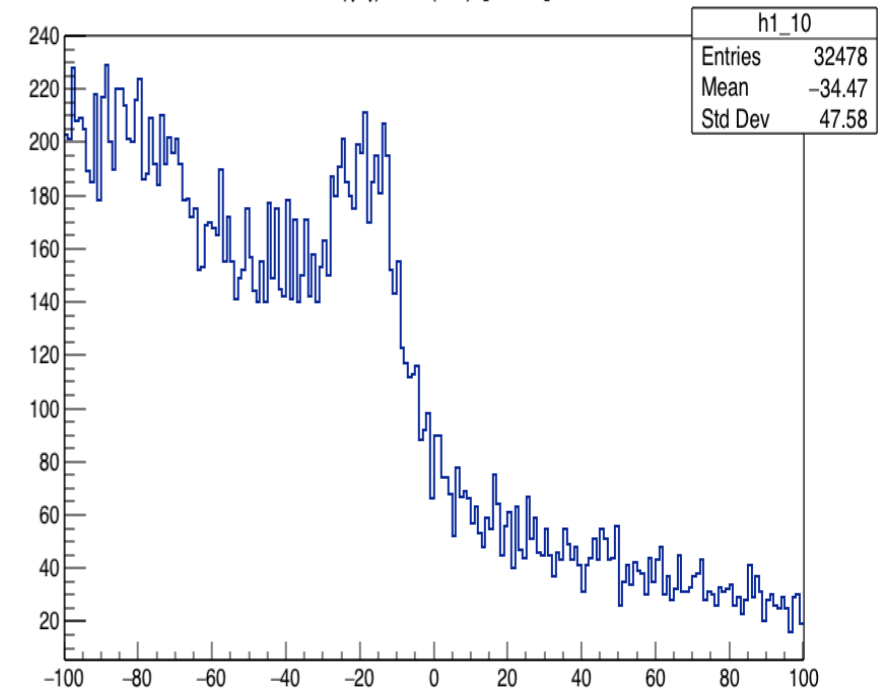
$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$



$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$



$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$



Conclusions

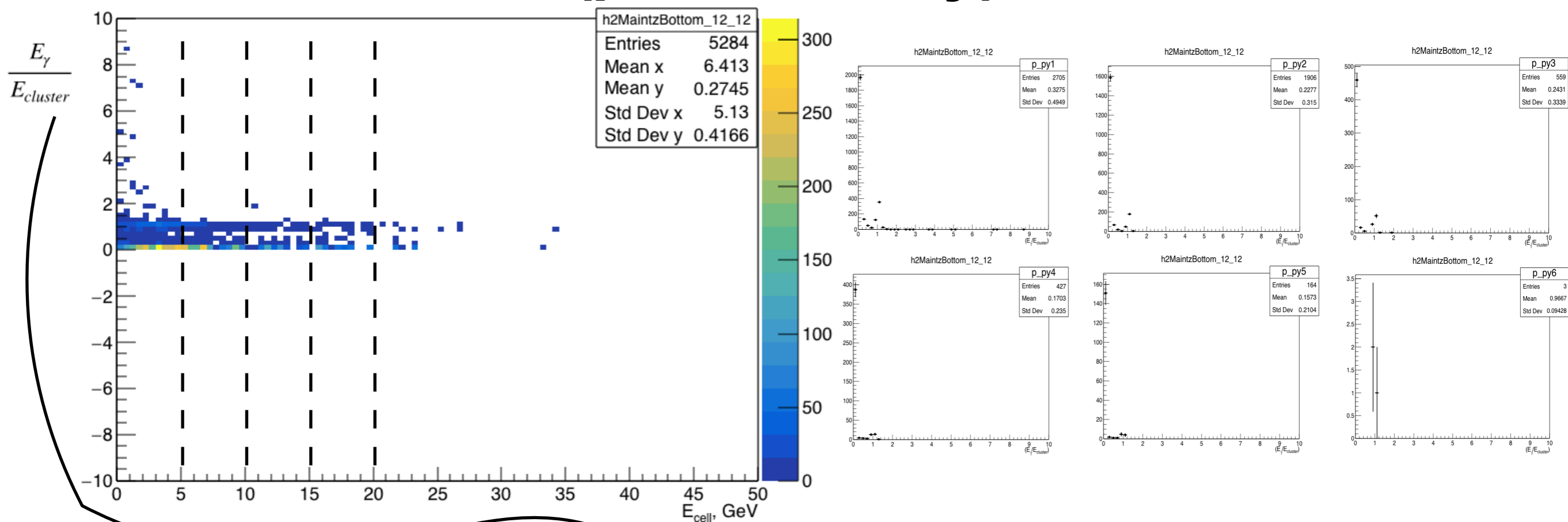
The parameters of π^0 peak are worse than in mass production 2016 MC. An explanation could be:

- the usage of 5GeV Ecell bin (1GeV is used for RD);
- the usage of postcorrection instead of a new reconstruction;

With usage of UE17 no corrections of TGeant and Coral are needed.

Backup

Energy dependent ECAL calibration (preliminary)



1092	MaintzBottom_12_12	1	0	0.327	5
1092	MaintzBottom_12_12	1	0	0.228	10
1092	MaintzBottom_12_12	1	0	0.243	15
1092	MaintzBottom_12_12	1	0	0.170	20
1092	MaintzBottom_12_12	1	0	0.157	25
1092	MaintzBottom_12_12	1	0	0.967	30
1092	MaintzBottom_12_12	1	0	0.500	35
1092	MaintzBottom_12_12	1	0	1.000	40
1092	MaintzBottom_12_12	1	0	1.000	45
1092	MaintzBottom_12_12	1	0	1.000	50

Absorber material in ECAL module was excluded from the sensitive material.

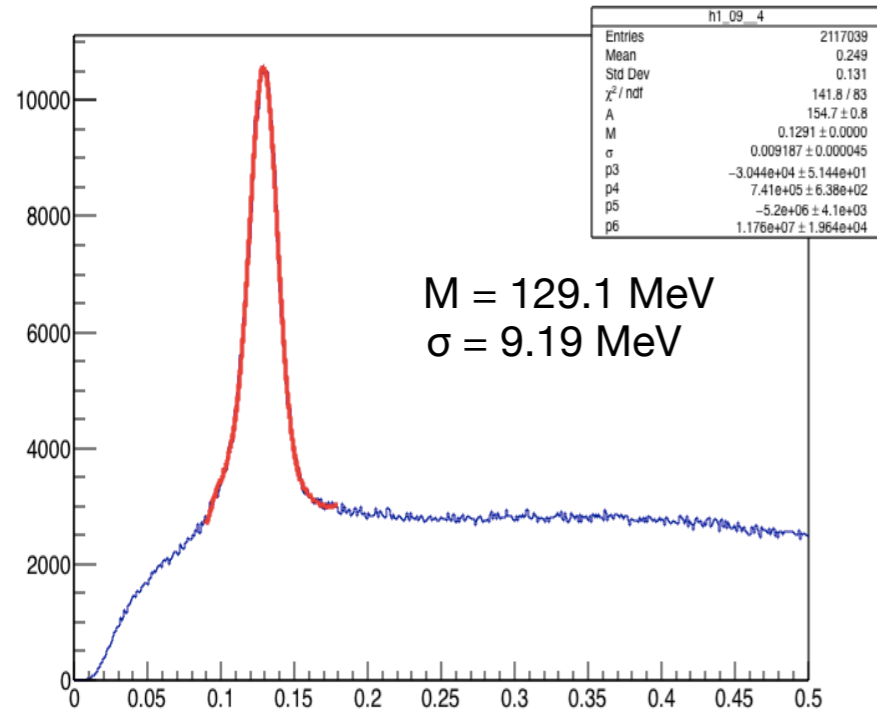
Each ECAL module has a set of calibration values in dependence of Ecell.

Calib values are extracted at low statistics with rough (preliminary) parameters.

Energy dependent ECAL calibration (preliminary) ECAL0

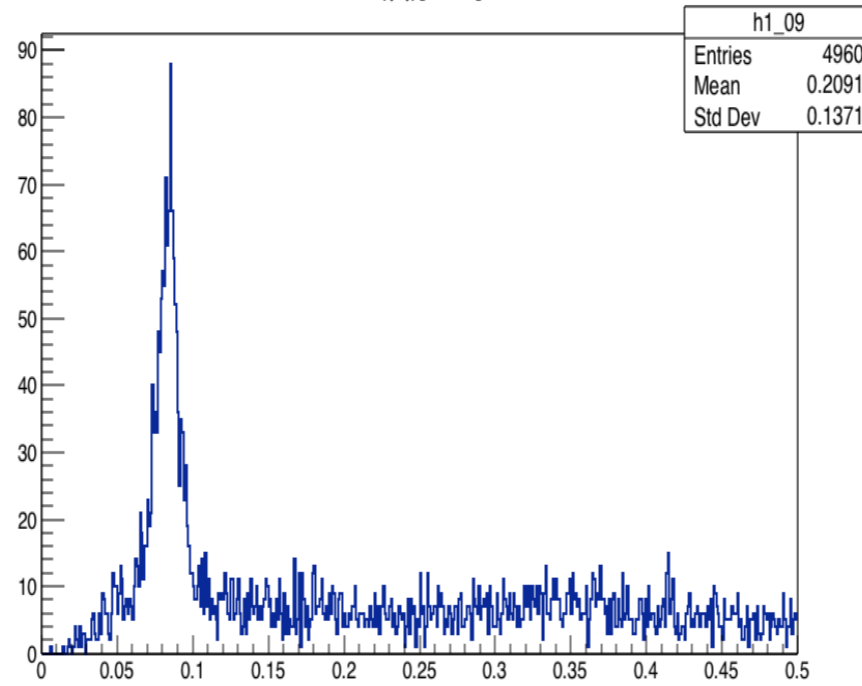
MC P09slot7.1

$M(\gamma,\gamma)$ [GeV]



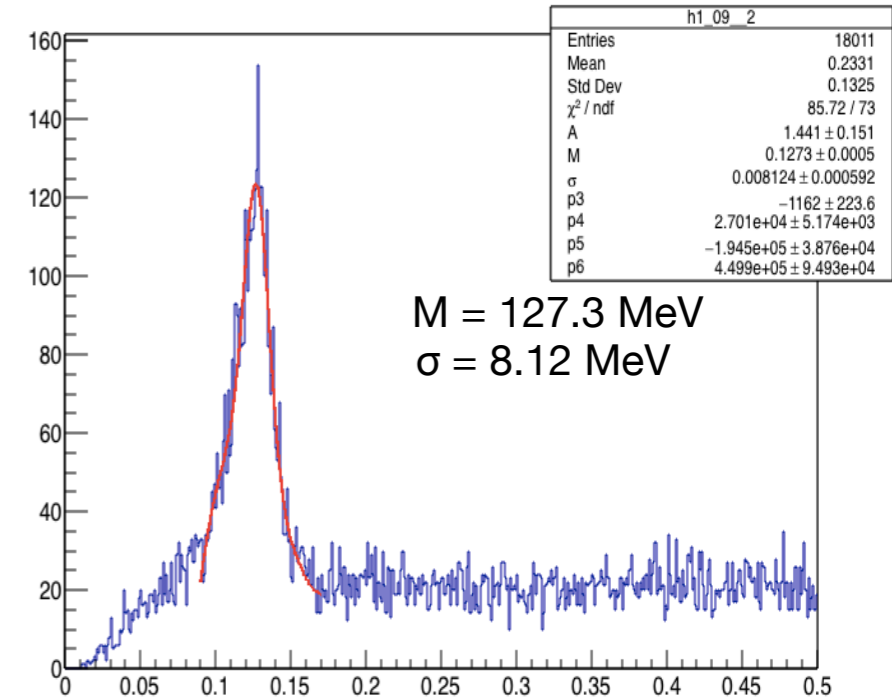
MC without calibration

$M(\gamma,\gamma)$ [GeV]

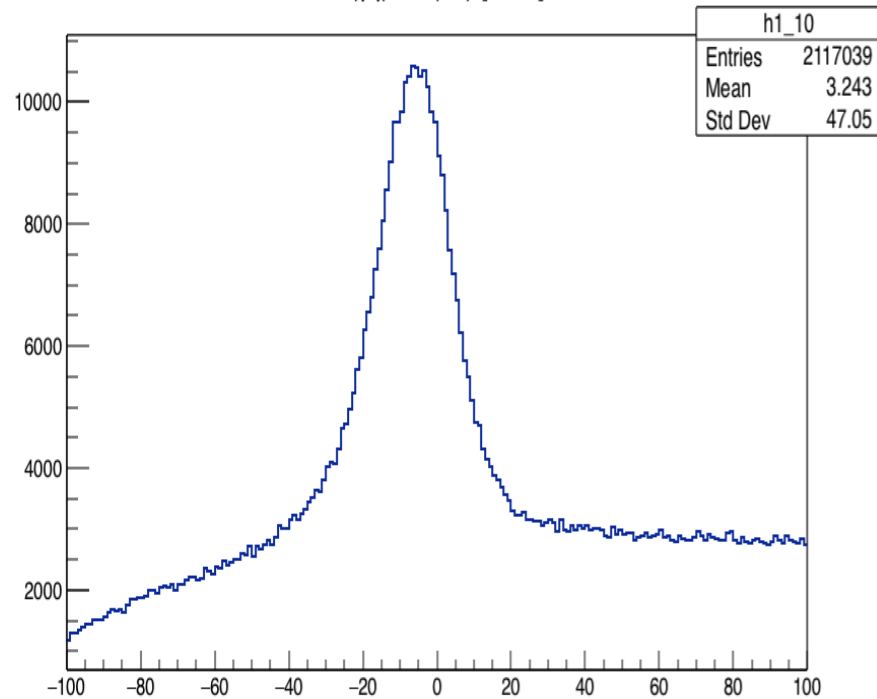


Edep calibration (1 iteration)

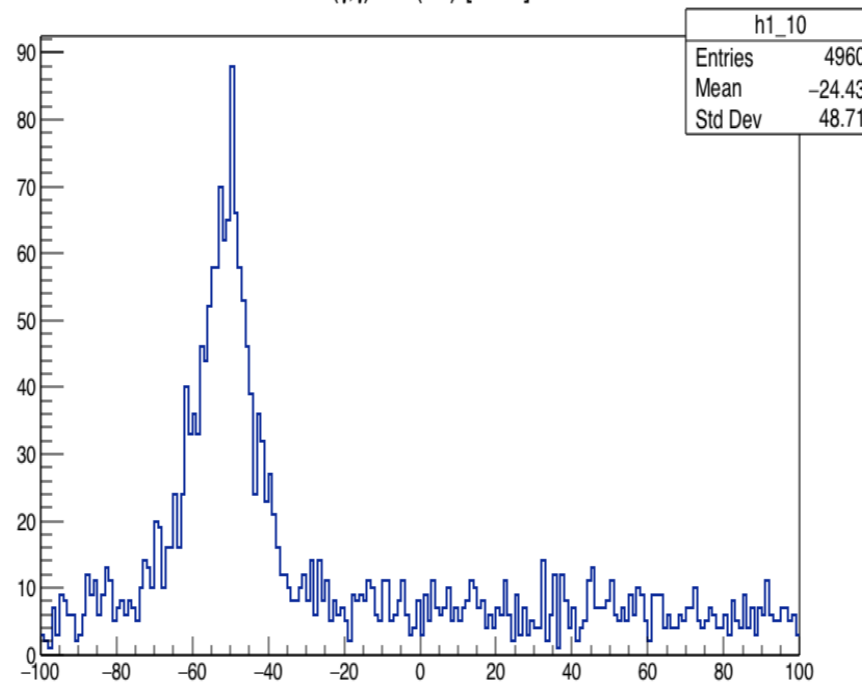
$M(\gamma,\gamma)$ [GeV]



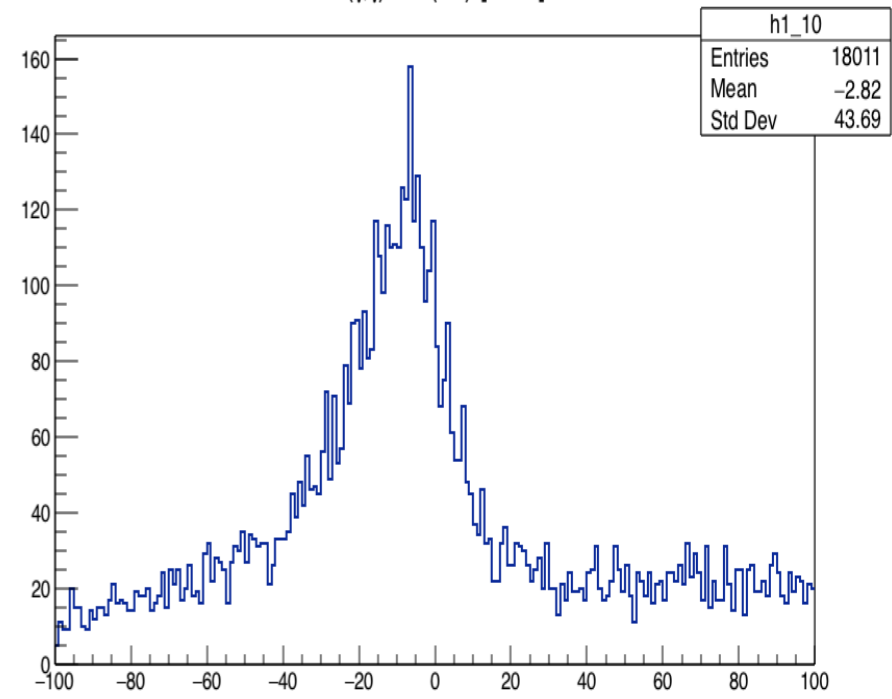
$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



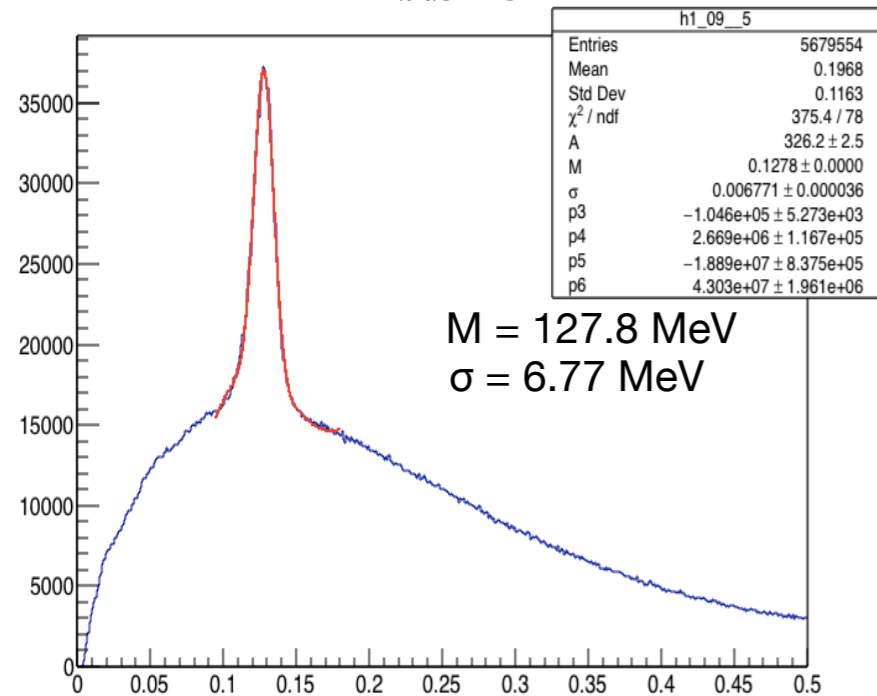
$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



Energy dependent ECAL calibration (preliminary) ECAL1

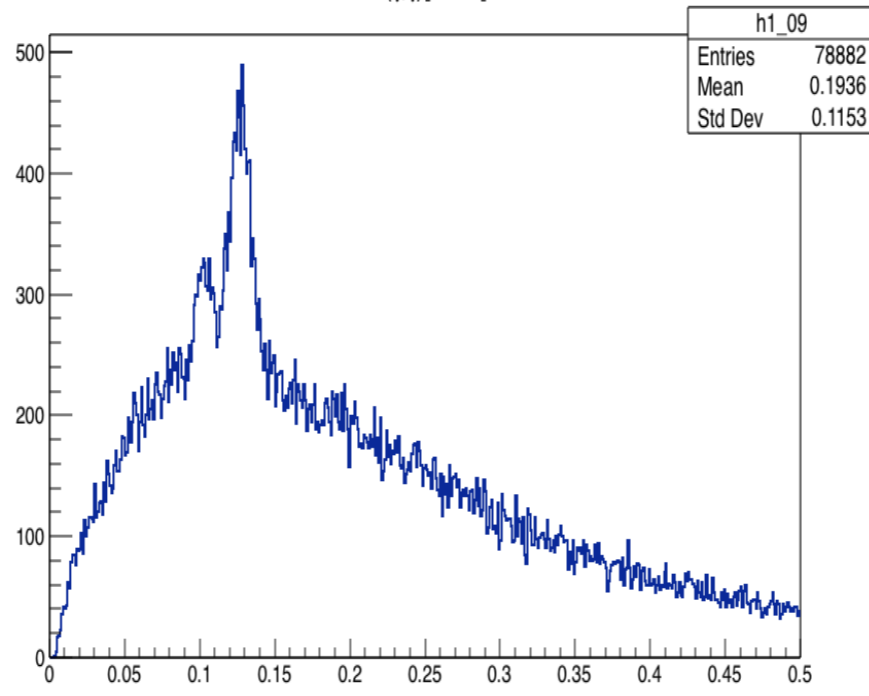
MC P09slot7.1

$M(\gamma,\gamma)$ [GeV]



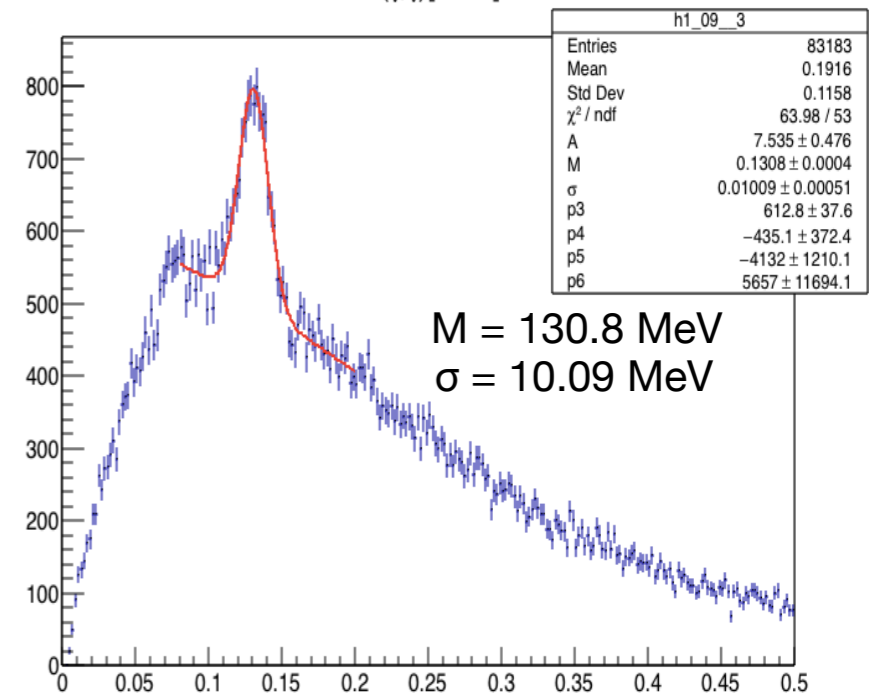
MC without calibration

$M(\gamma,\gamma)$ [GeV]

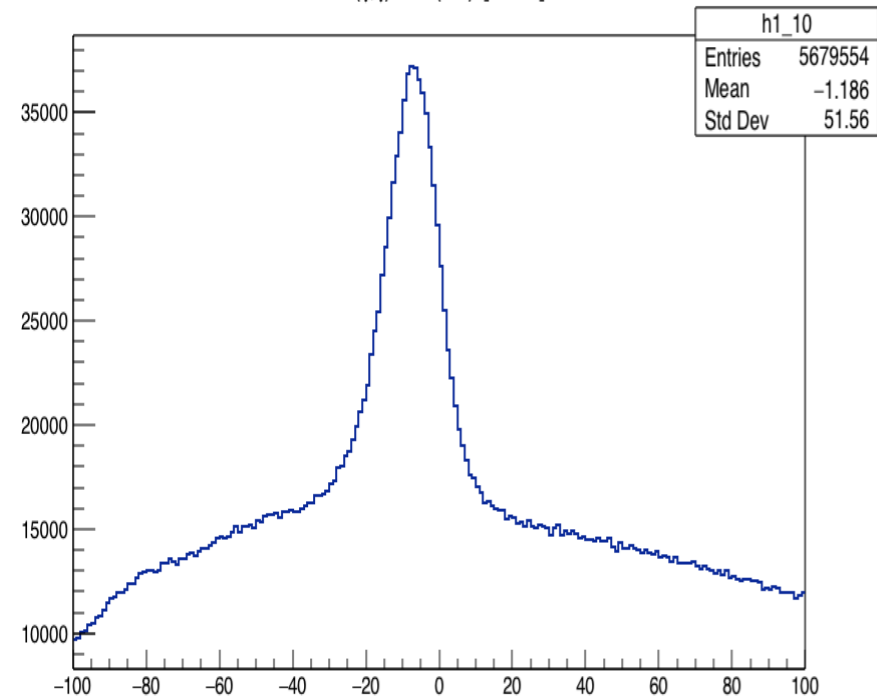


Edep calibration (1 iteration)

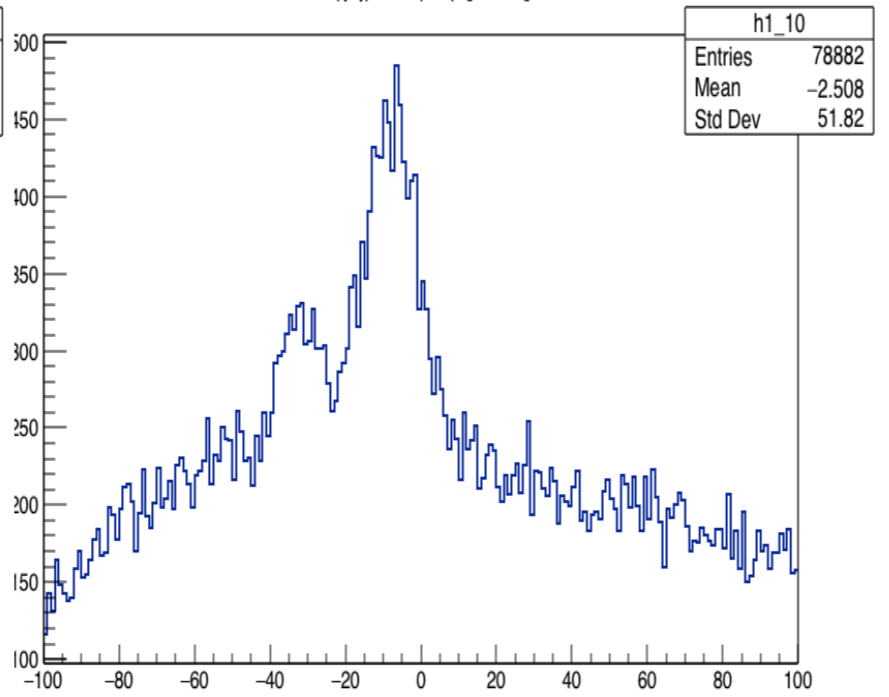
$M(\gamma,\gamma)$ [GeV]



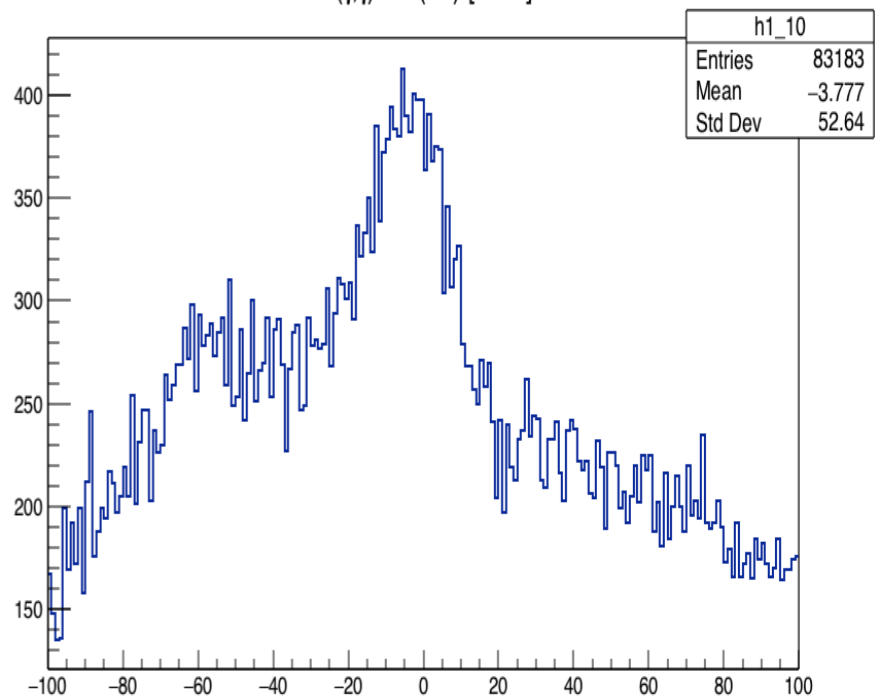
$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



$M(\gamma,\gamma) - M(\pi^0)$ [MeV]



Energy dependent ECAL calibration (preliminary) ECAL2

MC P09slot7.1

MC without calibration

Edep calibration (1 iteration)

$M(\gamma,\gamma)[\text{GeV}]$

$M(\gamma,\gamma)[\text{GeV}]$

$M(\gamma,\gamma)[\text{GeV}]$

h1_09	
Entries	913078
Mean	0.1053
Std Dev	0.09686

h1_09	
Entries	10406
Mean	0.09747
Std Dev	0.08876

h1_09	
Entries	14288
Mean	0.0994
Std Dev	0.09183

$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$

$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$

$M(\gamma,\gamma) - M(\pi^0) [\text{MeV}]$

h1_10	
Entries	913078
Mean	-24.31
Std Dev	49.4

h1_10	
Entries	10406
Mean	-34.47
Std Dev	47.33

h1_10	
Entries	14288
Mean	-28.97
Std Dev	48.42