

DESY.

DESY 2018 LongSlab MIP spectra fits for different angles

Experimental Setup



Hardware Setup



Mechanical Setup

Data Sets

Name	ASU's	Angle	Place	Particles
ASU Scan 0 deg	1-7	0	DESY	$e^-(3GeV)$
ASU Scan 45 deg	1-7	45	DESY	$e^-(3GeV)$
ASU Scan 60 deg	1-7	60	DESY	$e^-(3GeV)$
Full Angular Scan	8	0-45	DESY	$e^-(3GeV)$
Cosmic No RC (6-7)	1-8	?	LLR	Cosmic
Cosmic RC (6-7)	1-8	?	LLR	Cosmic
Cs137 ASUxThr Scan	1-8	?	LLR	$\gamma(662 keV)$

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My task : MIP fit Analyses 💵

- MIP Position Study
- Muon Run study
- Tigger Level Study
- Pedestal Study
- Cs137 Trigger level study
- Geant4 Simulation

common_calib_ls_ASU1_angle0_dif_1_1_1.raw





MIP spectrum Study How do we fit it?

Langaus (Landau convoluted with Gauss) Fit 💵 🗩



Angle != 0 -> Some tracks cross two pixels 🏟



Pixel energy fraction depends linearly on crossing position

- Distributed energy proportional to track length in cell
- Uniform beam profile across pixel
- Field lines in silicon are perpendicular to it surface. No boundary effects. 2D picture.



Fitting function Step 1 - Build Landau dE/dx Histogram 📗 🎝

Landau



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St	ep 2	- (hose	bin







landau modification Step 4 - same procedure for all bins 📠 🍄🌣

Landau







Geant4 Simulation

Simulation from Vincent for Cs137 source.

Modifications:

- Detector changed from tube to box
- 662 keV gamma changed to 3 GeV e-
- Changed detector rotation algorithm
- Geant 4.9.4



Flat left plateau is ideal for trigger threshold determination



Gauss Spread

Landau



LandauHist



Fit with Mod LanGau function 🛛 😪

common_calib_ls_ASU4_angle60_dif_1_1_1.rawCh4



Thrashold level search

Thrashold through ASU



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MP from ASU







Low Energy Region Non Linearity Response



ASU MIP position drop cosmics test

MP ASU



ASU MIP position drop cosmics test + RC

MP ASU



Pedestal Study, Single ASU, Single Channel, Single SCA, Angle = 0

common_calib_ls_ASU5_angle0_dif_1_1_1.raw_Channel_57_sca_1



Position of Gaussian centre



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Sigma distribution



Sigma distribution Profile



Sigma distribution by channel

SigmaChannel



ASU 1-7 +8*,Median of the Sigma of the Pedestal, Angle = 0, Connected Channels

PedistaConnASU



Done & Found

- MIP position drop
- Low energy region non-linearity
- Cosmic test
- Pedestal study

To do list

Summary

- Pedestal study with more
 - statistics
- More detail Geant simulation
- Master thesis