

e/π ratio in HCAL of ILD and CLIC_ILD

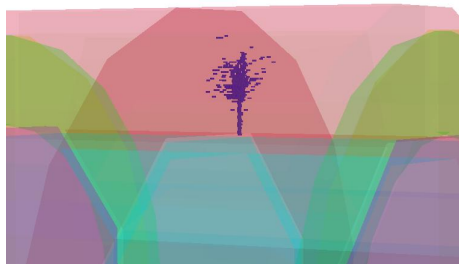
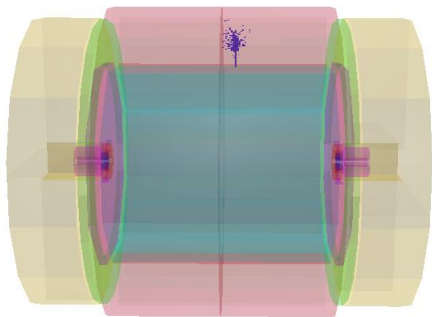
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Data samples

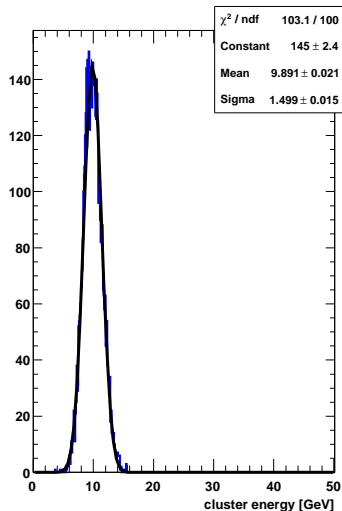
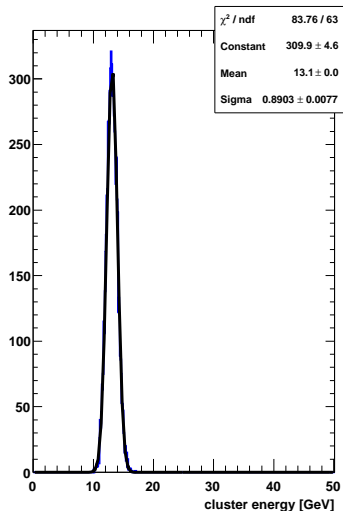
- Simulated and reconstructed 10000 events of e^- and π^- in CLIC_ILD and ILD
- Particle gun placed in the gap between ECAL and HCAL
- Energies 10 GeV and 30 GeV
- Physics Lists: QGSP_BERT and FTF_BIC
- Pandora setting: MaxHcalHitEnergy = 10000



Results: ILD Hcal - 10GeV

 e^- π^-

$$\frac{e}{\pi} = 1.324$$

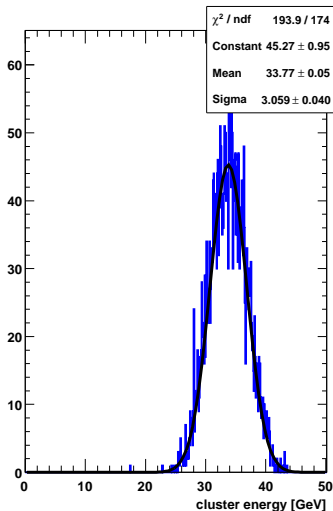
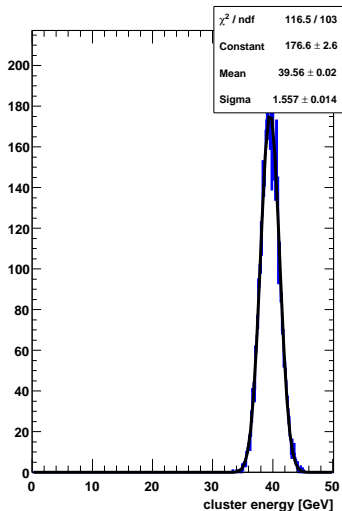


Results: ILD Hcal - 30GeV

e^-

π^-

$$\frac{e}{\pi} = 1.171$$

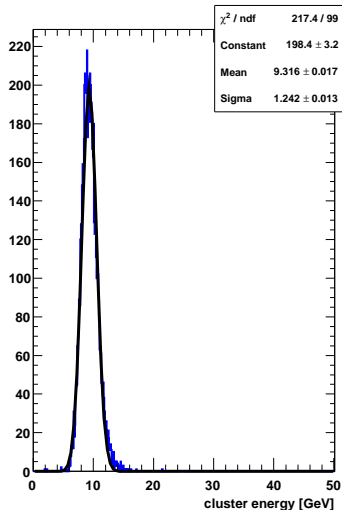
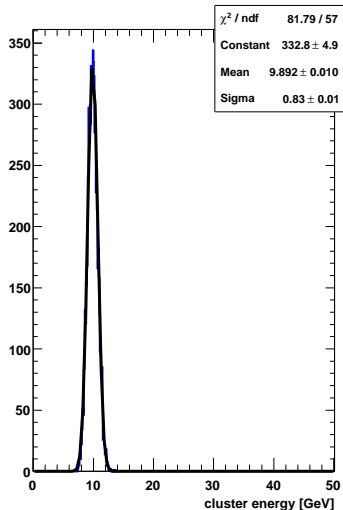


Results: CLIC_ILD Hcal - 10 GeV

e^-

π^-

$$\frac{e}{\pi} = 1.062$$

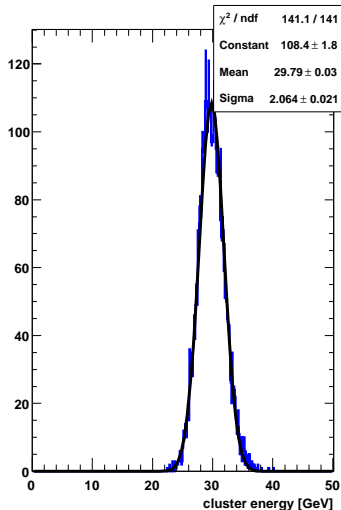
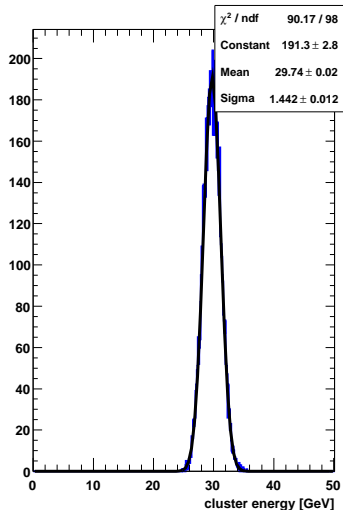


Results: CLIC_ILD Hcal - 30 GeV

e^-

π^-

$$\frac{e}{\pi} = 0.998$$



- Results for e/π ratio checked at different steps (after Mokka, after digitization, after Pandora)
- Similar numbers with physics list FTF_BIC
- Results cross checked with an independent Geant4 simulation of Frank
 - Important factors (besides geometry):
B-field, Birks law, time cut, min hit energy cut
 - calorimeter with 5 mm thick scintillator cells:
ILD: $\frac{e}{\pi} = 1.27$
CLIC_ILD: $\frac{e}{\pi} = 1.02$
 - calorimeter with 3 mm thick scintillator cells:
ILD: $\frac{e}{\pi} = 1.27$
CLIC_ILD: $\frac{e}{\pi} = 1.0$

- $e/\pi \approx 1$ for CLIC_ILD HCAL
 - ⇒ Compensating Calorimeter
 - ⇒ no software compensation needed / possible

	ILD	CLIC_ILD
after Mokka	1.30	1.04
after digitization	1.30	1.04
after PandoraPFA	1.32	1.06

- after Mokka: min hit cut of 0.25 MeV on SimCalorimeterHits of $1 \times 1 \text{ cm}^2$ cells
- after digitization: CalorimeterHits of $3 \times 3 \text{ cm}^2$ cells
- after PandoraPFA: clustering