Plans for

Longitudinal containment parametrisation for TeV single hadrons and jets

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FCC-hh calorimeter informal meeting

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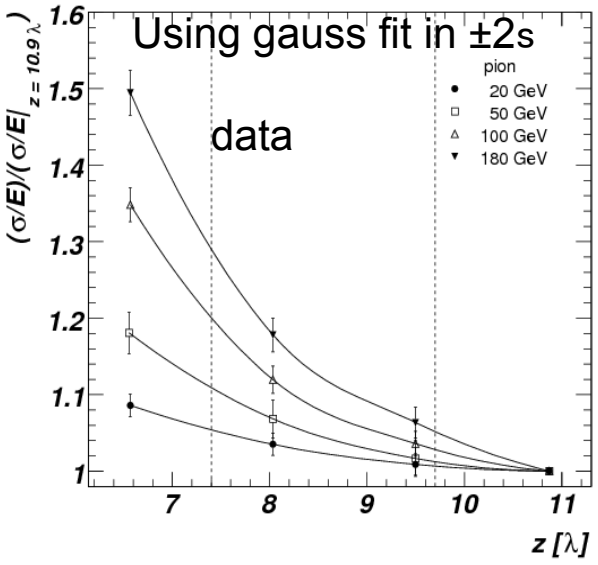
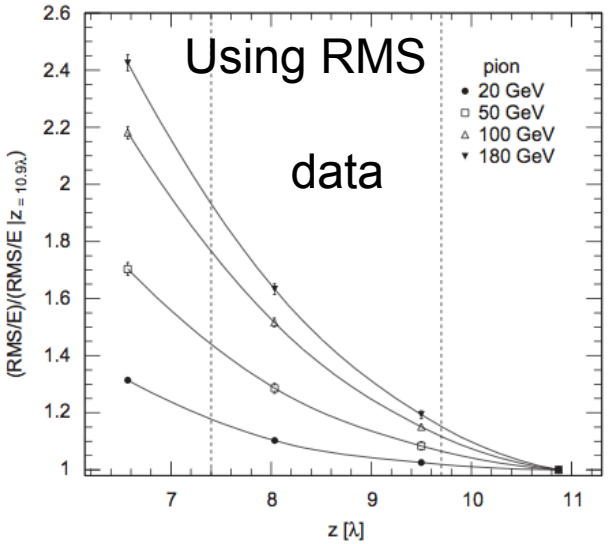
Introduction

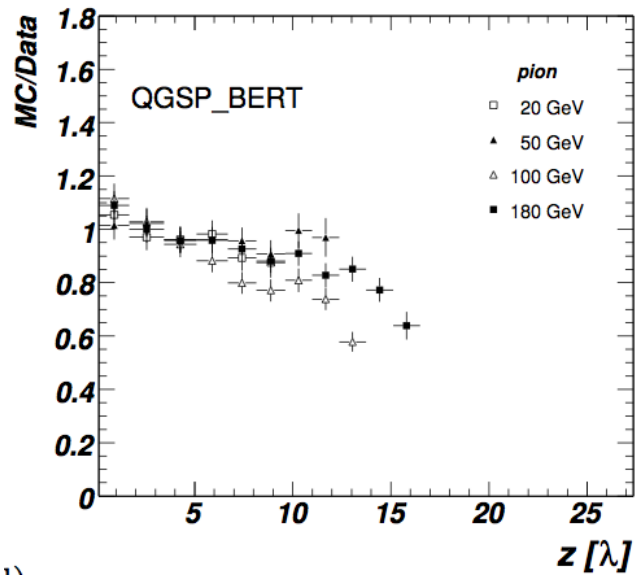
- Longitudinal shower profiles up to ~20λ measured with TileCal

http://dx.doi.org/10.1016/j.nima.2010.01.037

- Resolution deterioration vs calorimeter depth in two methods



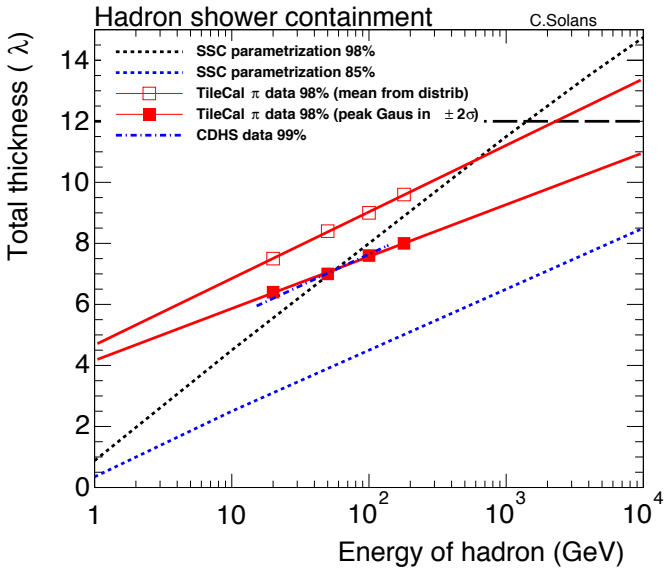


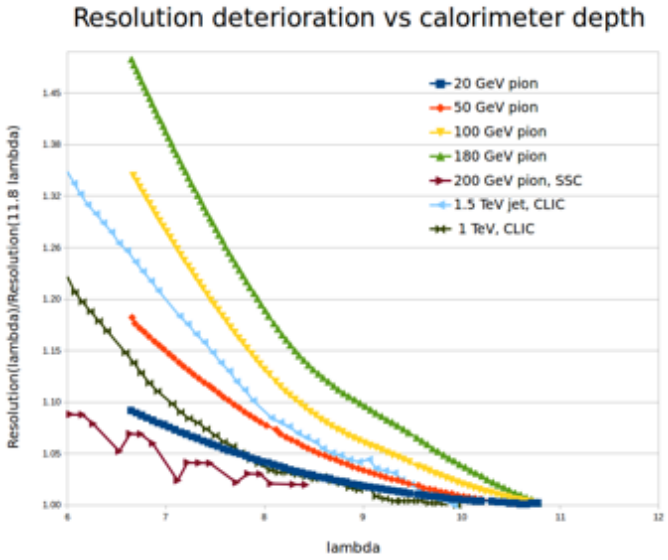


- We know MC showers are 10% shorter than data

What we plan to do?

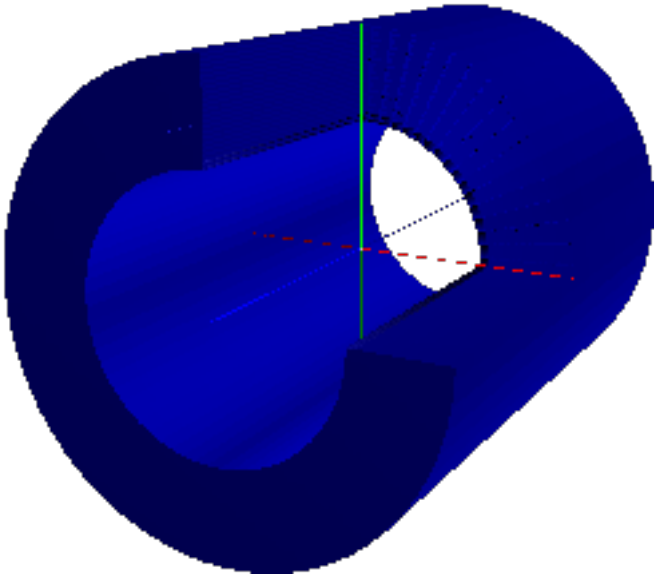
- Add few more points to the hadron shower containment with single pions at 1 and 10 TeV
  - Using a TileCal type sampling calorimeter simulation
- Measure shower containment for 10, 20, 40 TeV jets
- Express results as degradation of resolution as a function of calorimeter depth using two conventions (gaus fit and RMS)

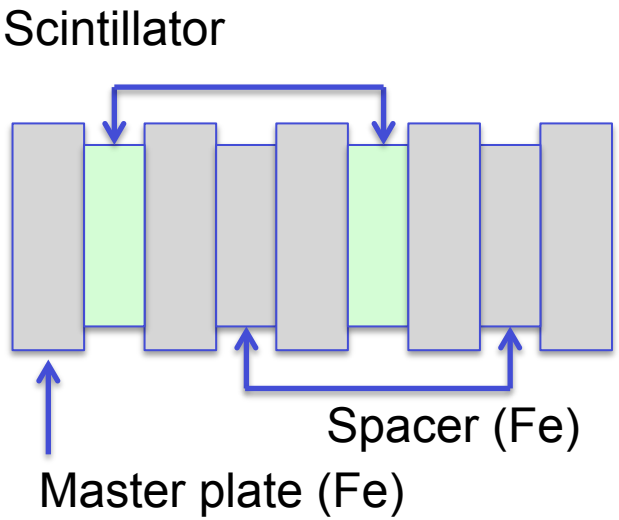




How do we plan to do it?

- Sampling type (TileCal) detector description in pure Geant4
  - 128 wedges in ϕ: $\Delta\phi = 0.05$
  - Tile height: 10 cm
  - Scintillator width (Δz): 4 mm
  - Master plate width (Δz): 5 mm
  - Spacer plates to keep sampling rate
- Simulation highlights
  - No attenuation effect in the scintillators
  - Read-out all tiles independently
- Event simulation
  - Geant4 particle gun for pions
  - HepSim dijet samples for jets





HepSim

Repository with Monte Carlo predictions for HEP experiments

Selected: pp collisions, 100 TeV energy, all type

Show 25 entries — Previous 1 Next — Search: dijet

Id	→←	E [TeV]	Name	Generator	Process	Topic	Info	L [fb^{-1}]	Link
7	pp	100	tev100_qcd_herwigpp_pt2700	HERWIG++	All dijet QCD events	SM	Info	3.34E+01	URL
11	pp	100	tev100_qcd_pythia8_pt300	PYTHIA8	All dijet QCD events	SM	Info	3.01E-04	URL
12	pp	100	tev100_qcd_pythia8_pt900	PYTHIA8	All dijet QCD events	SM	Info	3.12E-02	URL
13	pp	100	tev100_qcd_pythia8_pt2700	PYTHIA8	All dijet QCD events	SM	Info	1.20E+04	URL
14	pp	100	tev100_qcd_pythia8_pt8000	PYTHIA8	All dijet QCD events	SM	Info	3.37E+03	URL
46	pp	100	tev100_qcd_pythia8_pt16000	PYTHIA8	All dijet QCD events	SM	Info	7.63E+05	URL

Schedule

- Single particle simulations are ongoing
- Integration with HepSim events to be done
- First results for January FCC detector WS