

SCECAL STATUS REPORT

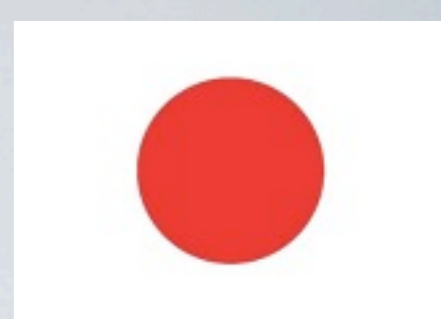
T.Takeshita (Shinshu: CALICE-Asia)
CALICE meeting @ Heidelberg Sep/2011

☀ new funding & plan in Japan

silicon & scintillator ECAL / HCAL

- current activities on scECAL
 - integration of electronics
 - photo-sensor study
 - FNAL data analysis
- summary & outlook

NEW FUNDING



- named : ILC-Tokushin
for 5 years ; 2011-2015 FY , ~ 4MEuro total
Led by Hitoshi Yamamoto (Tohoku U)
- VTX : Tohoku + KEK
- TPC : Saga + KEK
- CAL : Kyushu + Shinshu + Tsukuba
- software & physics : Tokyo + KEK

7 Post Doc's

KickOff meeting 12-14/Sep/2011 @ Tohoku U.

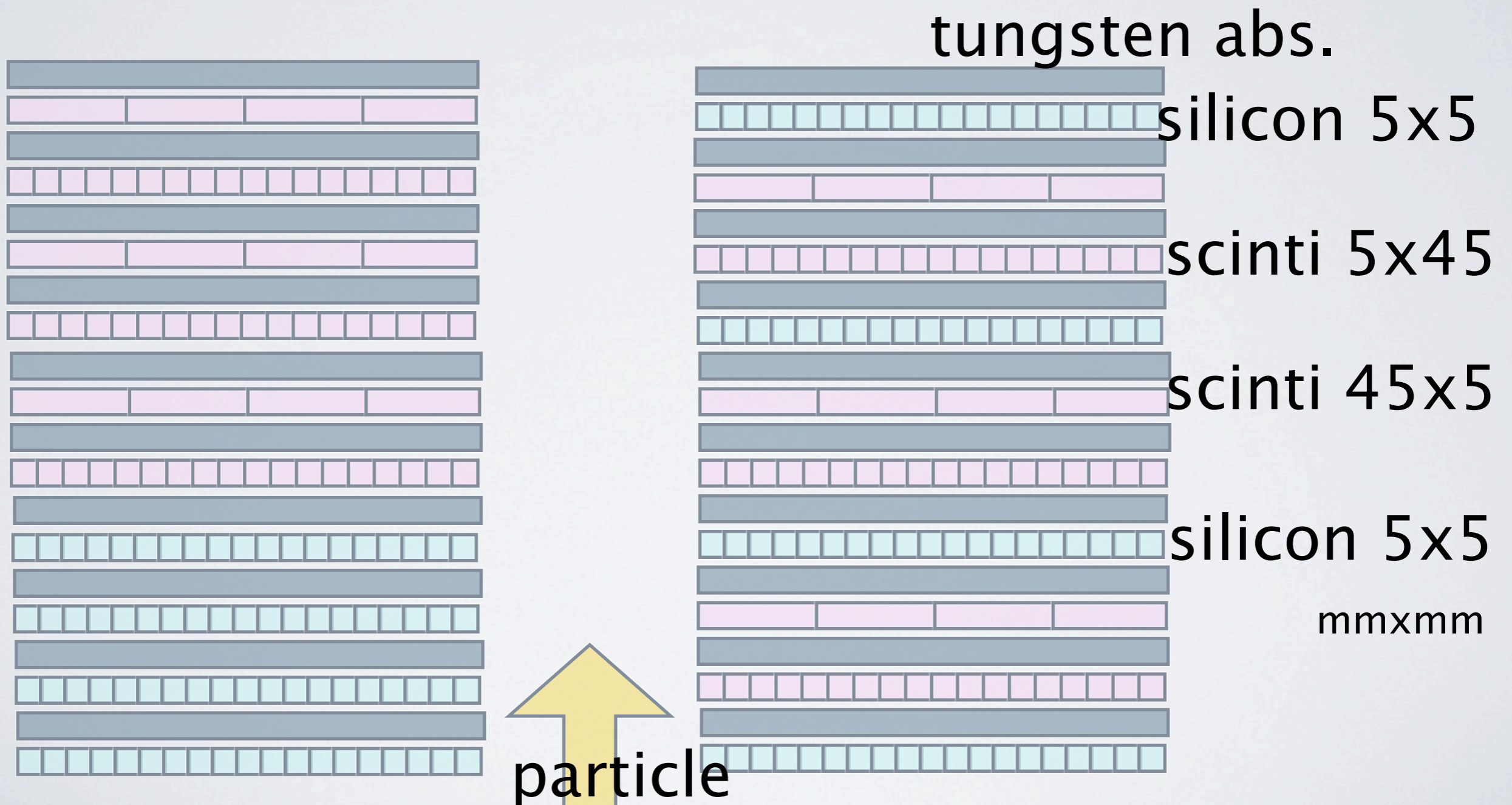
NEW FUNDING FOR CAL

- ECAL : Silicon (Kyushu) / scintillator (Shinshu)
+2 PostDoc's & Hybrid
- HCAL : long scintillator strip

2011 – 2012	2013 – 2014 – 2015 <small>post DBD</small>
Hybrid ECAL silicon+scintillator simulation/BT	structure /readout & silicon sensor scintillator sensor mass production study
HCAL scintillator strip + tile optimization (simulation)	evaluation with BT scintillator sensor mass production study

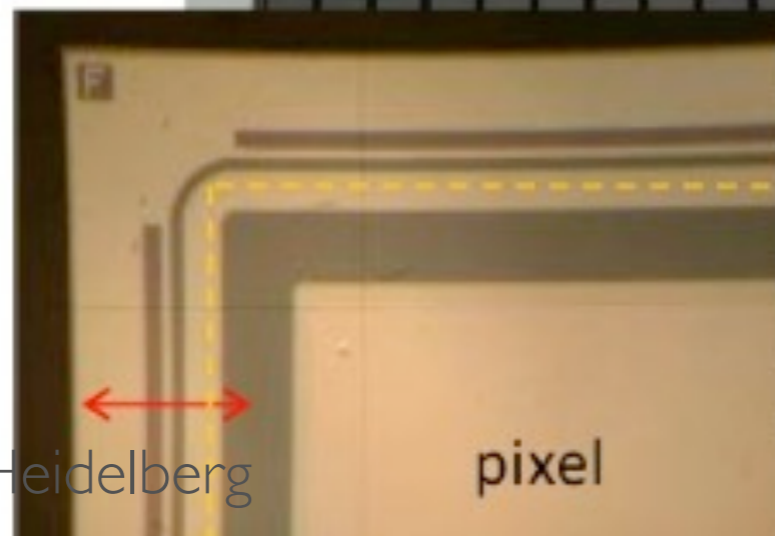
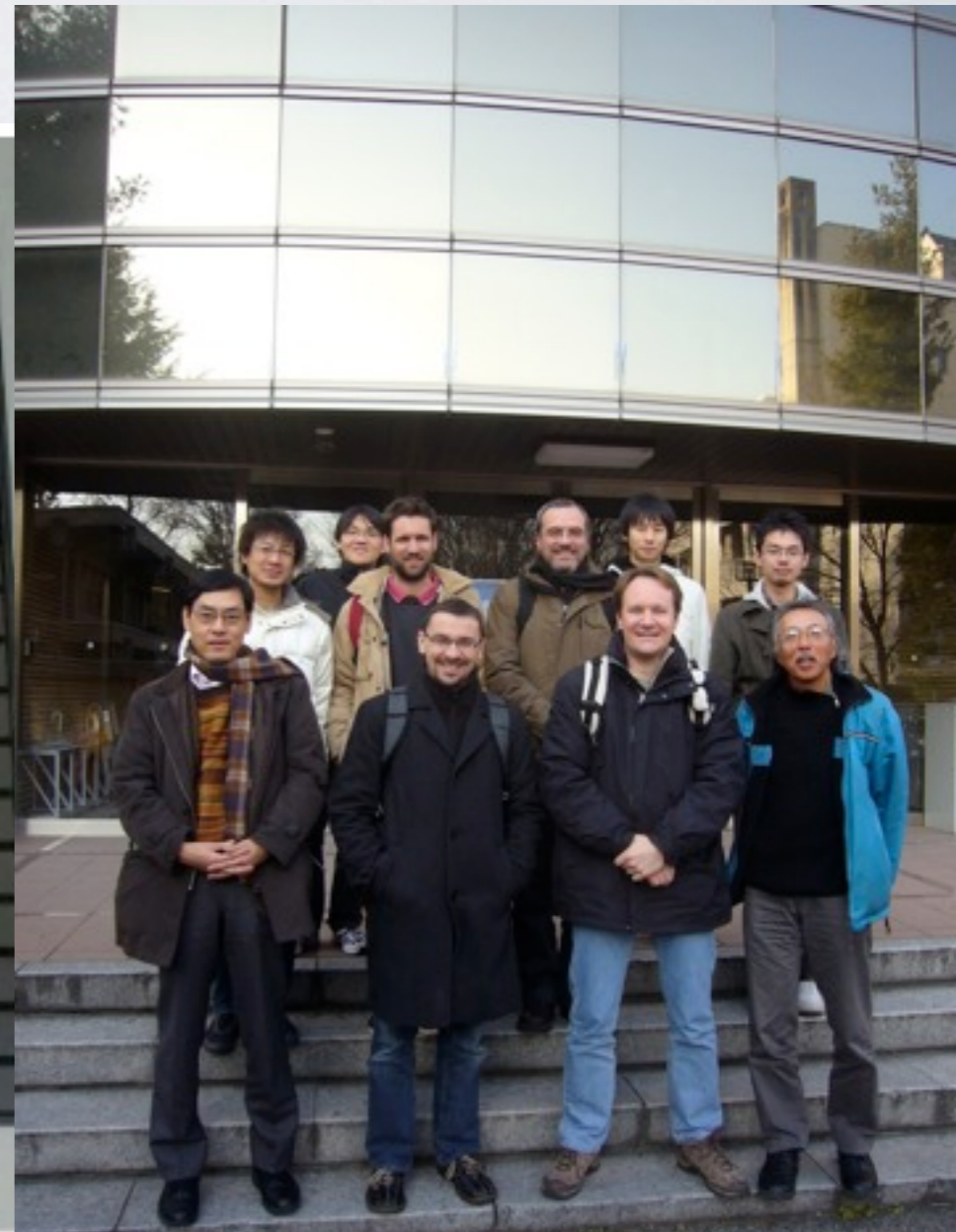
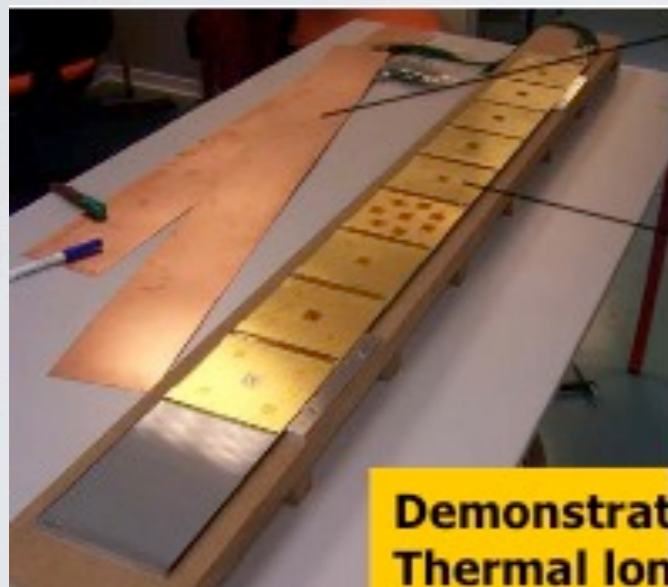
HYBRID ECAL STUDY

- optimization of layers order / combination with cost effective way



SILICON ECAL

- joint effort for silicon ECAL started Jan/2010
silicon sensor study with cost engineering work for TDR/post DBD



SCINTILLATOR CAL

- collaboration with Korea+Japan continues
scintillator production = Korea KNU
photo sensor MPPC = Japan Shinshu

2009

2010

2011

2012

PFA : strip clustering algorithms dev. & improv.

layer elex. dev.

layer elex, implem.

5mm scinti. dev.

test of 5mm scinti.

MPPC dev. increase # of pixels

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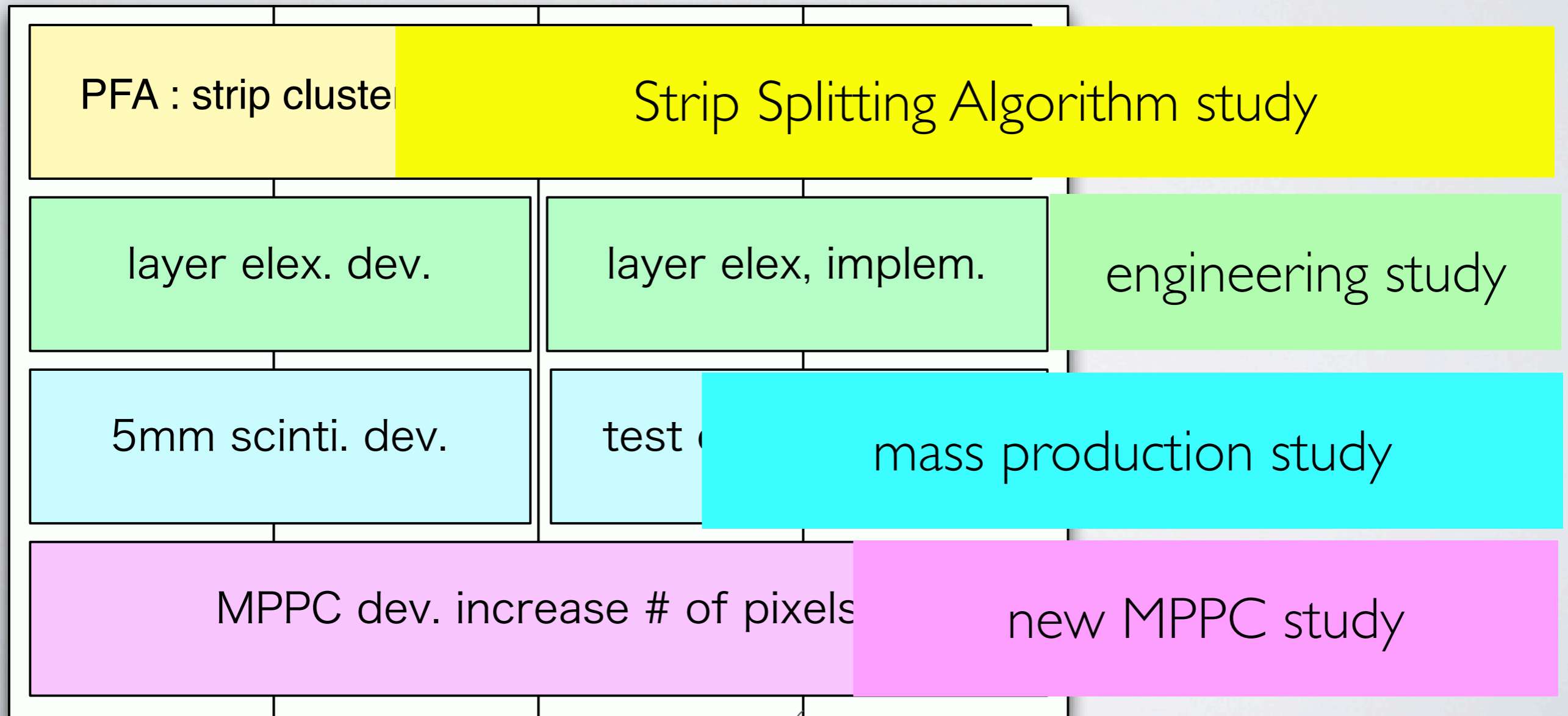
2009

2010

2011

2012

2013-2015



STRIP HCAL

- long strip scintillator for HCAL

aiming 1 cm x 1 cm effective

resolution

- with WLSF read out

- expertise technology

- start from Strip Splitting

Algorithm for hadron

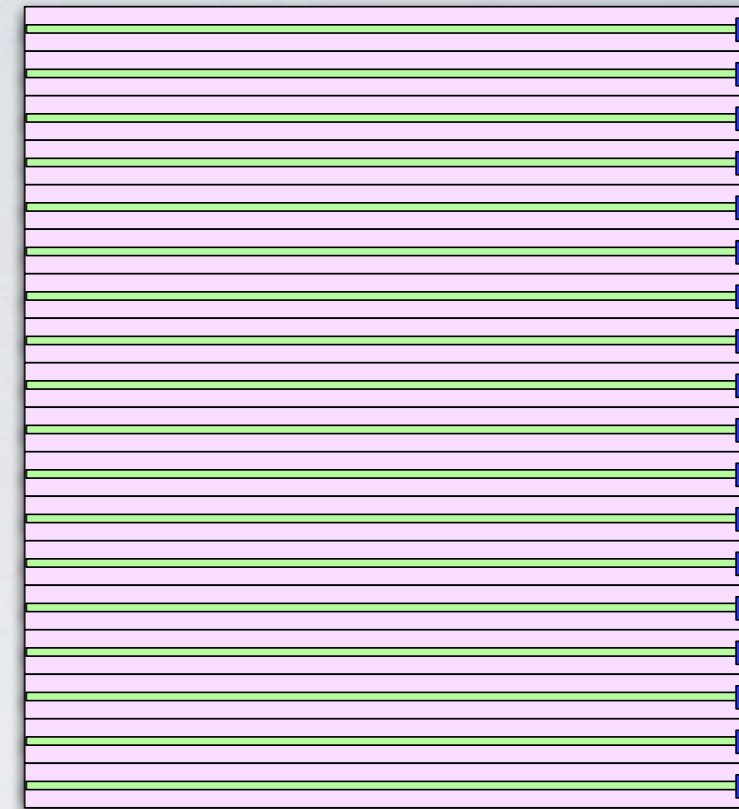
interactions

- two layers are constructed and

tested

- with integrated electronics,

Beam Test



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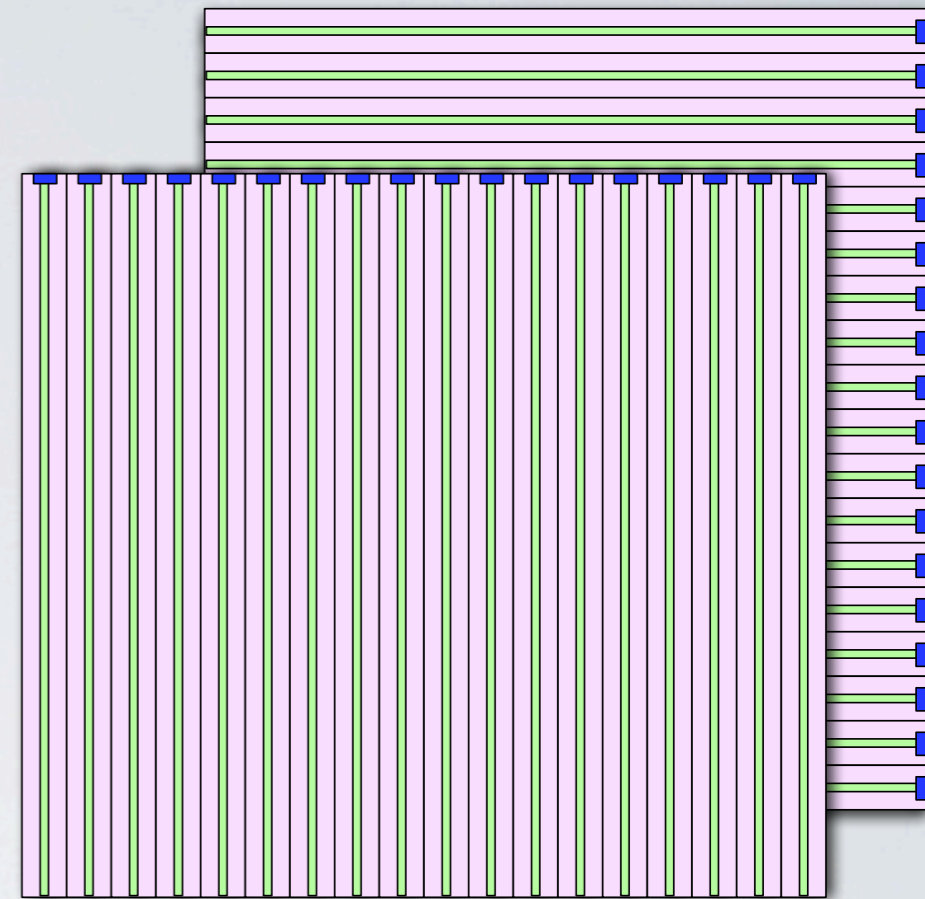
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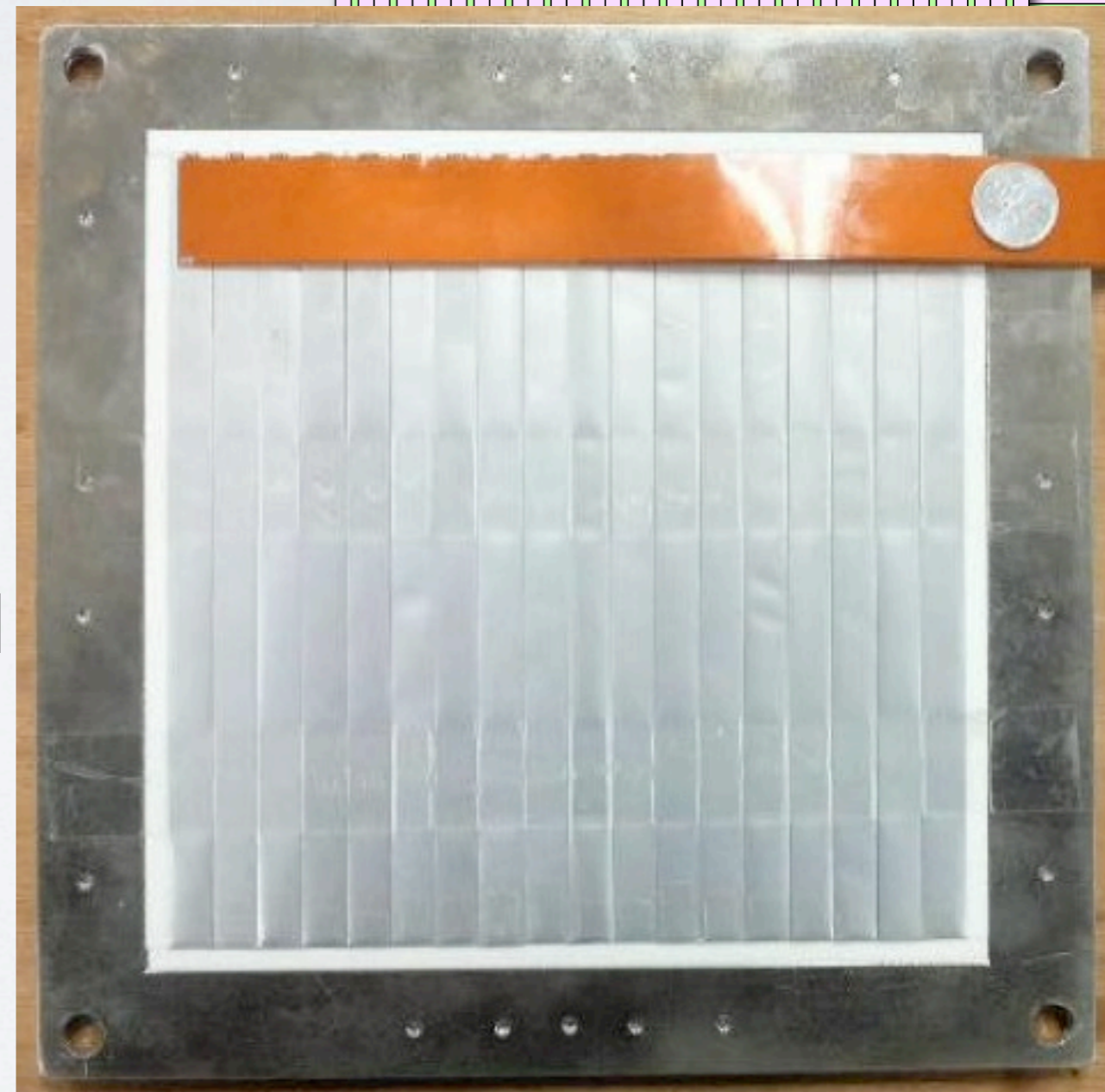
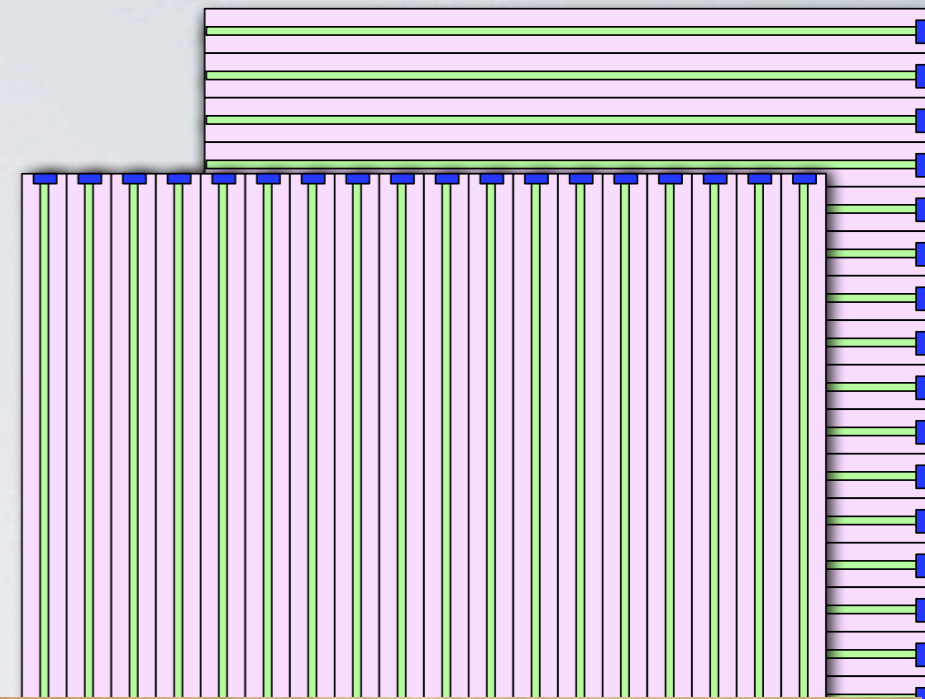
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Beam Test

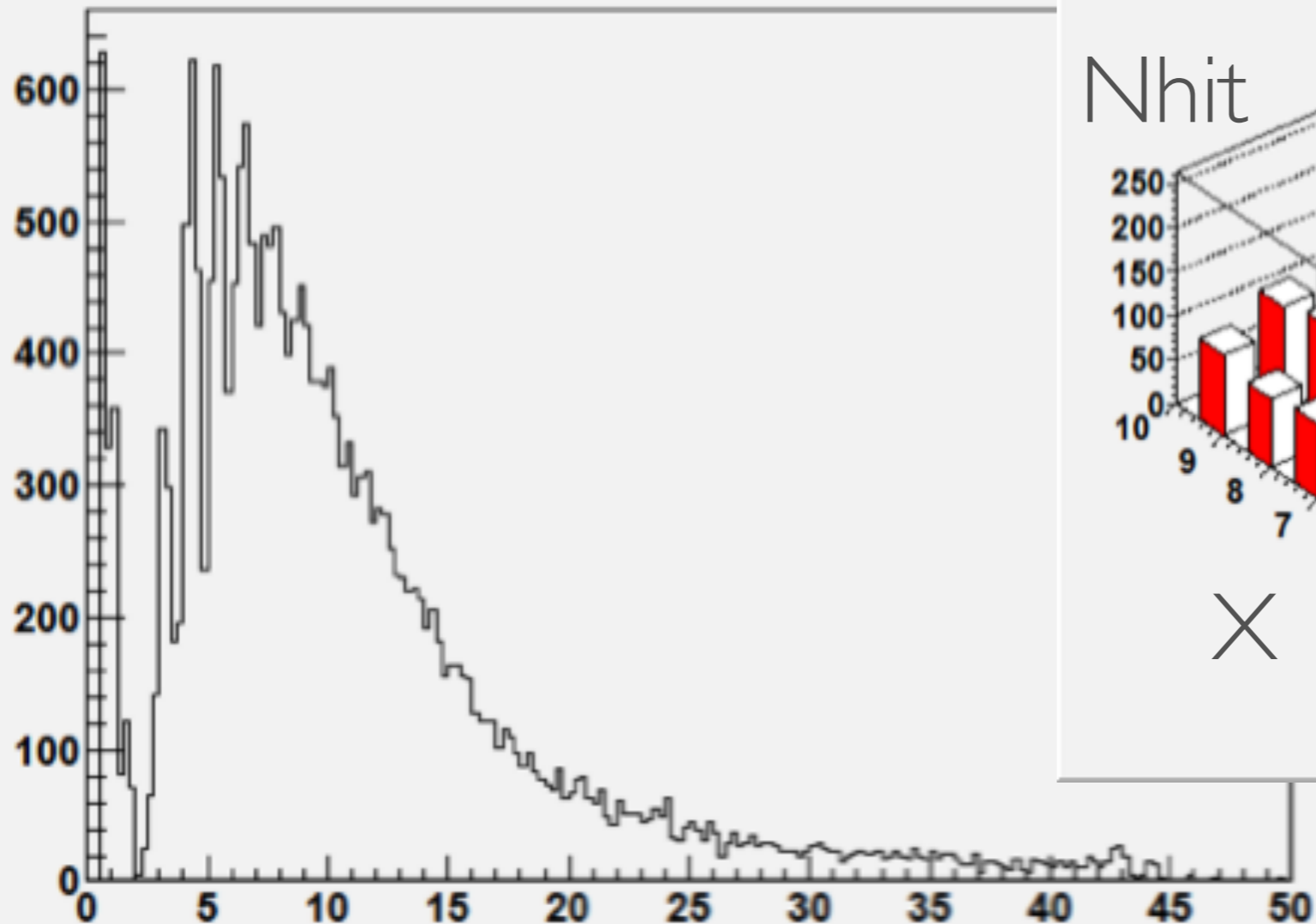


STRIP HCAL CONT.

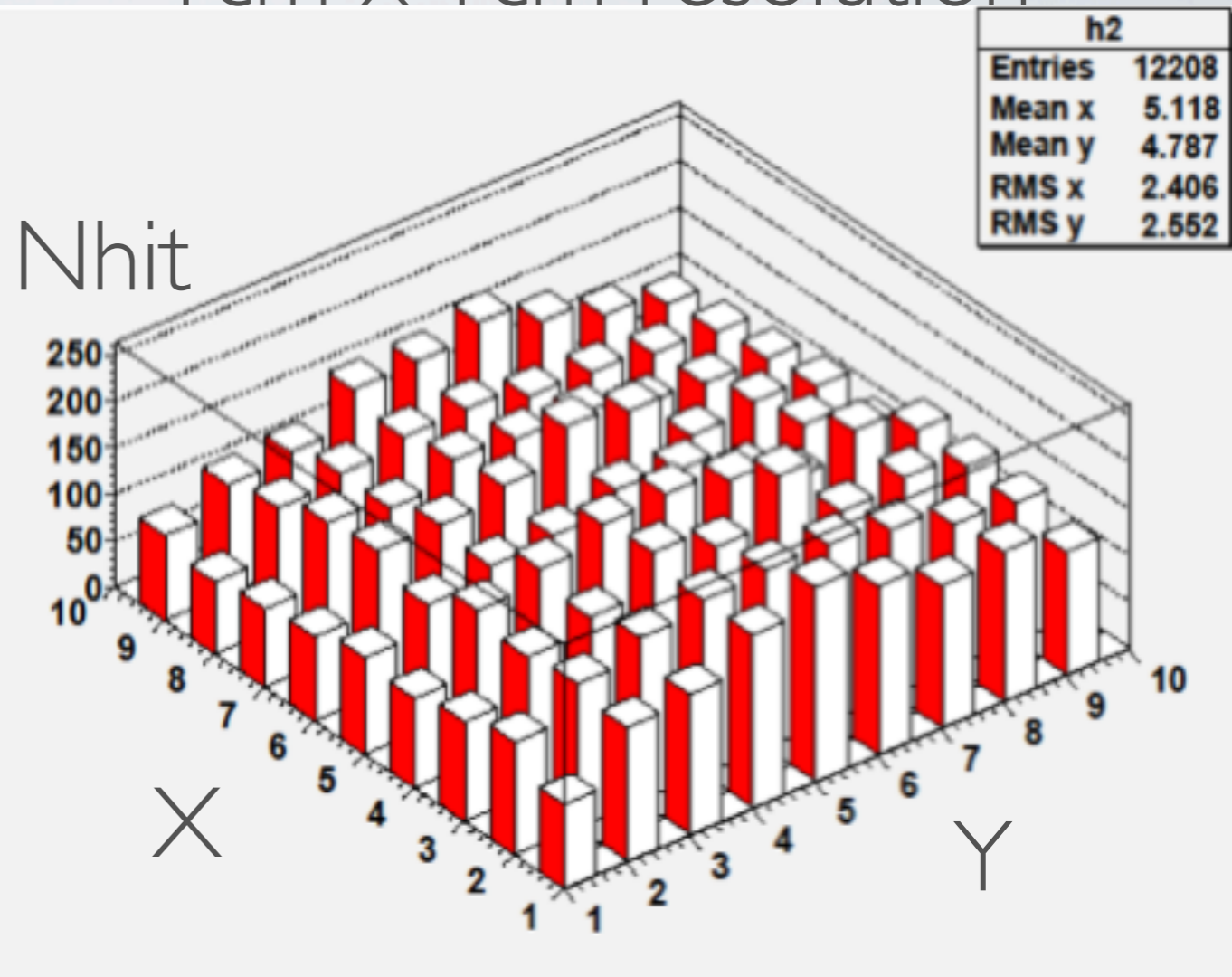
cosmic ray test
with 2 layers of 18 strips
7.2 p.e. for 18 strips

1 cm x 1 cm resolution

18 scintillators

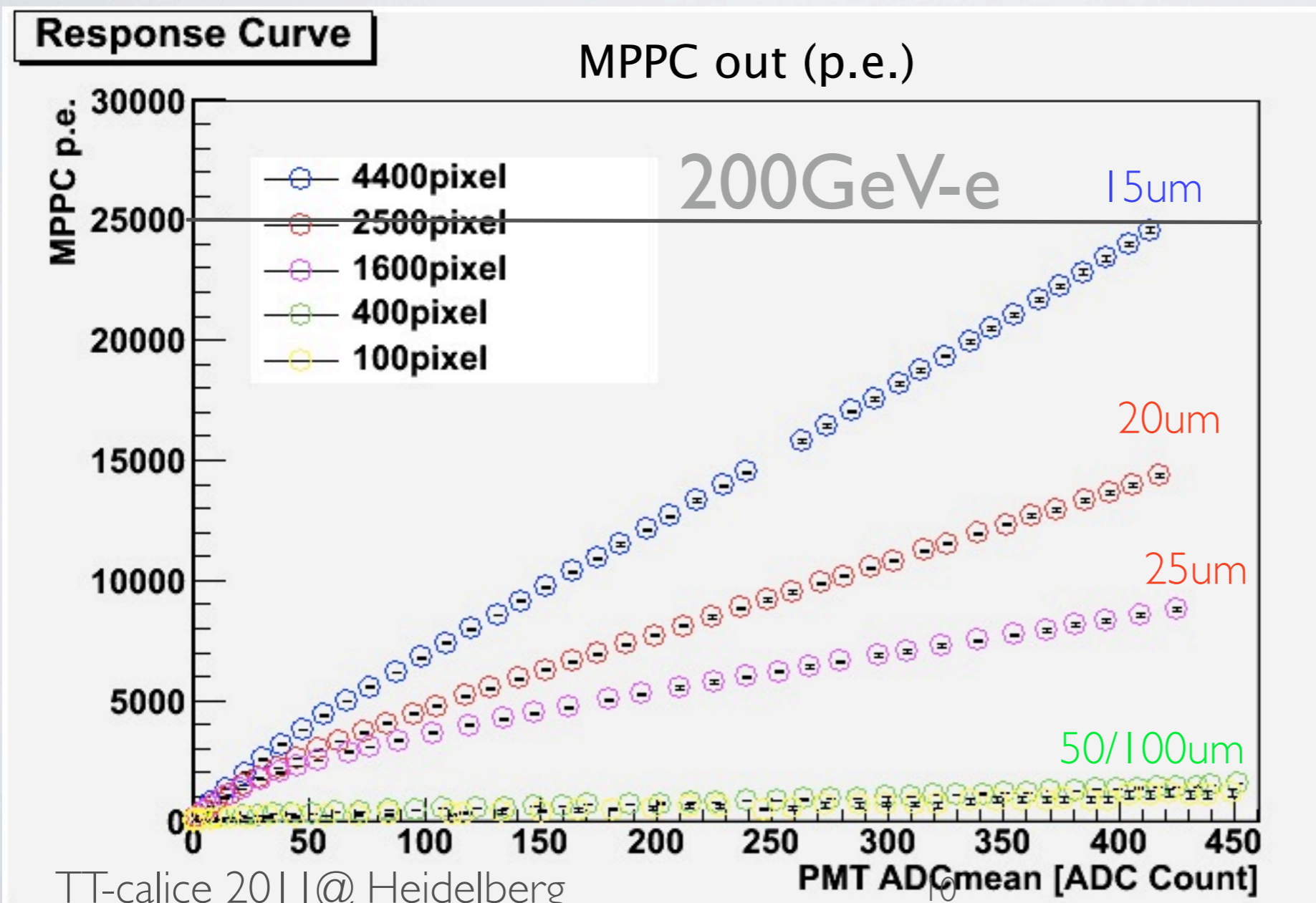
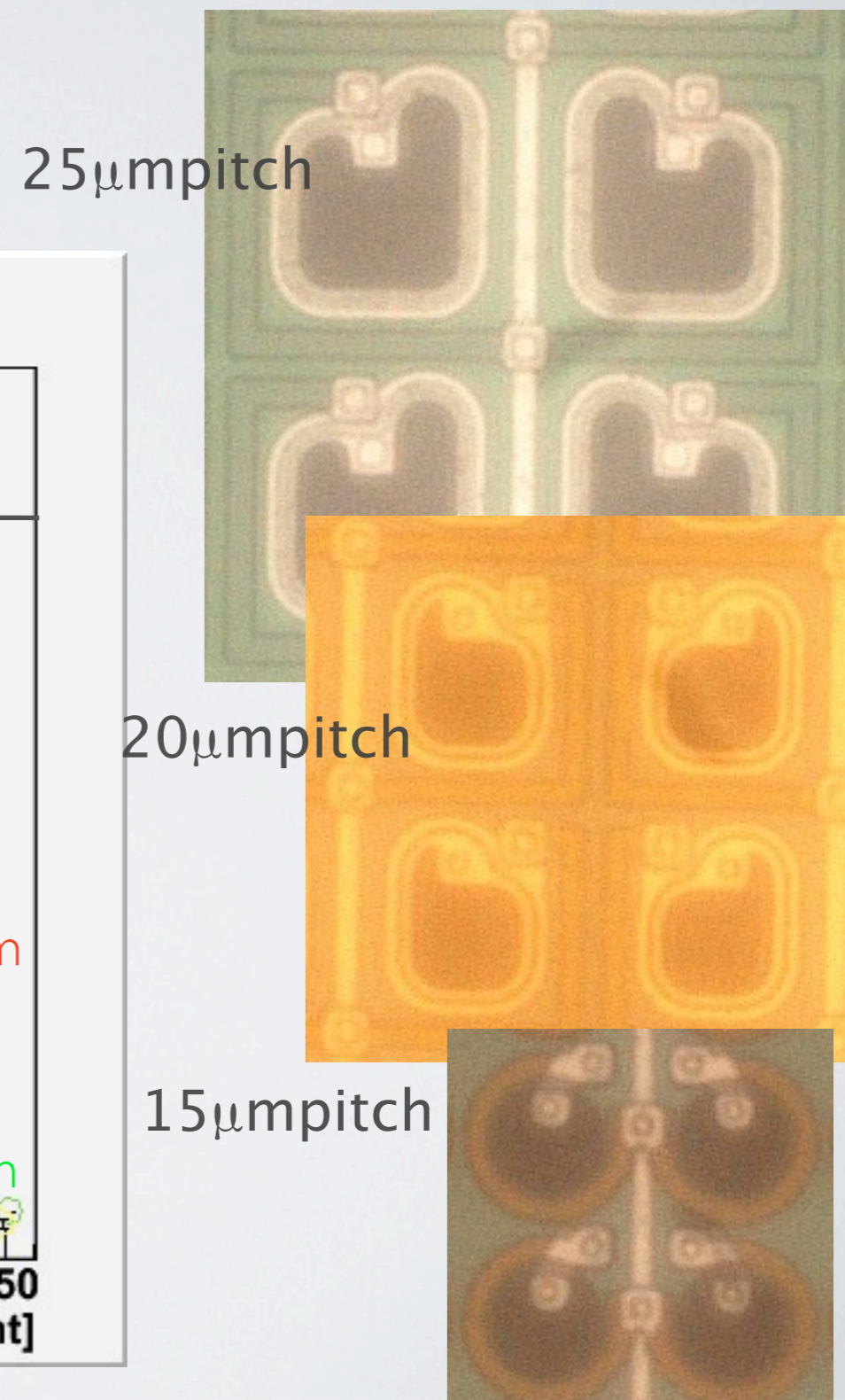
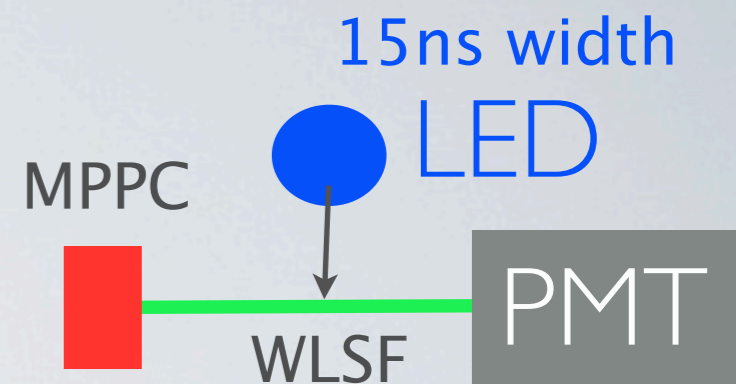


pulse height (p.e.)



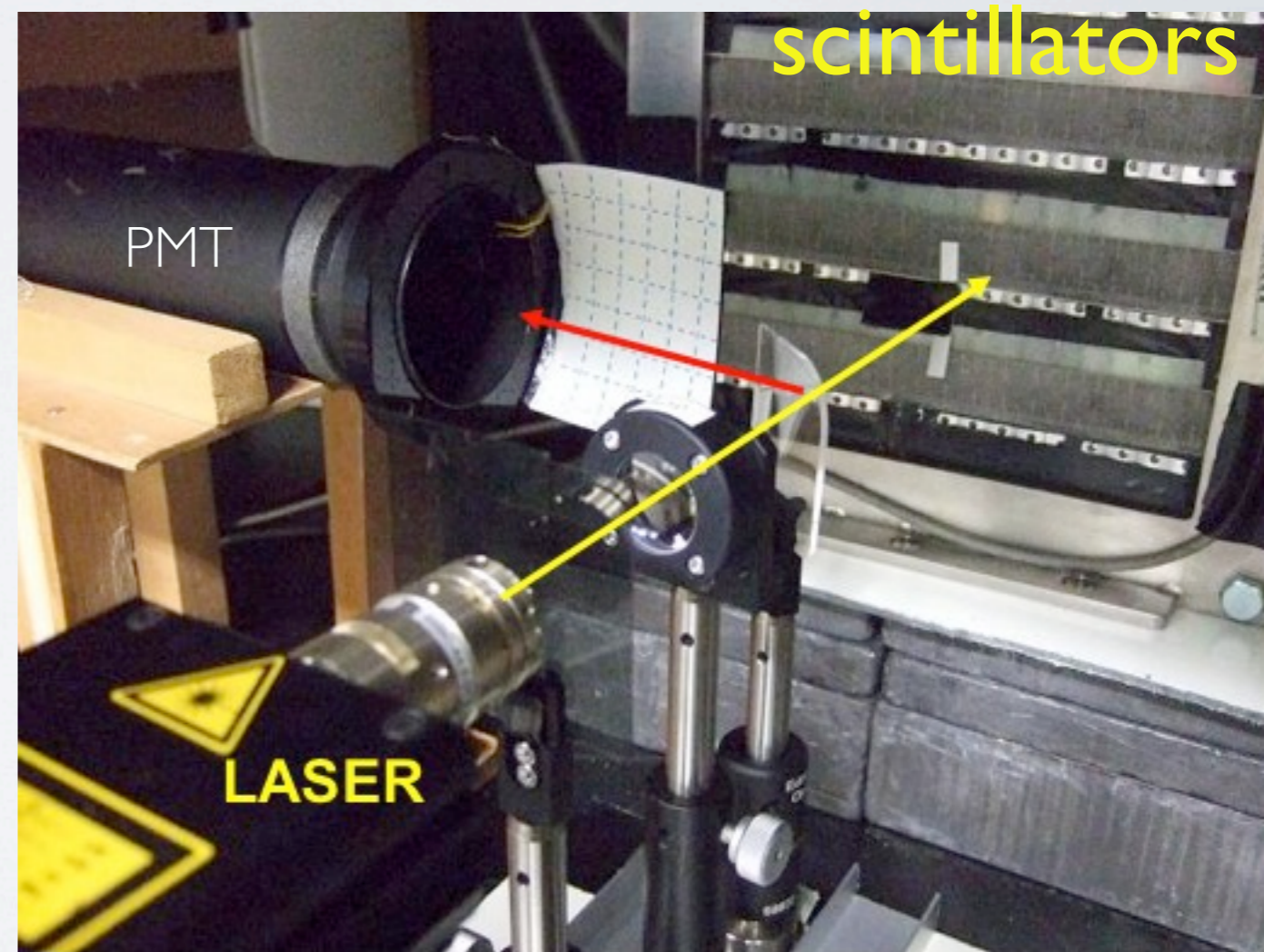
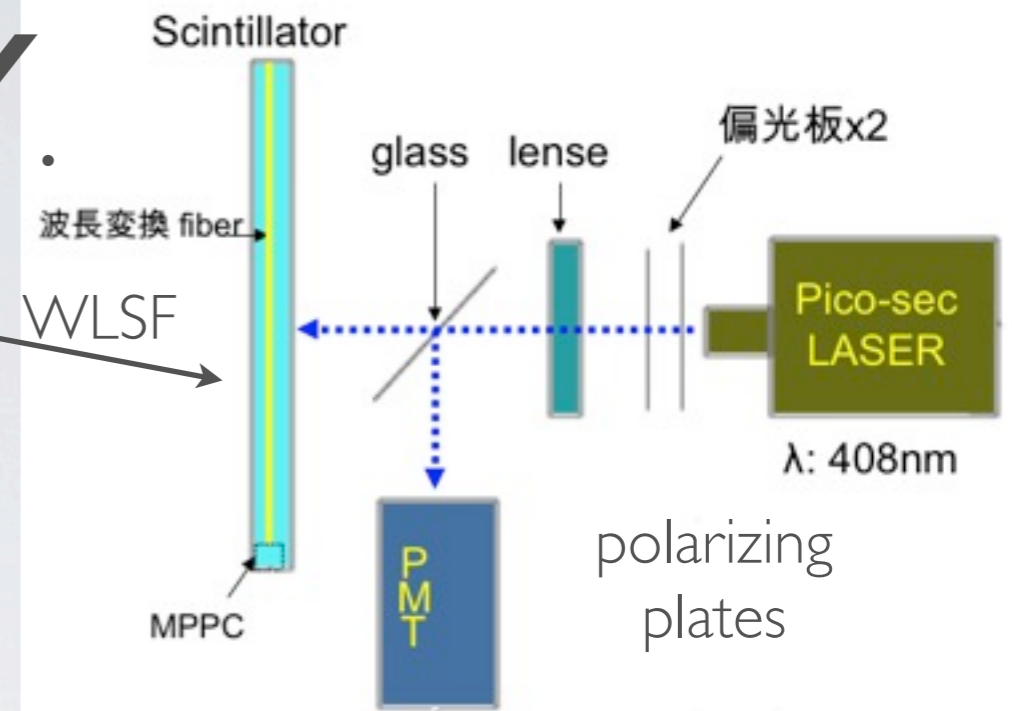
MPPC STUDY

- saturation
simply increase number of pixels
study the mechanism



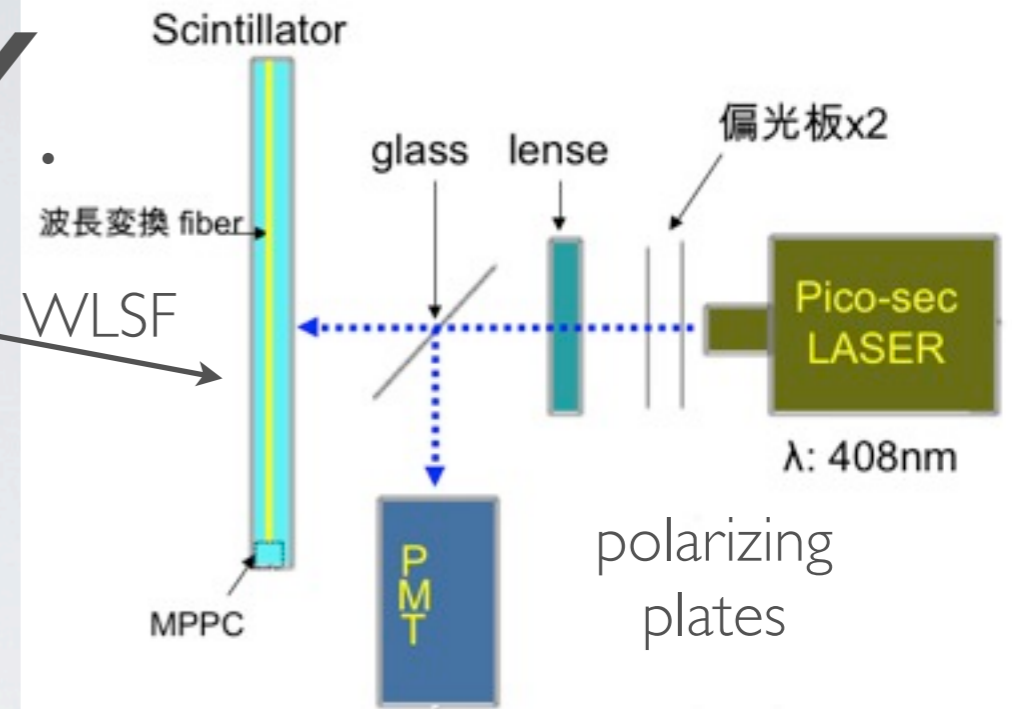
SCINTI. ST. STUDY.

saturation in the actual scecal
at FNAL
pico-sec laser pulse
rotating polarizing plate

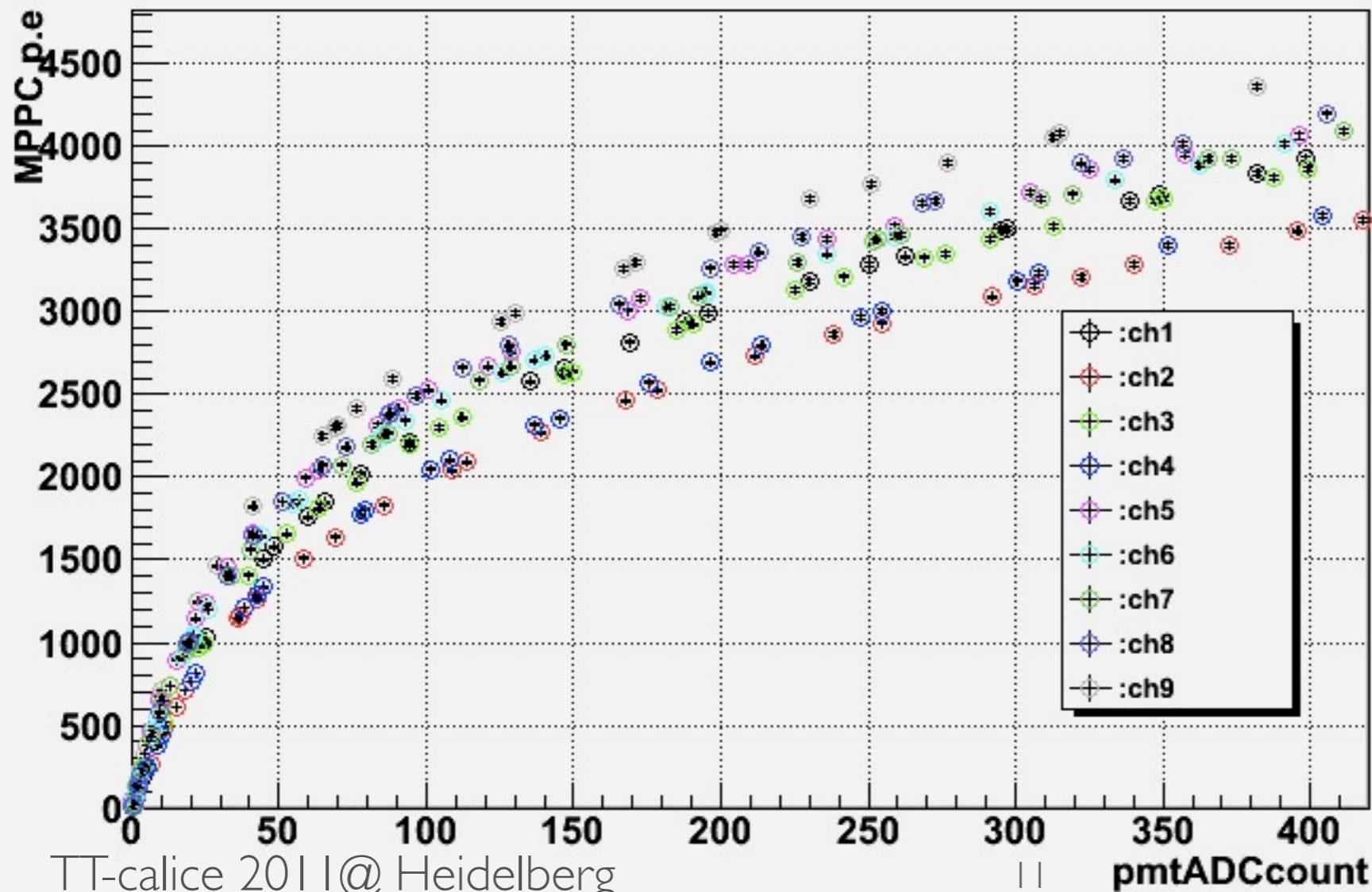


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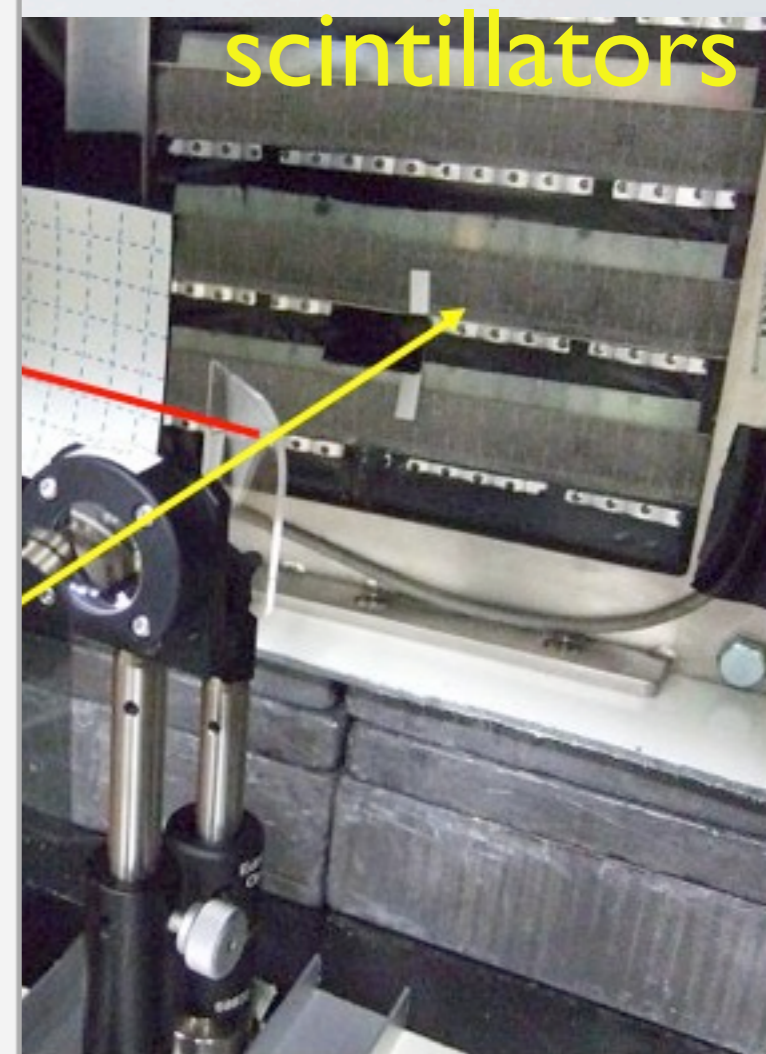
saturation in the actual scecal
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pico-sec laser pulse
rotating polarizing plate



mppcsaturation ly30 cb8

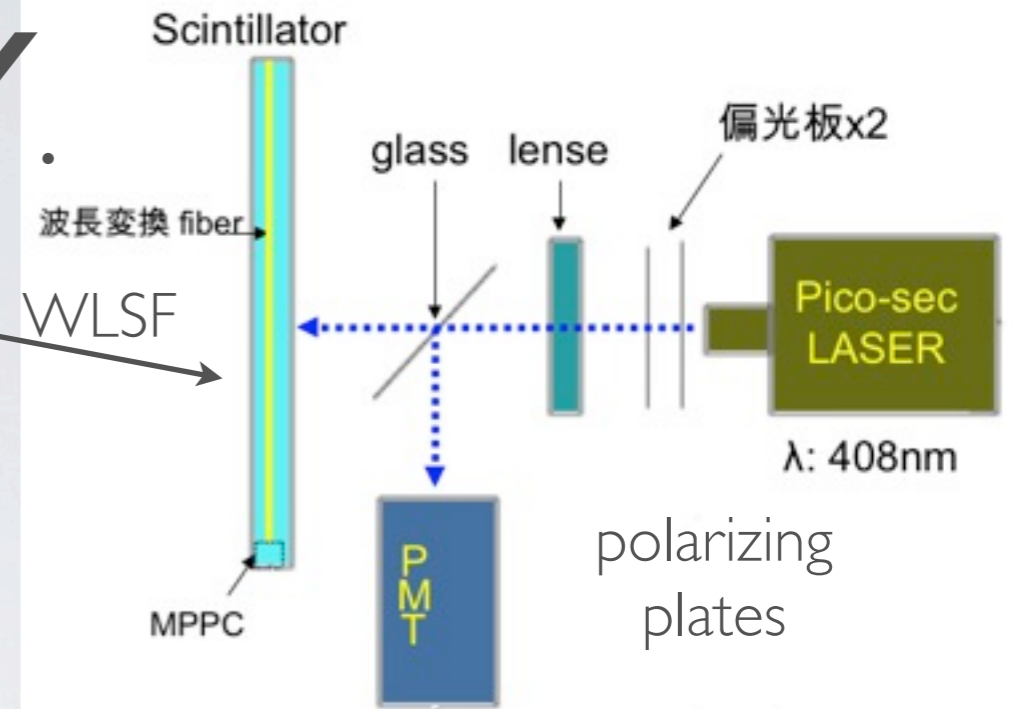


TT-calice 2011 @ Heidelberg



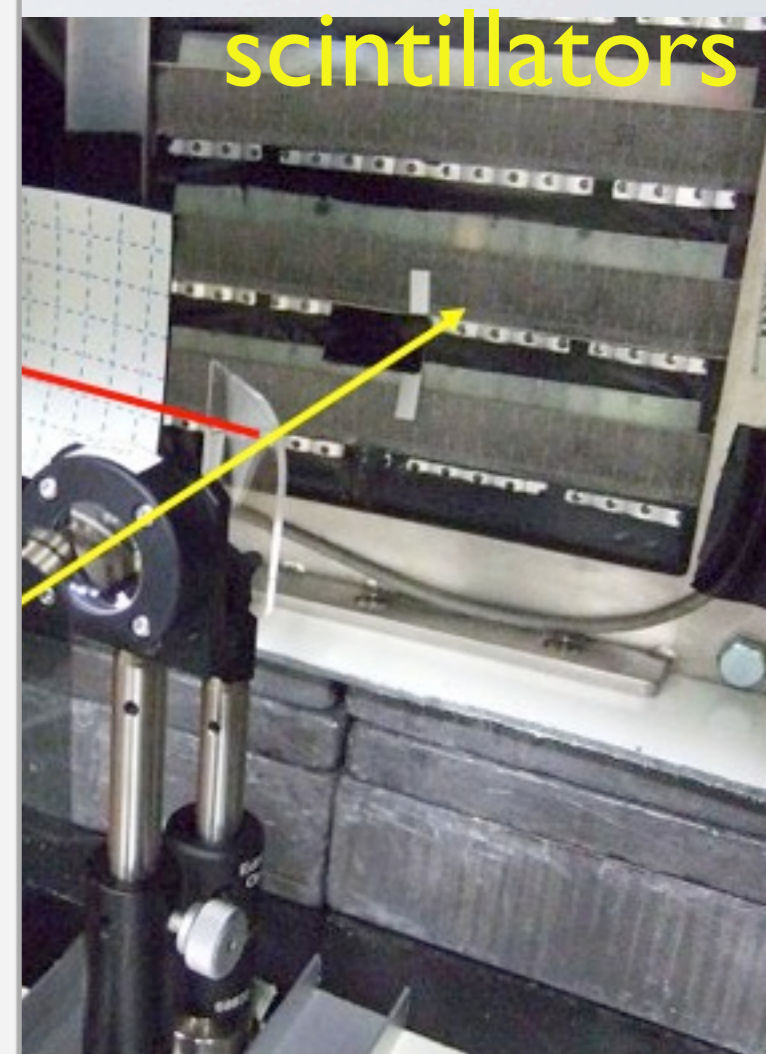
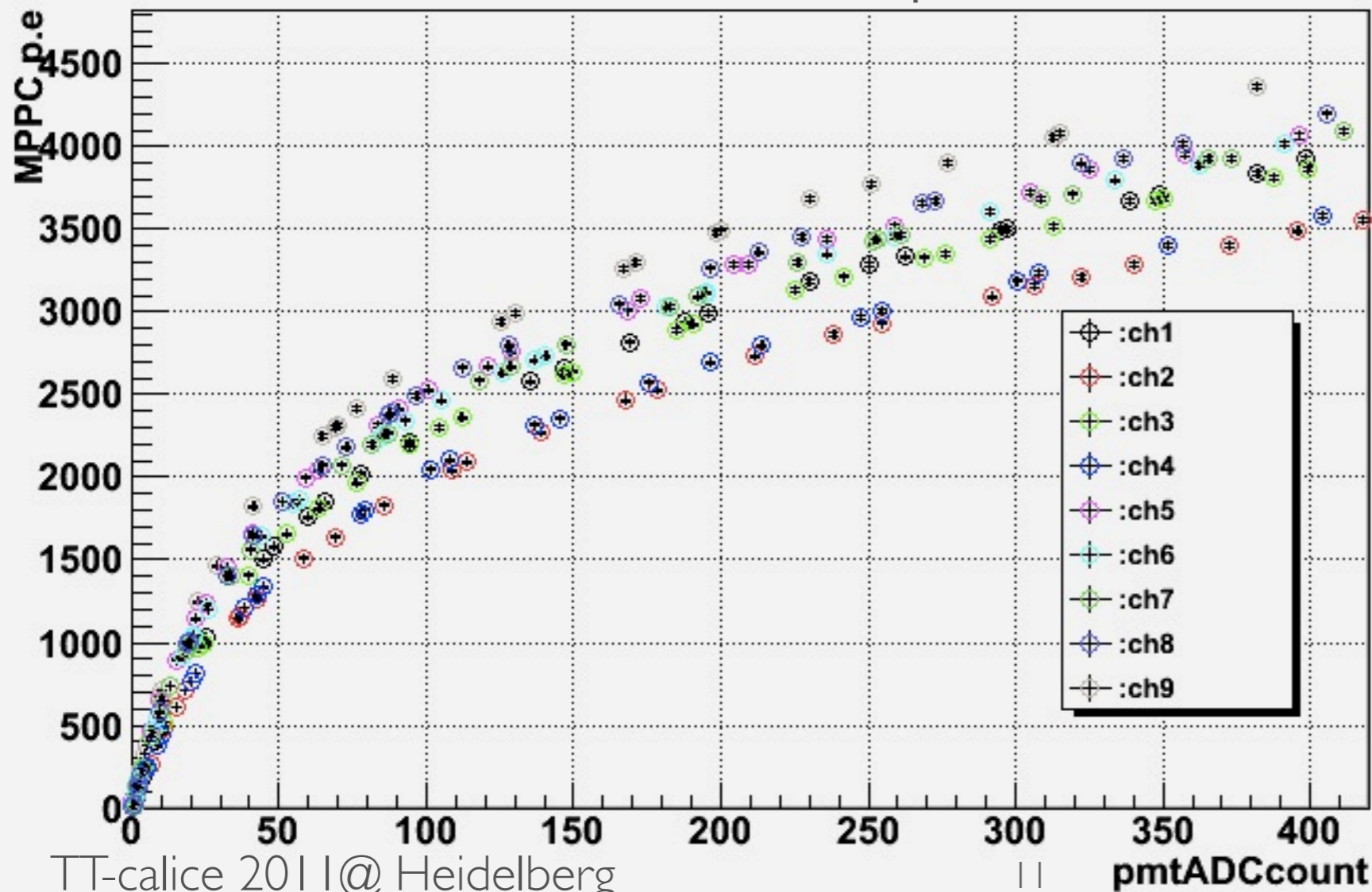
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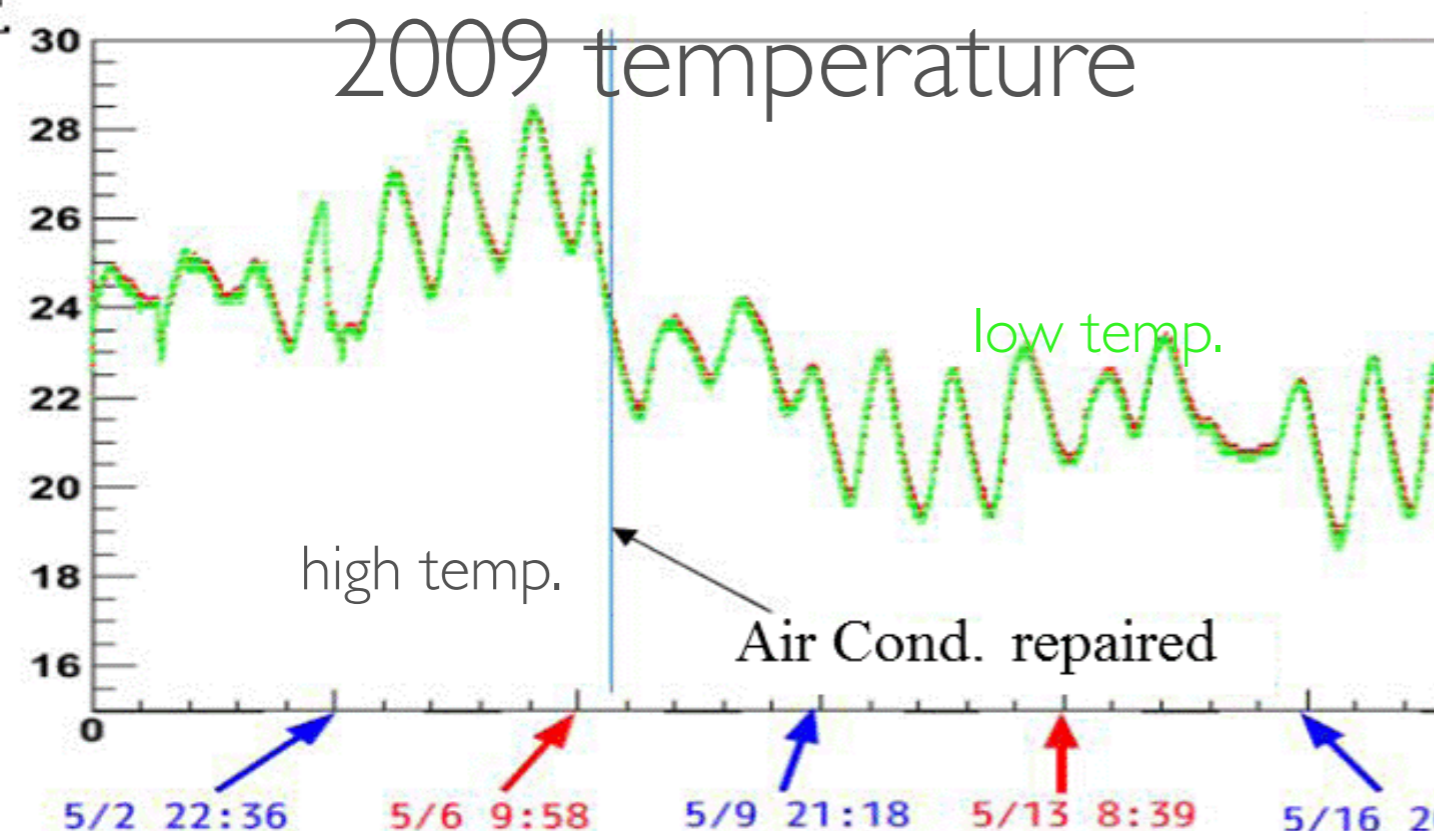
mppcsaturation ly30 cb8

9 strips

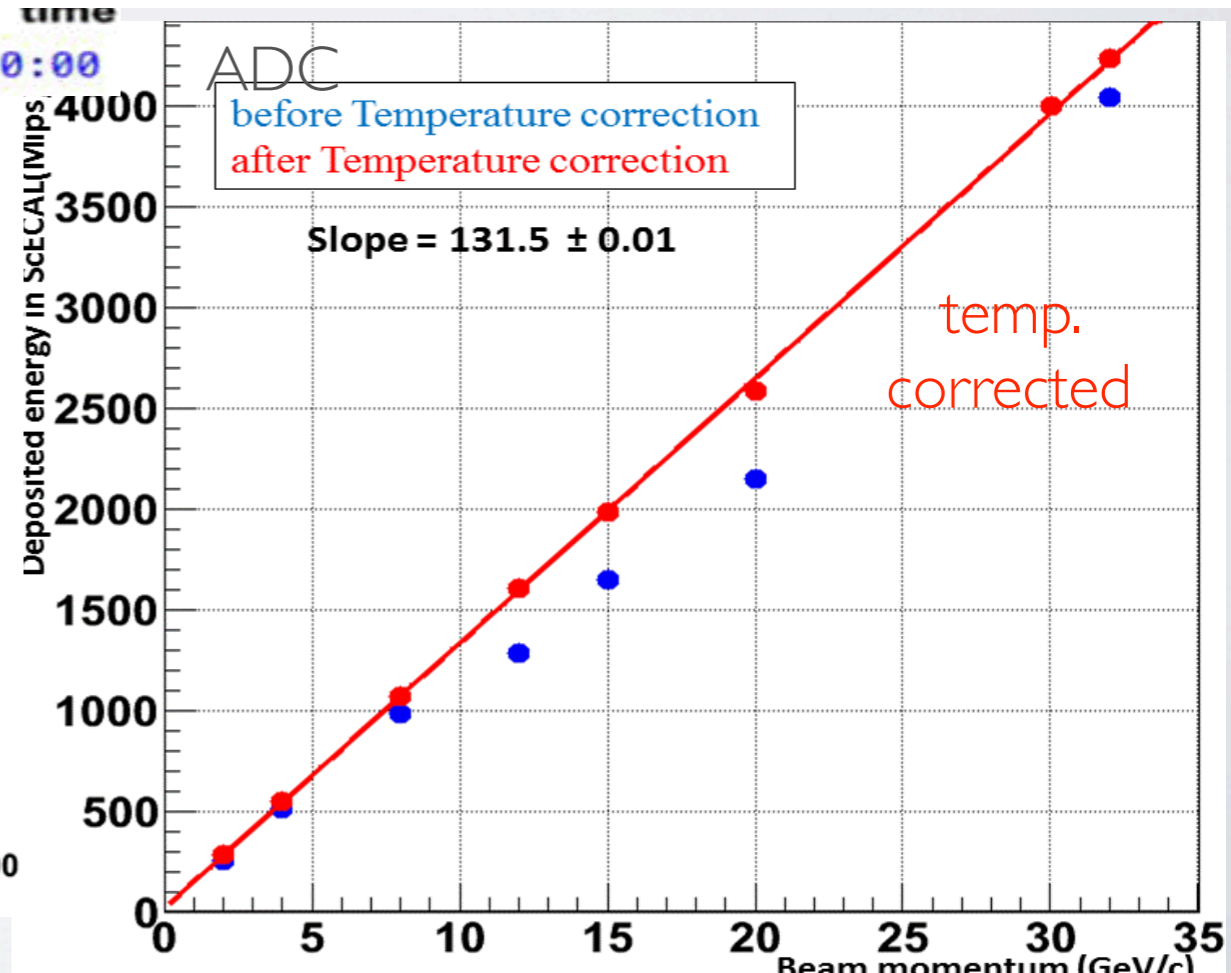
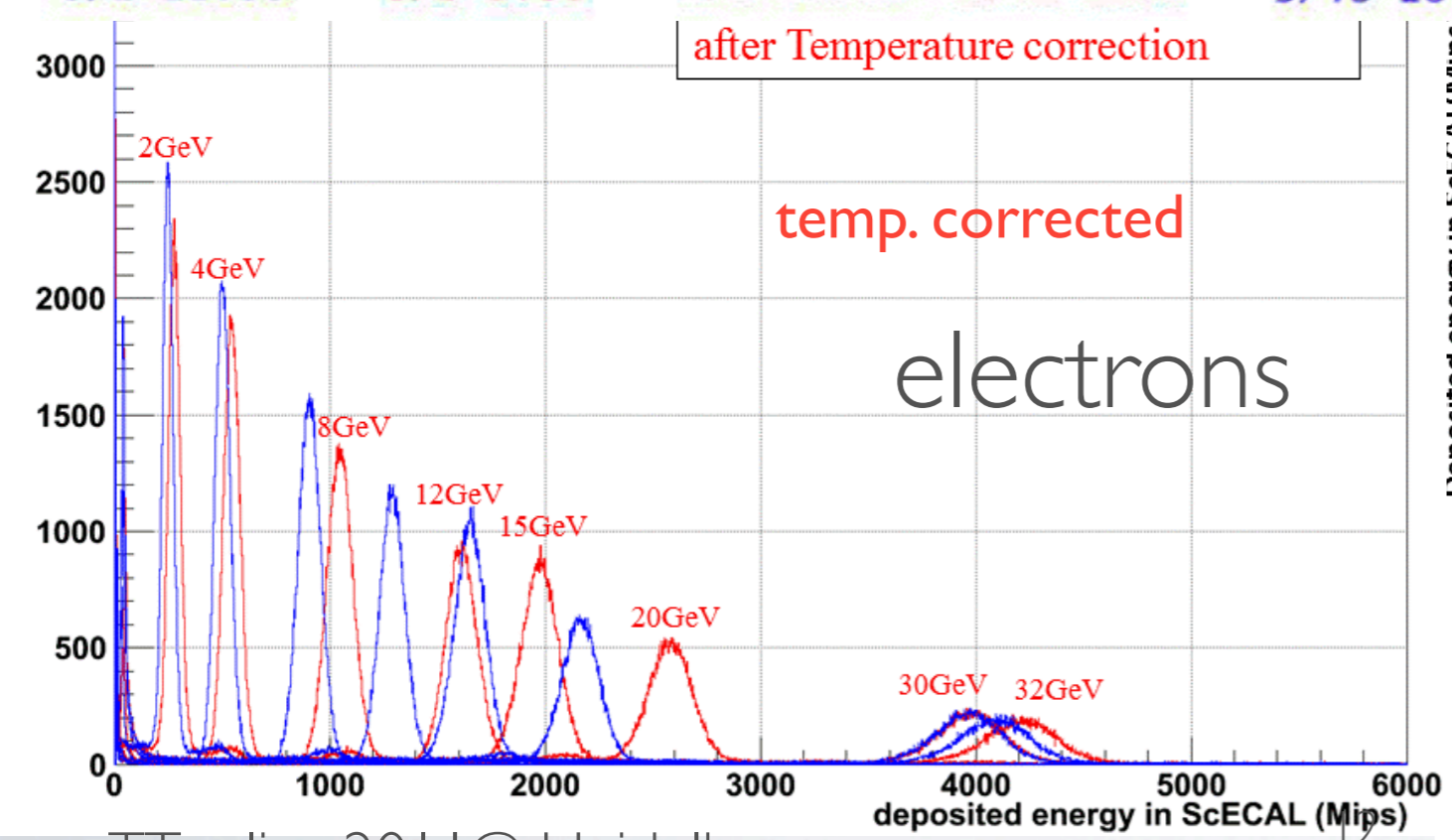
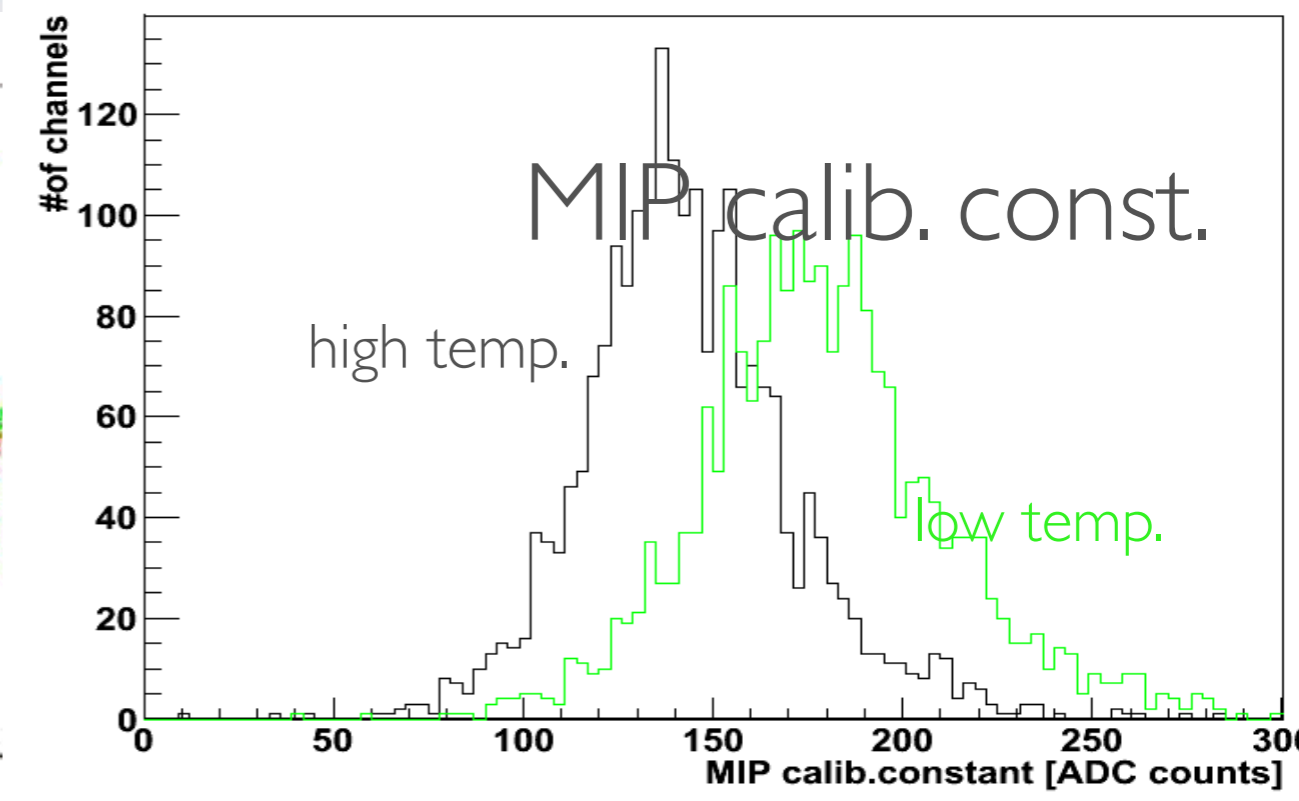


FNAL DATA ANALYSIS

temperature correction applied

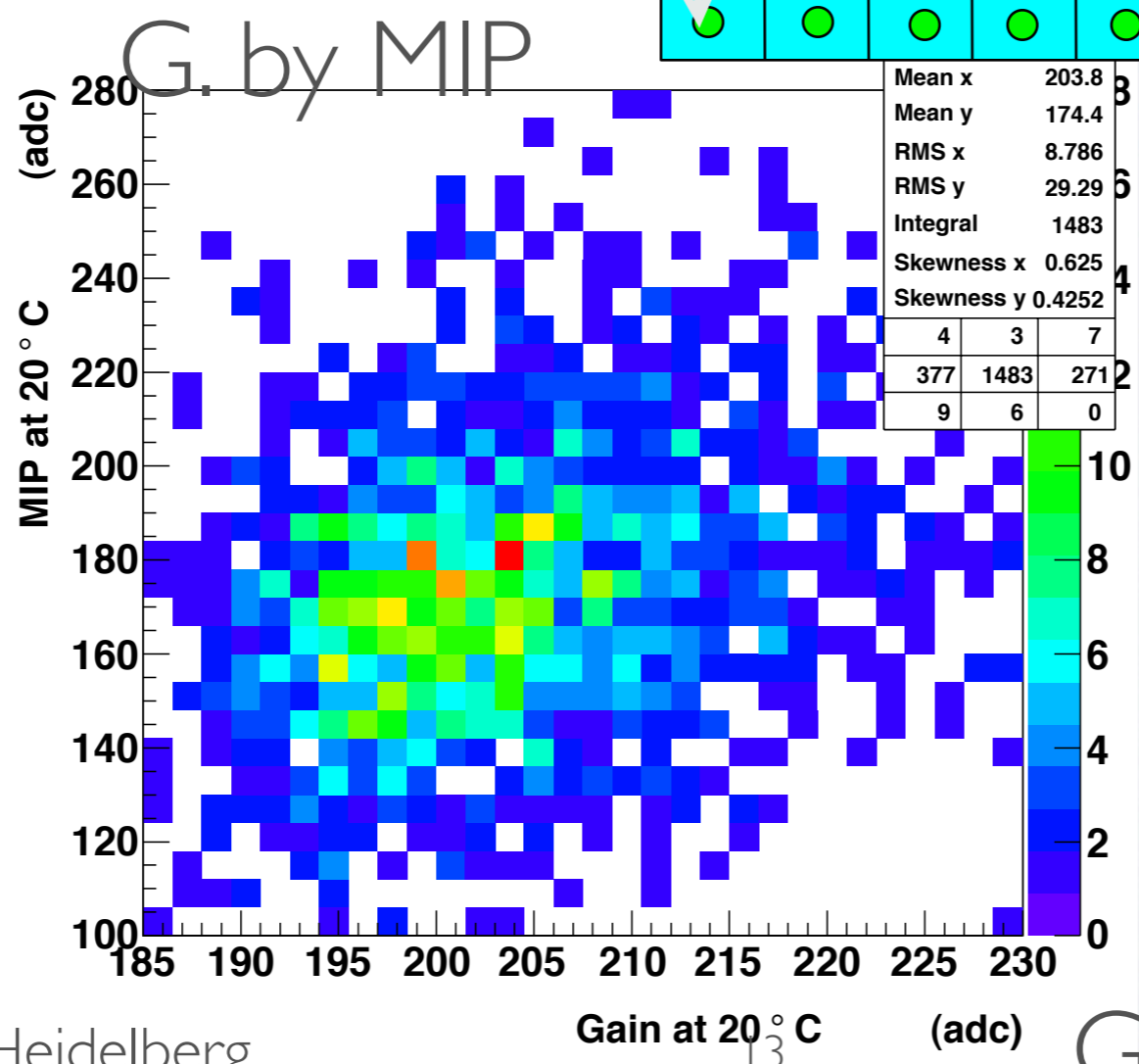
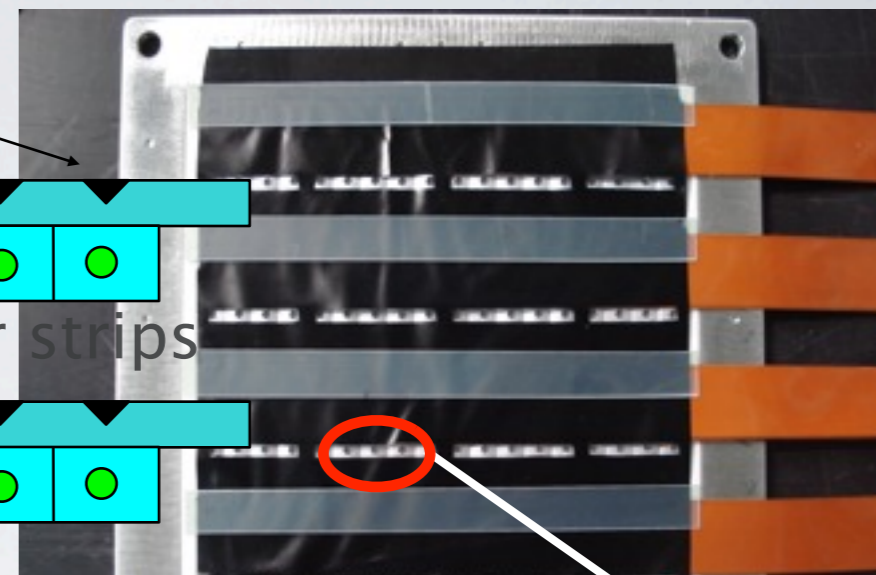
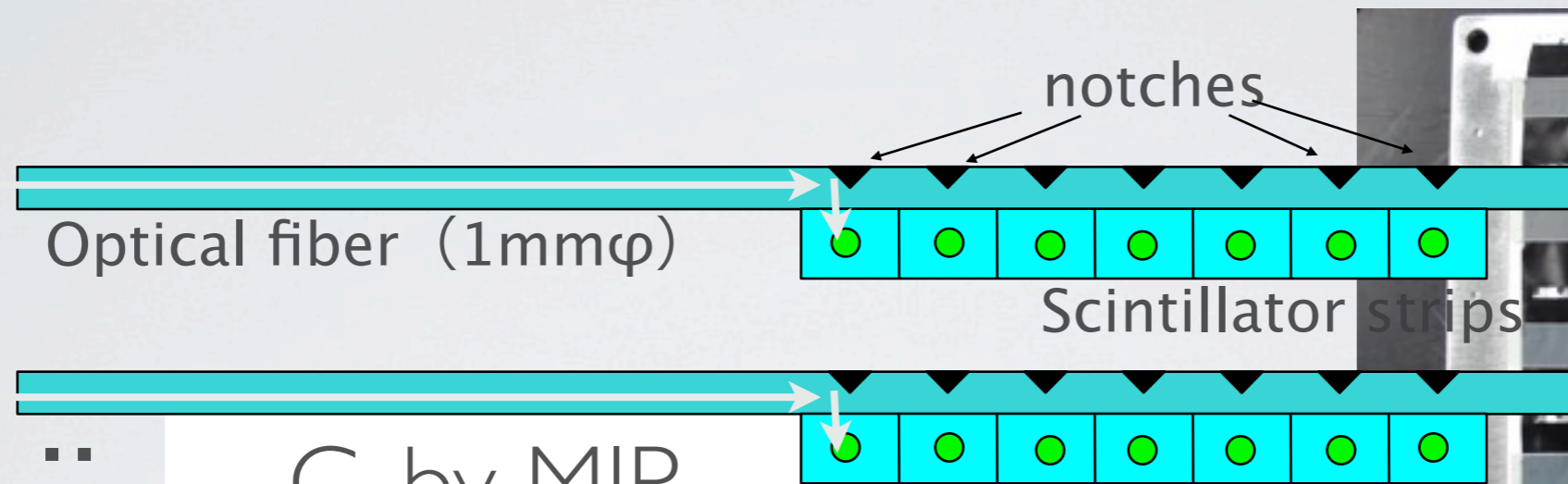
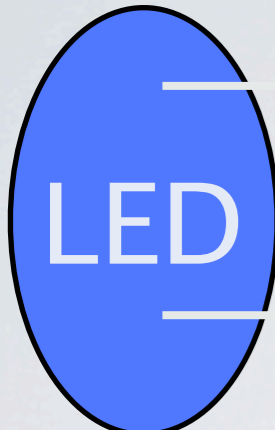


MIP calib. constant



FNAL DATA ANALYSIS CONT.

gain monitoring system performance



CAL. CALIBRATION

with **Beam Halo muons**

Nicolai showed beam background muon in ILC at

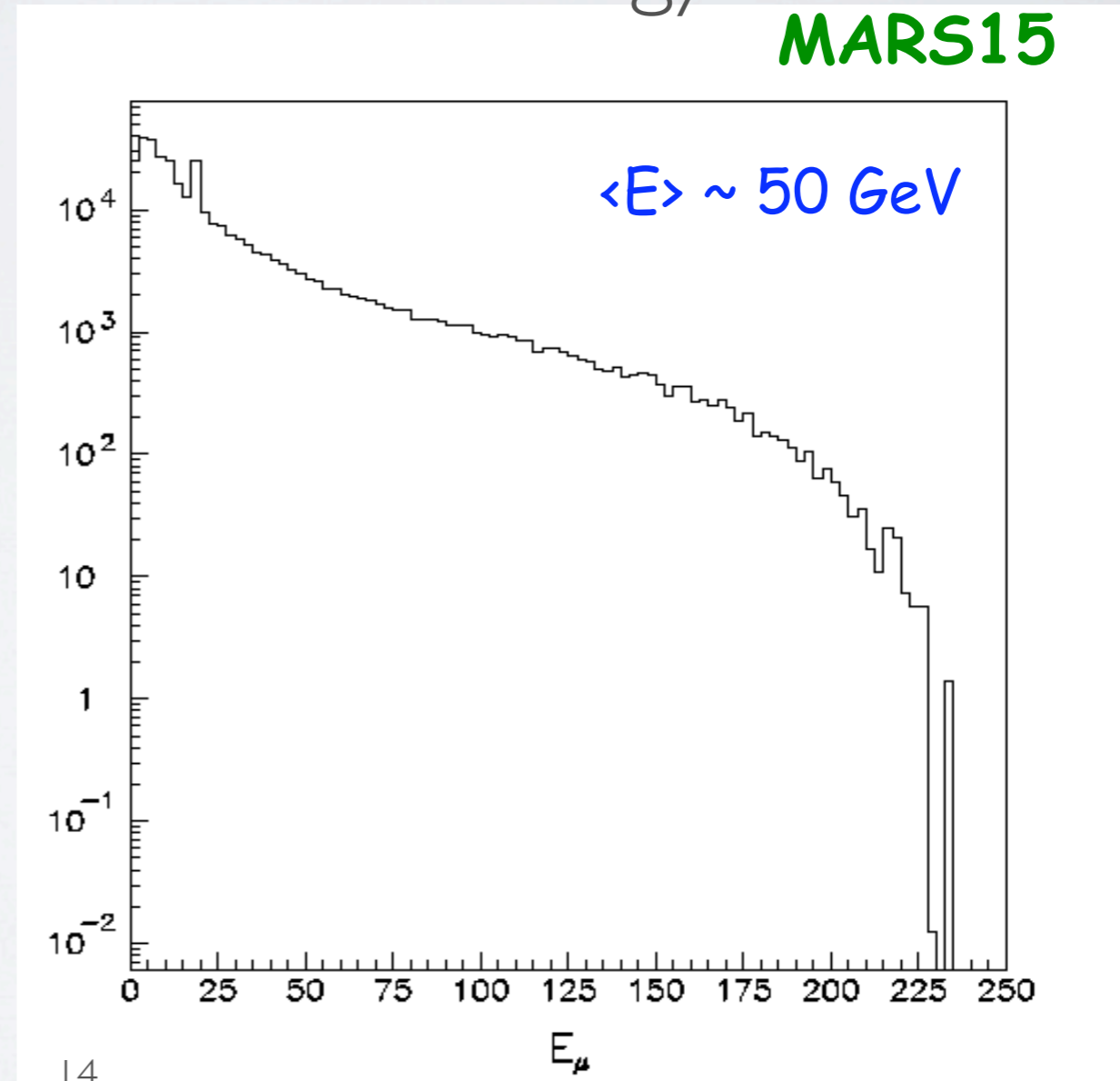
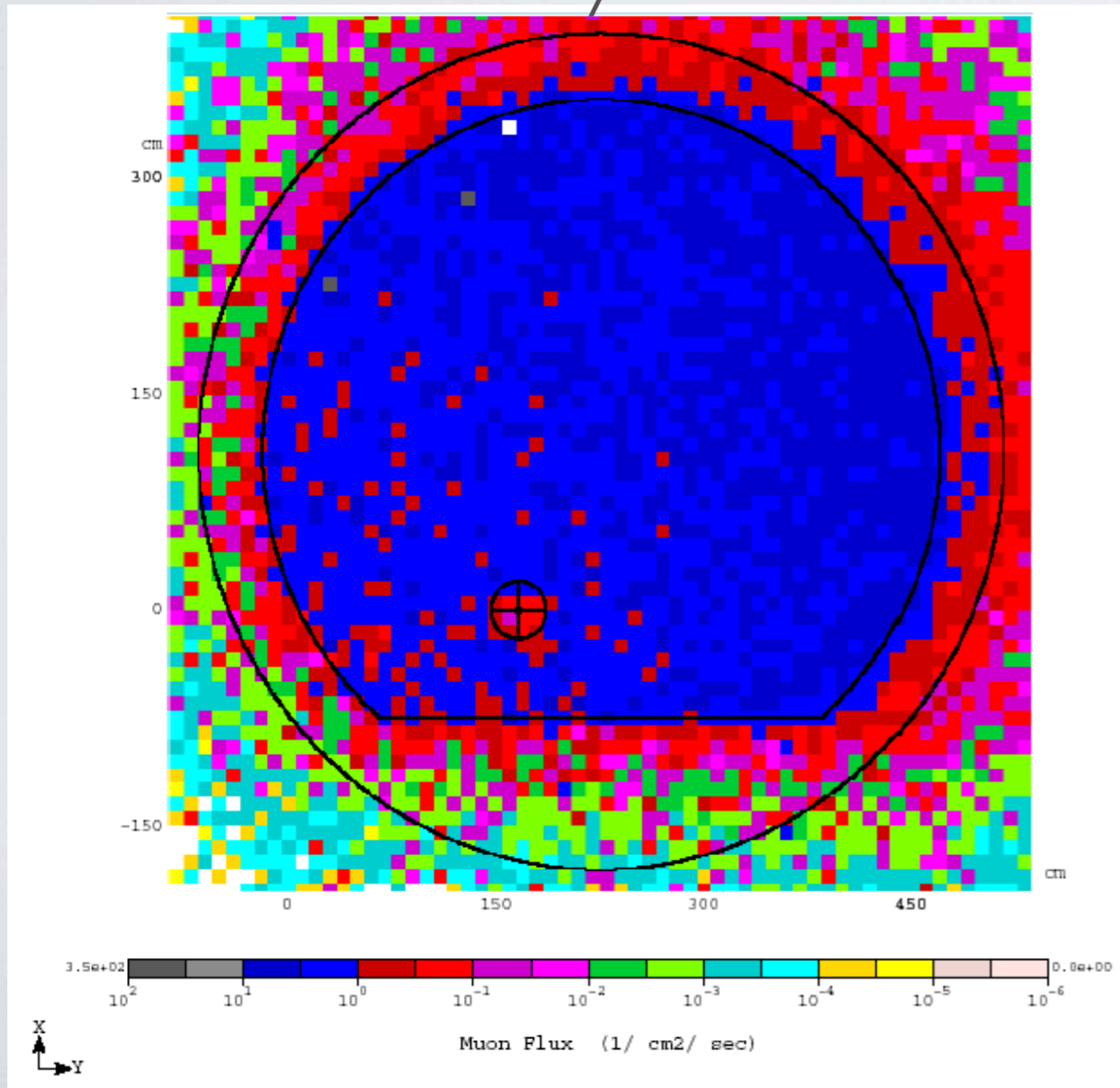
Snowmass

$10^0/\text{cm}^2/\text{s}$

muon density in tunnel

muon energy : $E_b=250\text{GeV}$

MARS15

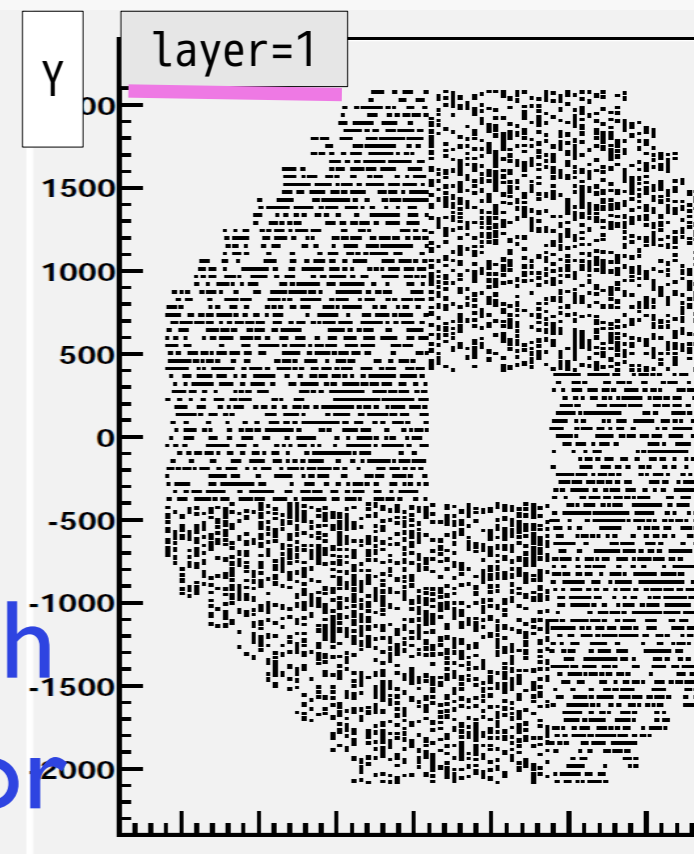
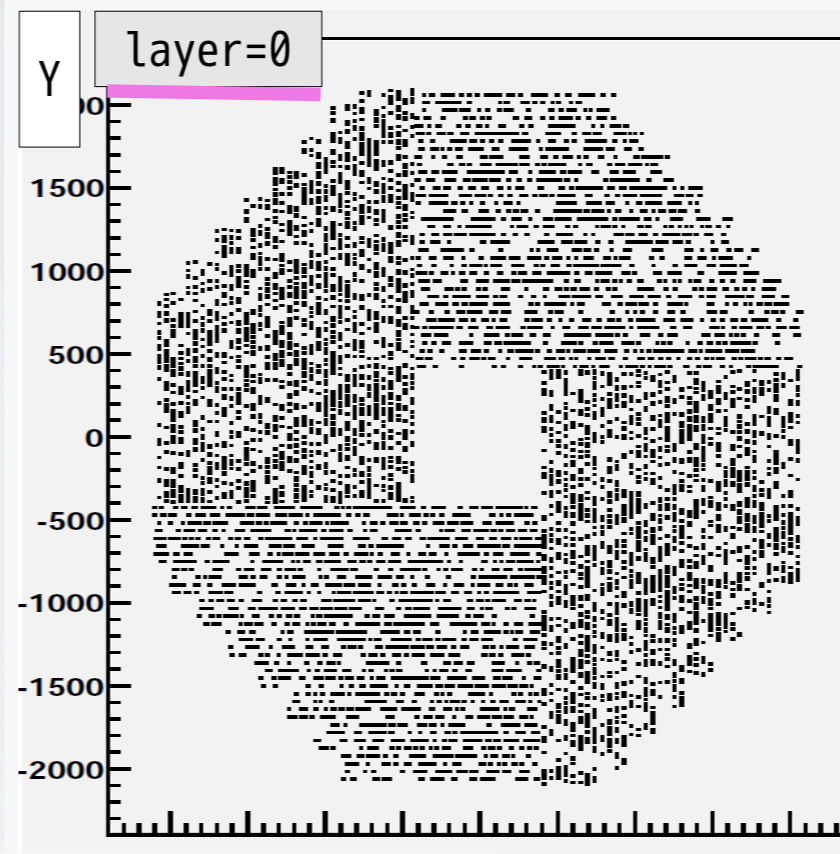
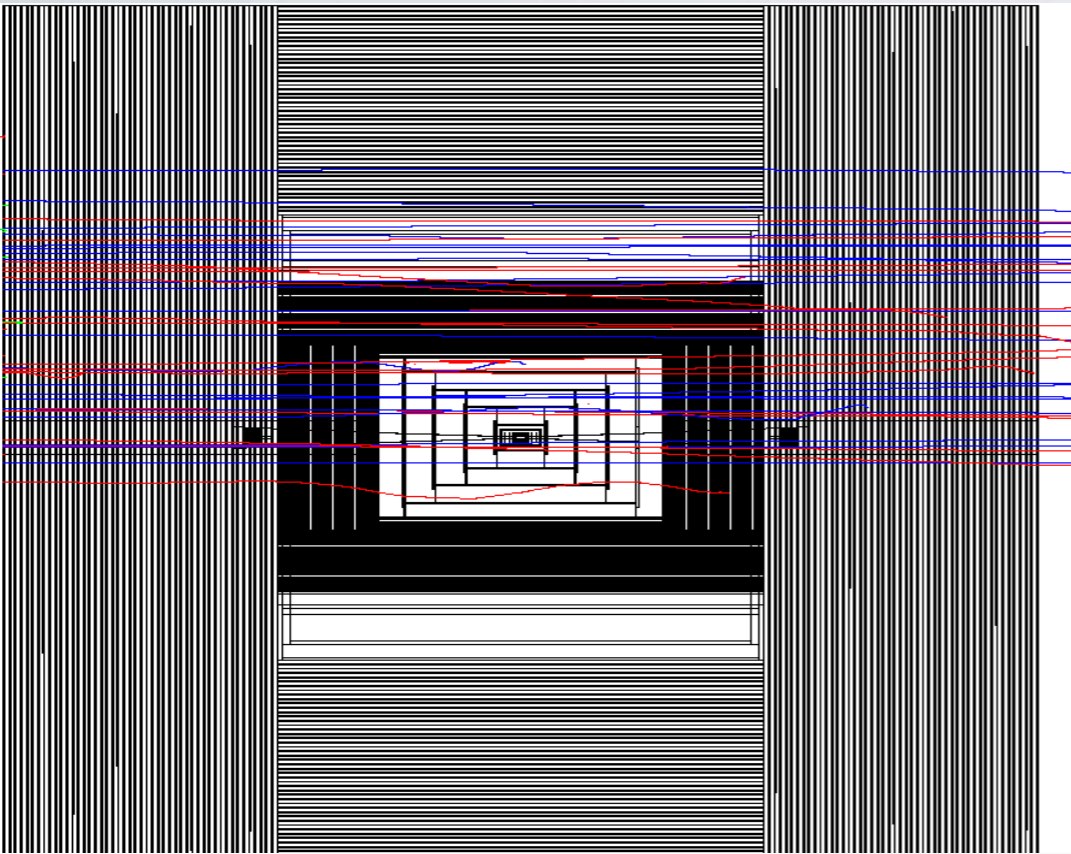


CAL. CALIBRATION CONT.

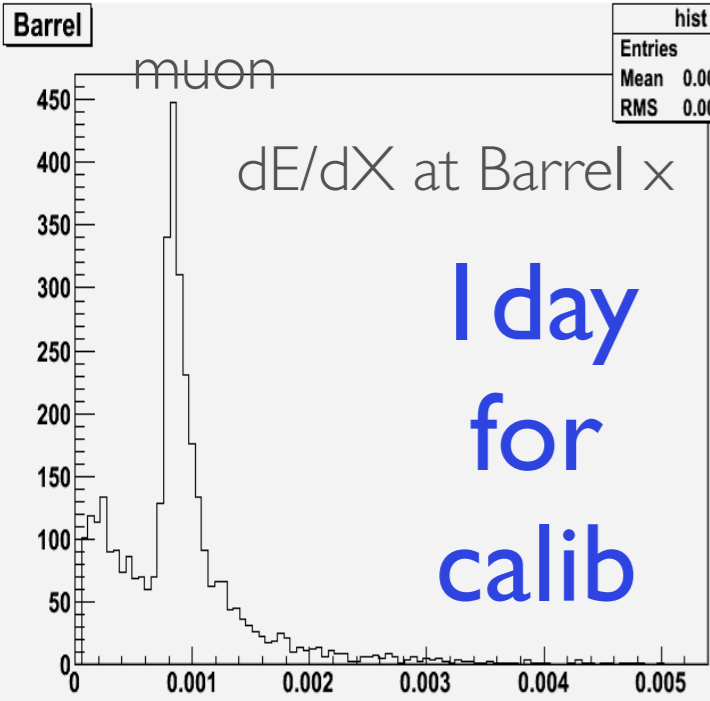
can be reduced $10^{-3}/\text{cm}^2/\text{s}$ by spoilers

SiD

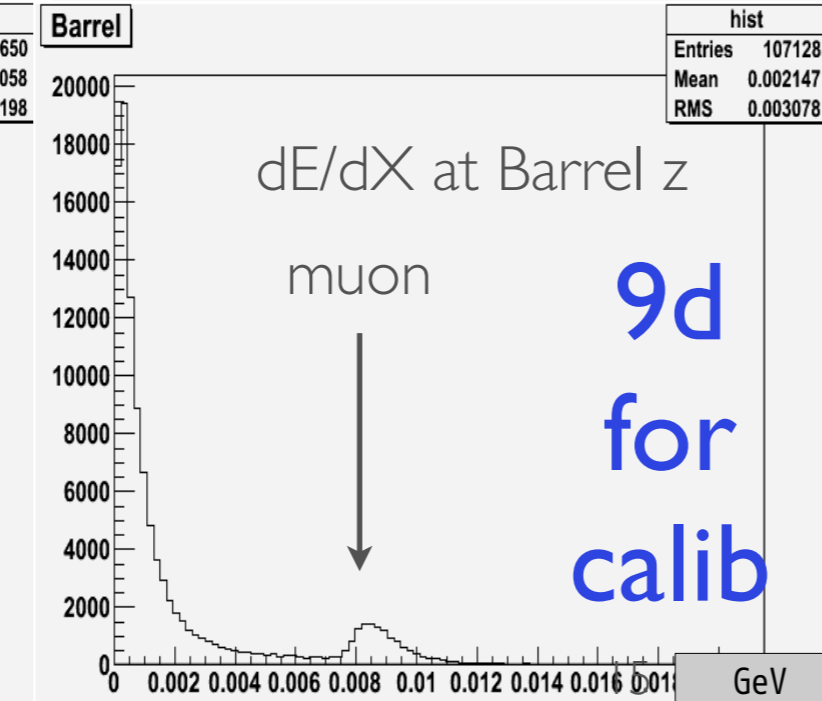
ILD EndCap



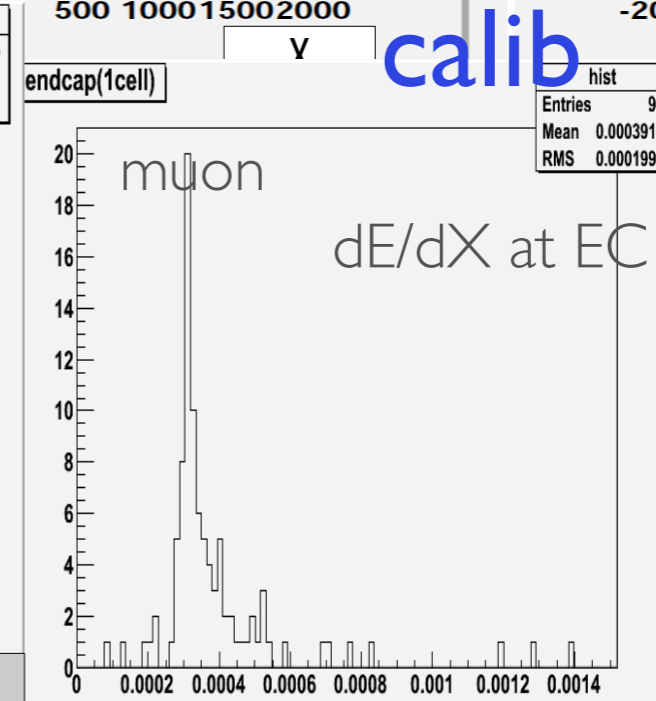
3h
for
calib



1 day
for
calib



9d
for
calib



calibration time

SUMMARY AND OUTLOOK

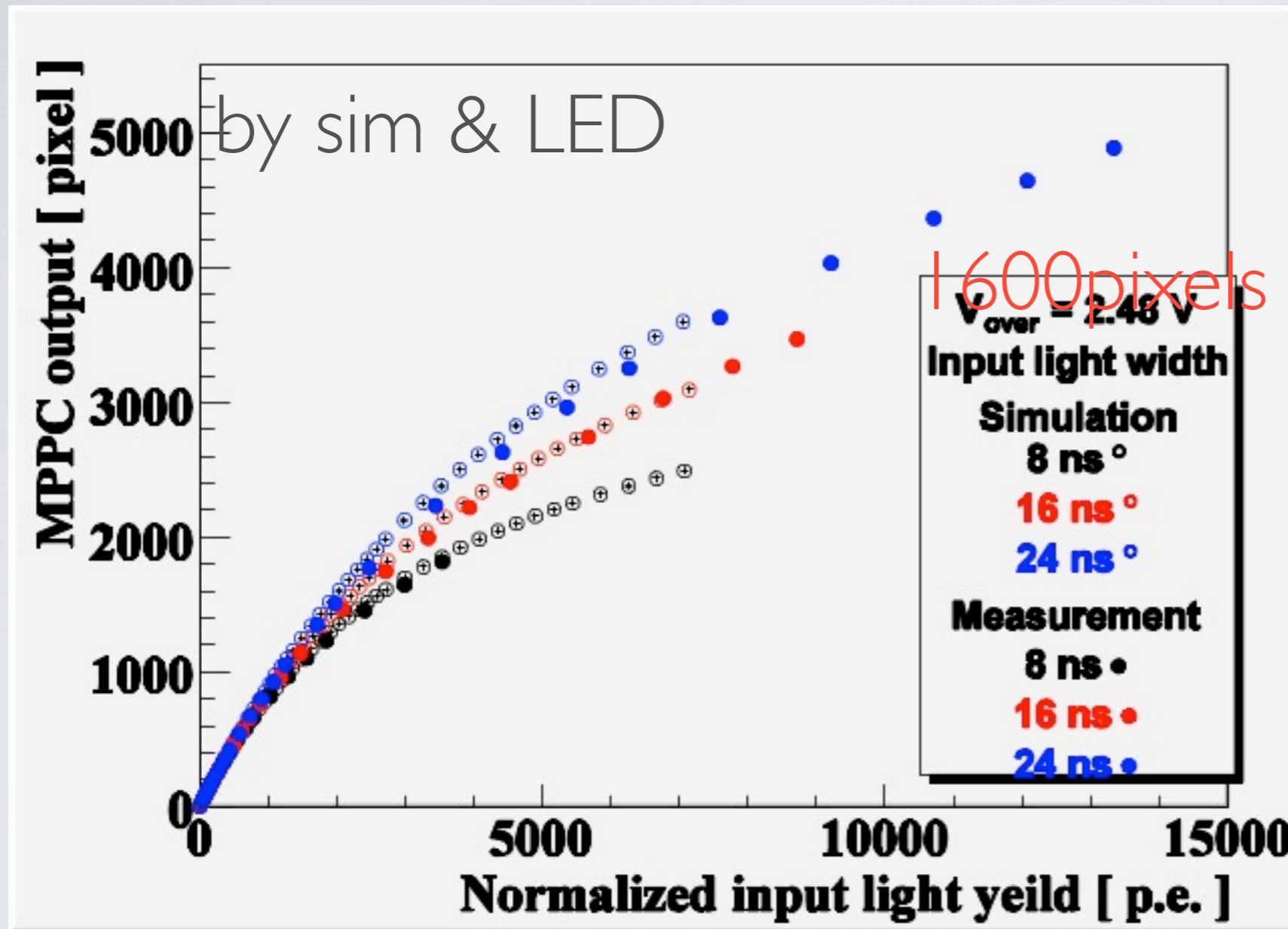
- ◆ We got budget for 5 years for ILC detector R&D
 - silicon ECAL + scintillator ECAL, toward Hybrid ECAL
 - collaborative work with French silicon group
 - mass production issue
 - strip scintillator HCAL

- ◆ strip scintillator R&D
 - photo-sensor development and understanding saturation
 - toward engineering prototype module

- ◆ FNAL beam data analysis
 - temperature correction and LED monitoring

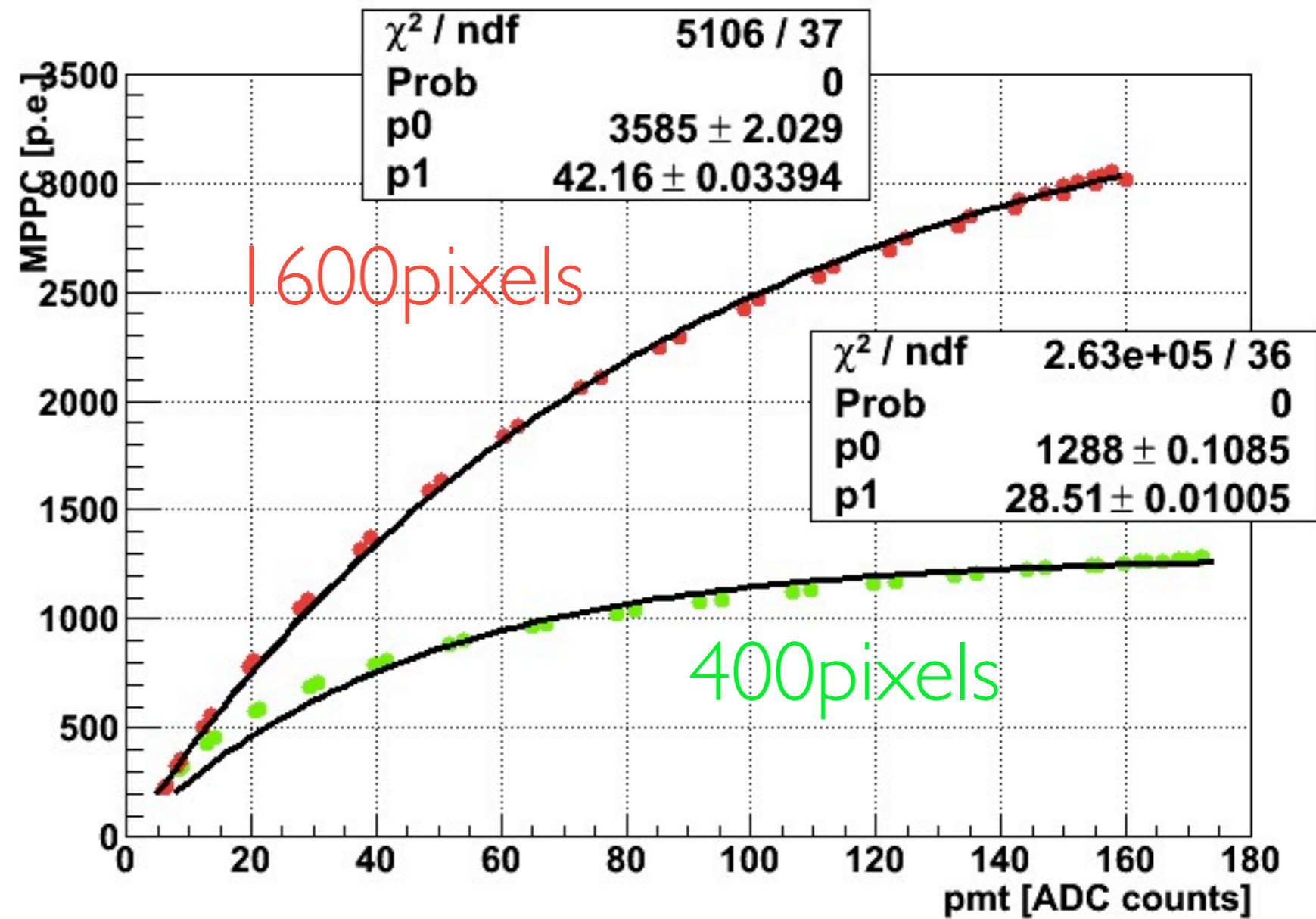
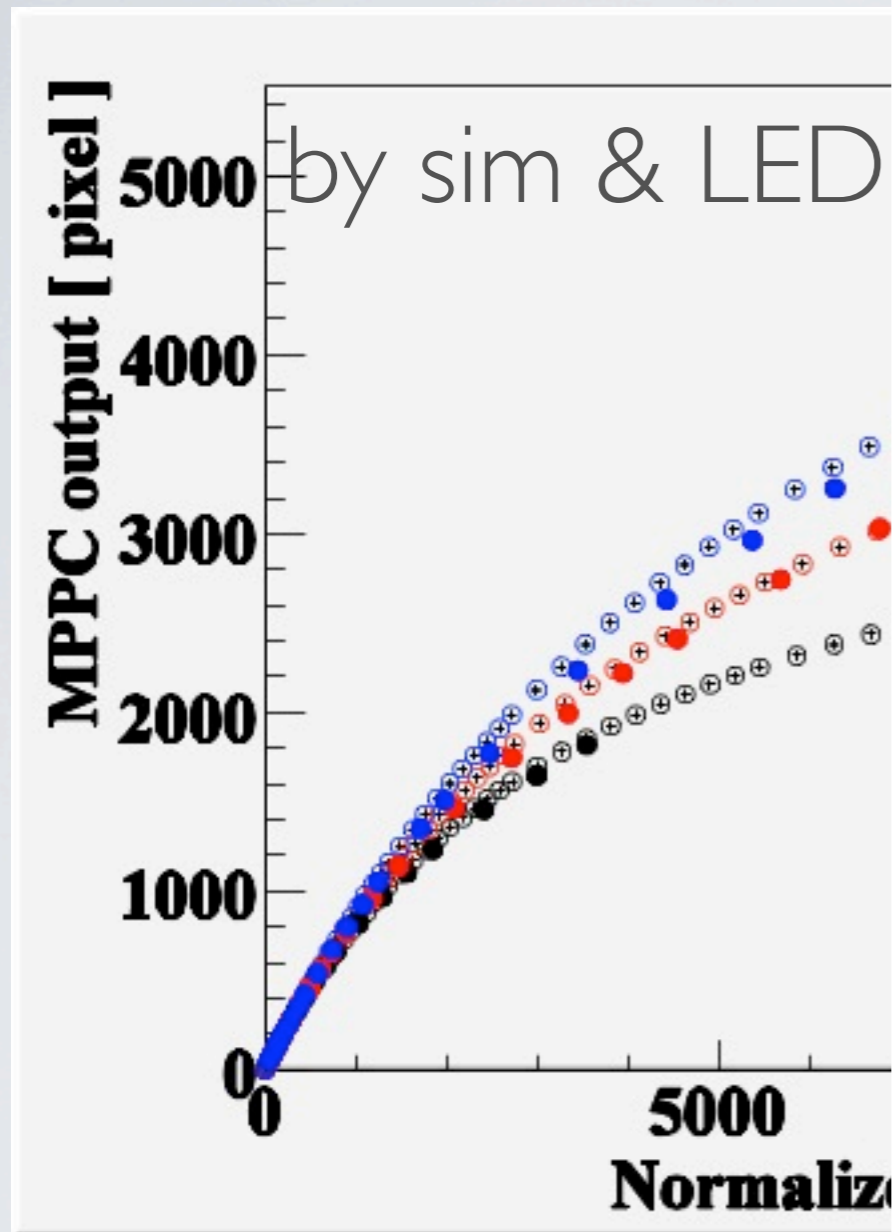
two post Doc. researches will show up

MPPC SATURATION STUDY



simulation
small number of pixels

MPPC SATURATION STUDY



simulation
small number of pixels