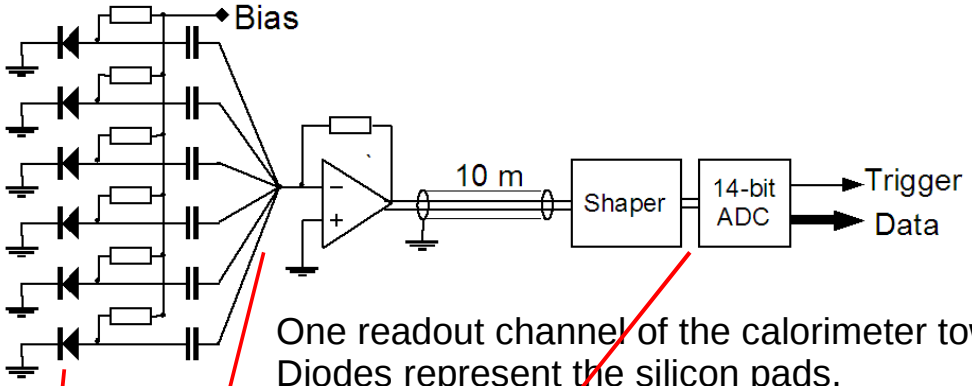
FOCAL Electronics

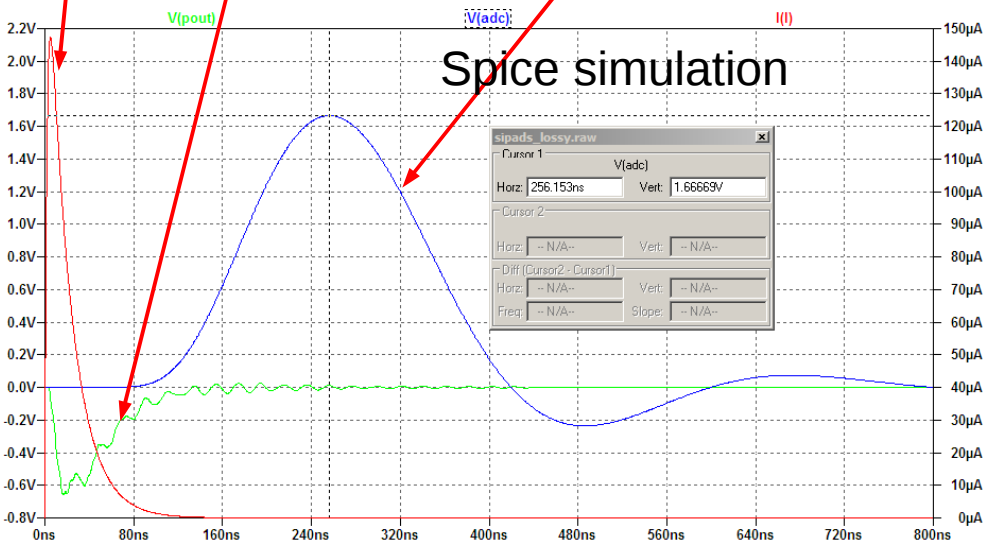
Andrey Sukhanov, BNL

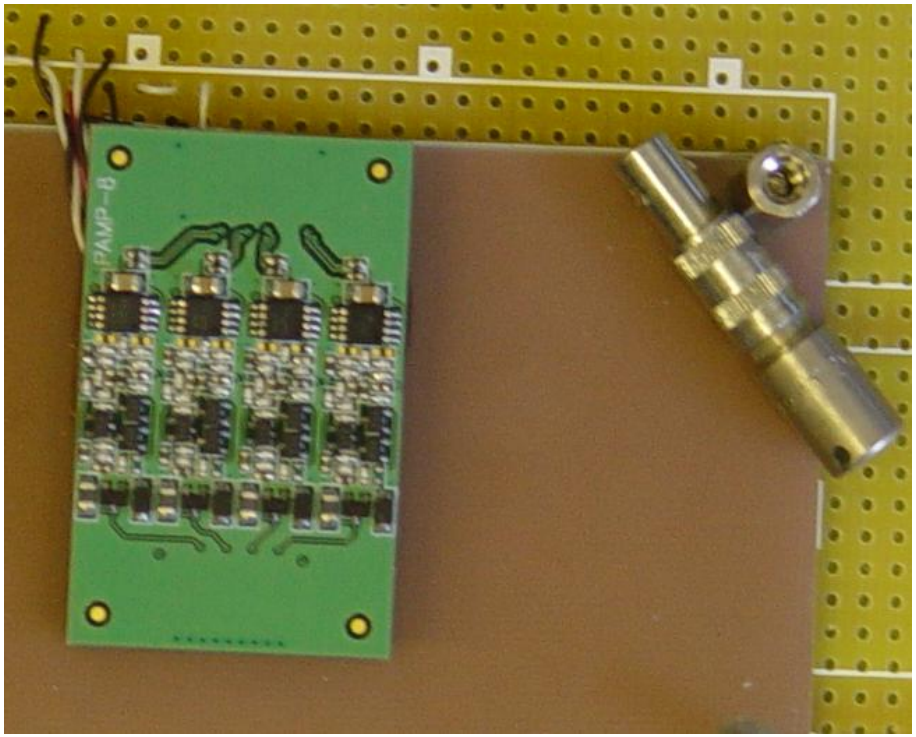
- Readout of Pad Sensors
- Readout of Strip Sensors
- Summary, Readiness for the Test Run in June

Readout of Pad Sensors



One readout channel of the calorimeter tower.
Diodes represent the silicon pads.



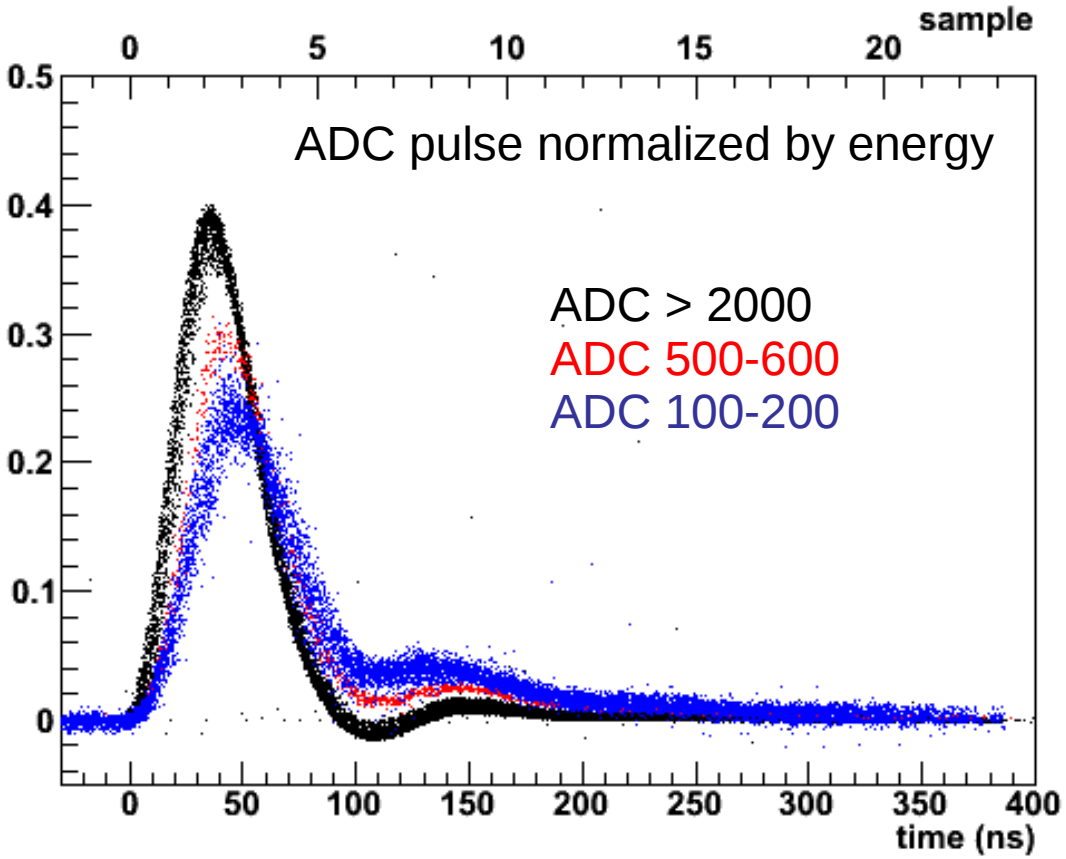


8-channel preamplifier

ADC clock 50 MHz,
Digitization time = Shaping time + ADC latency
= 400ns + 8*20ns = 560 ns

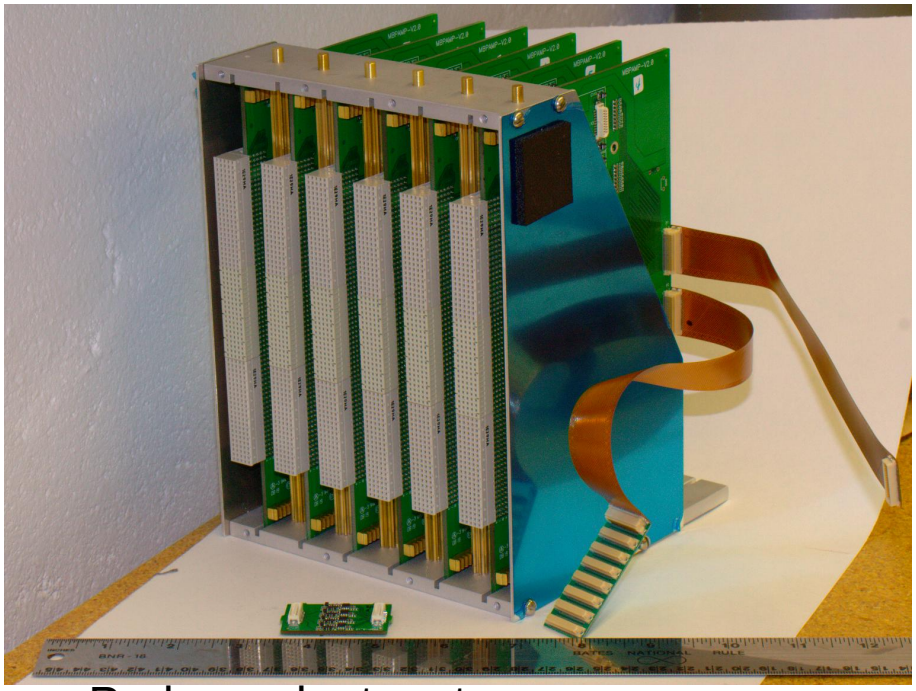
2007, Pulse Shape Energy Dependence

Measured during CERN test beam run in 2007



Pads Readout, May 2009

Partially assembled calorimeter brick.

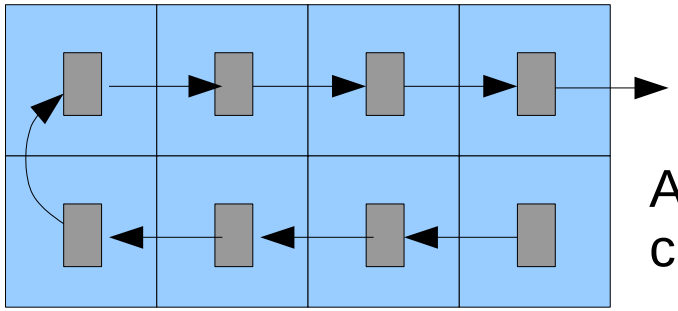


Pads readout crate,
preamp and summing board.

<u>For the test beam run at CERN, June 2009.</u>

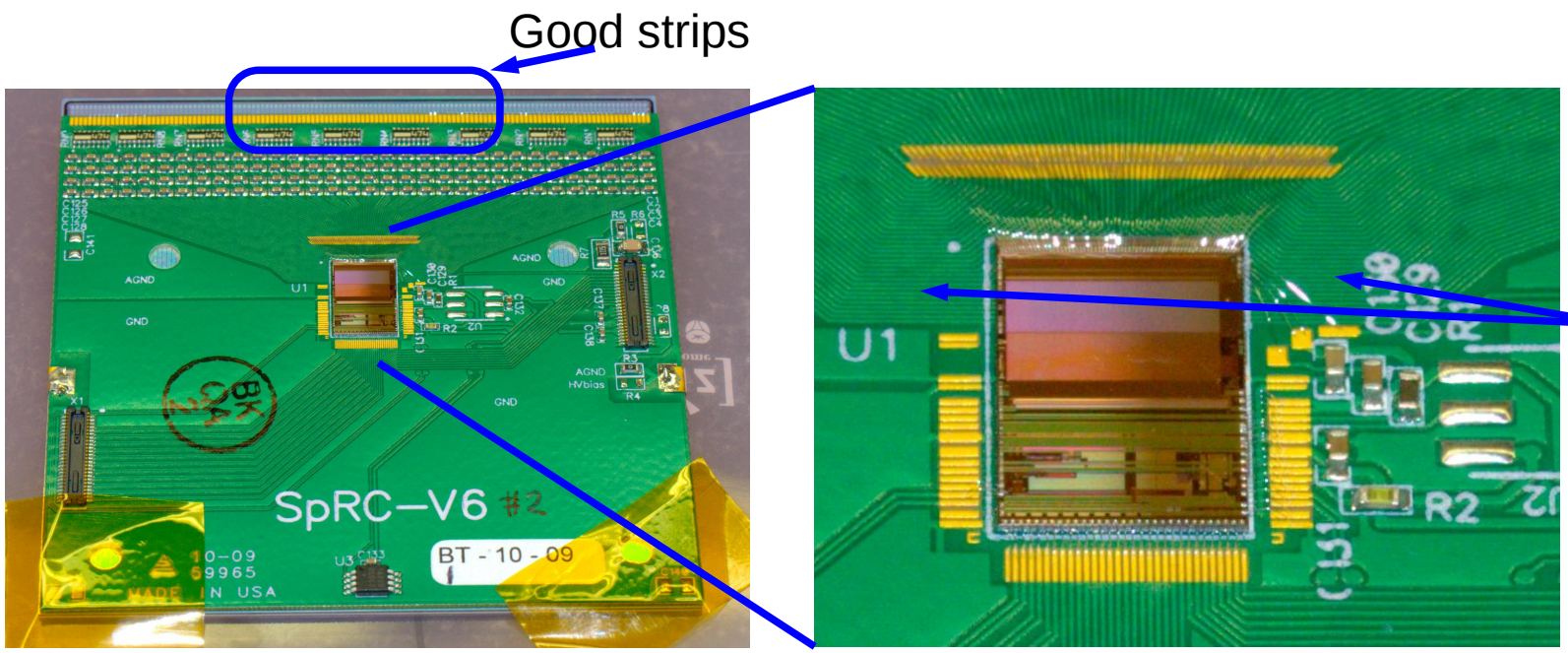
- Mechanics for 3 of segments, in each 2x8 sensors, 7 layers.
- Only 2x4 sensors will be populated,
- Total 192 digitized towers.
- 12-bit ADCs (from HBD), no shaping.
- PHENIX standalone DAQ

Readout of Strip Sensors using SVX4 chip



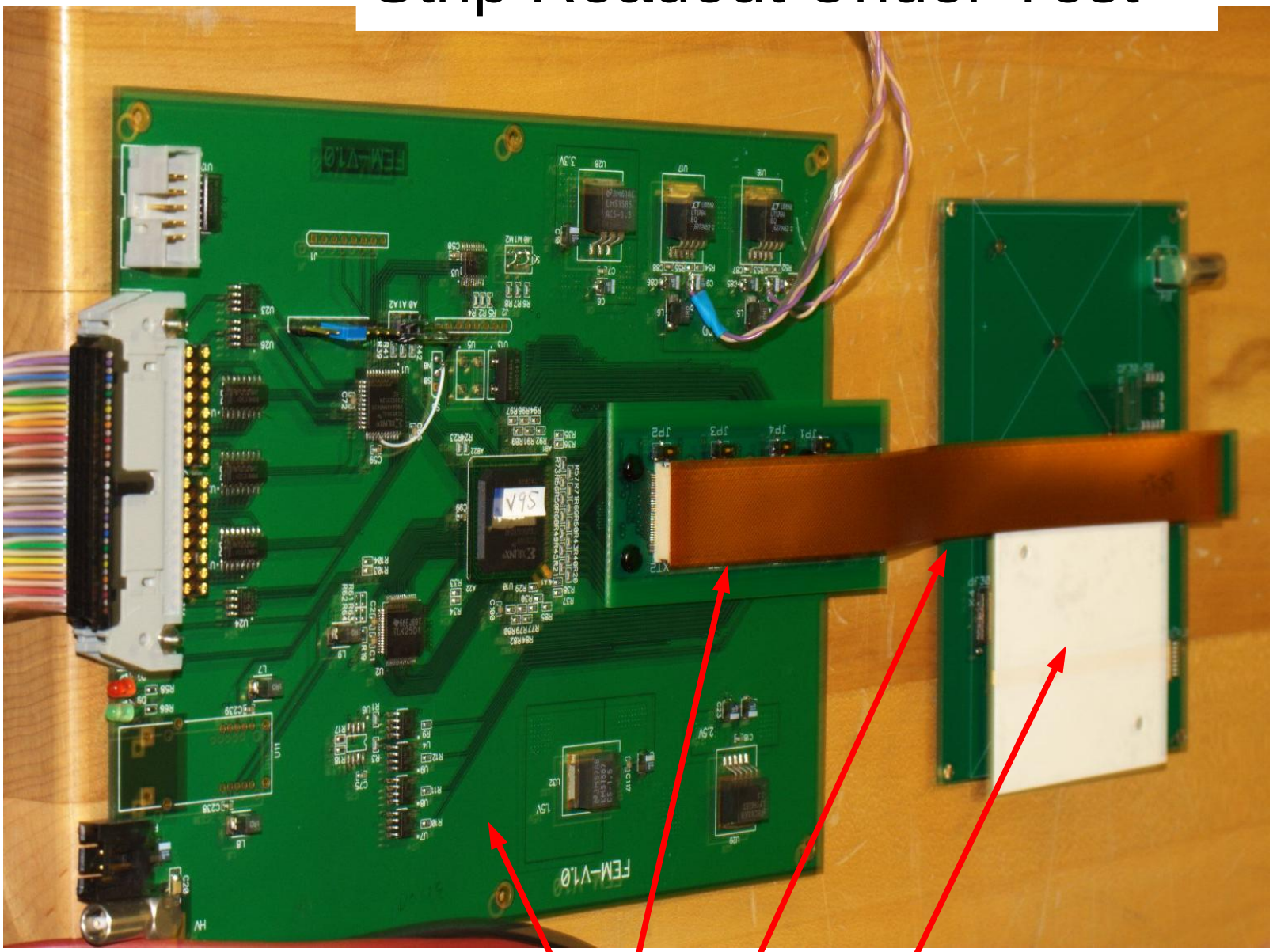
Any individual sensor could be bypassed.

Readout chain of strip sensors.



Readout card, mounted on top of the strip sensor

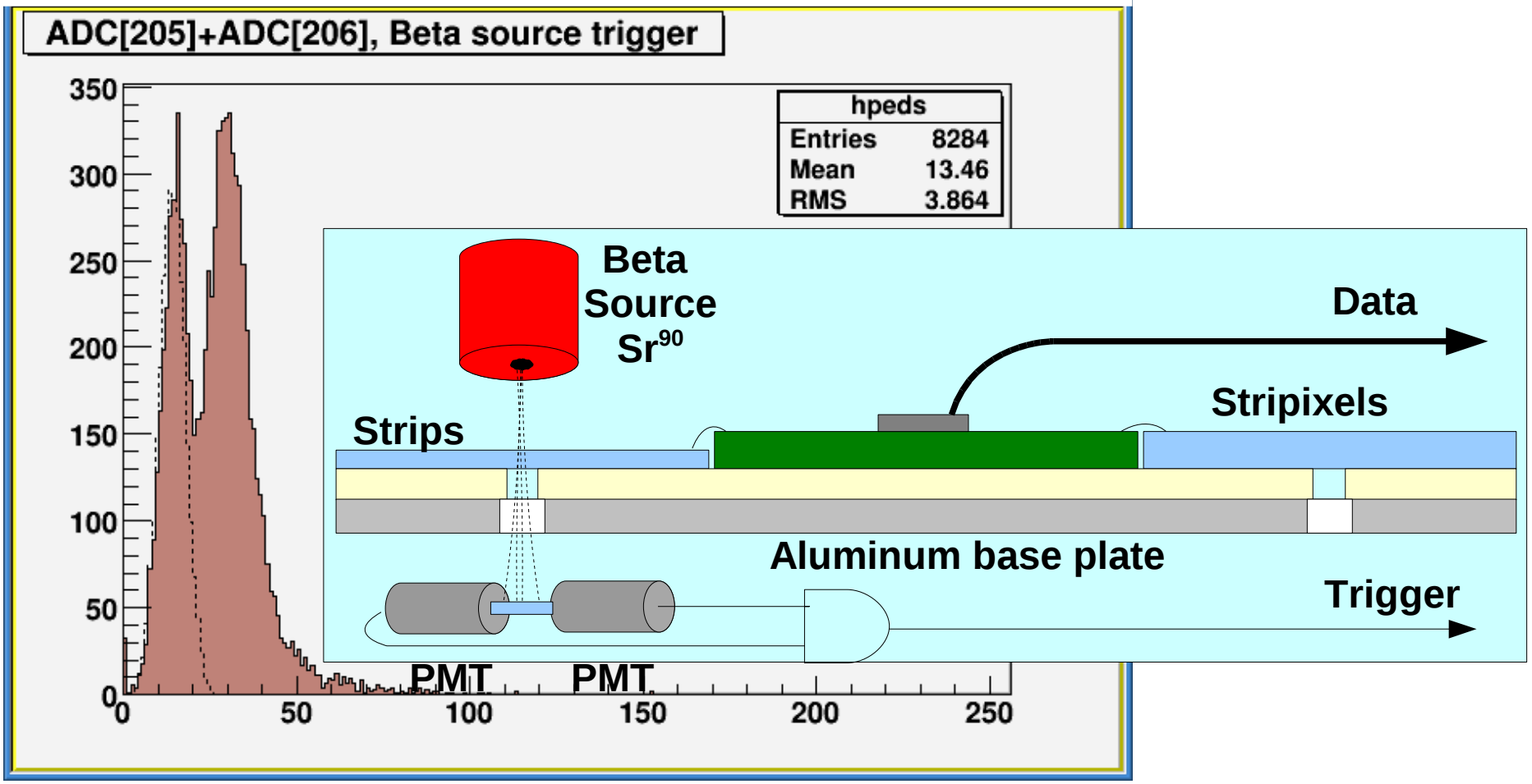
Strip Readout Under Test



- FEM
- Connector adapter for 5 StripCars
- StripCar1
- Strip Micro-module.

Jan. 2008 test with the Beta Source Sr^{90}

Readout card is on the side of the sensor.

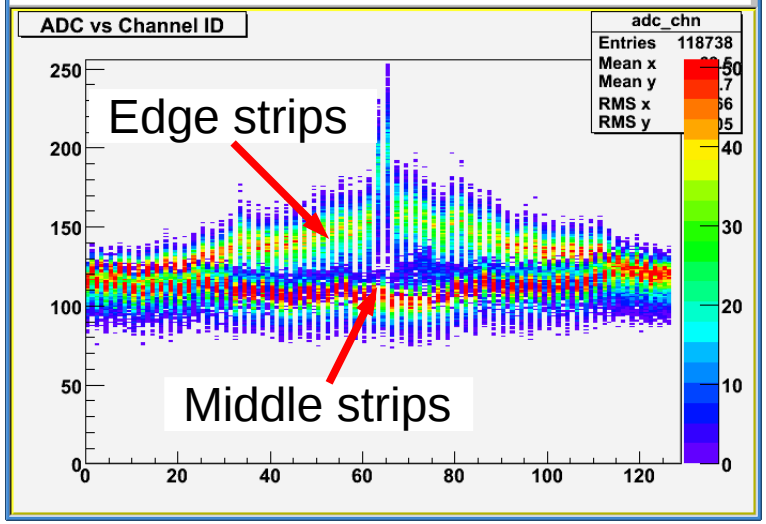


Sum of amplitudes from two adjacent strips. The dashed line – from the pedestal run. The MIP peak is clearly seen.

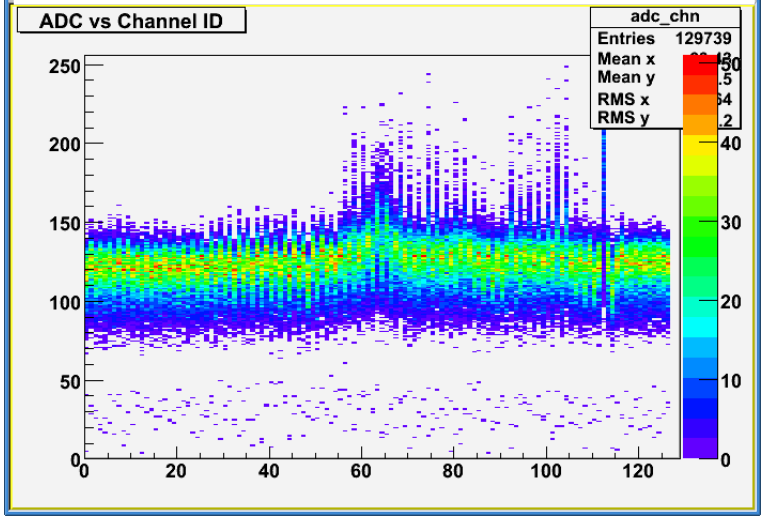
Strip Readout, May 2009, Preliminary

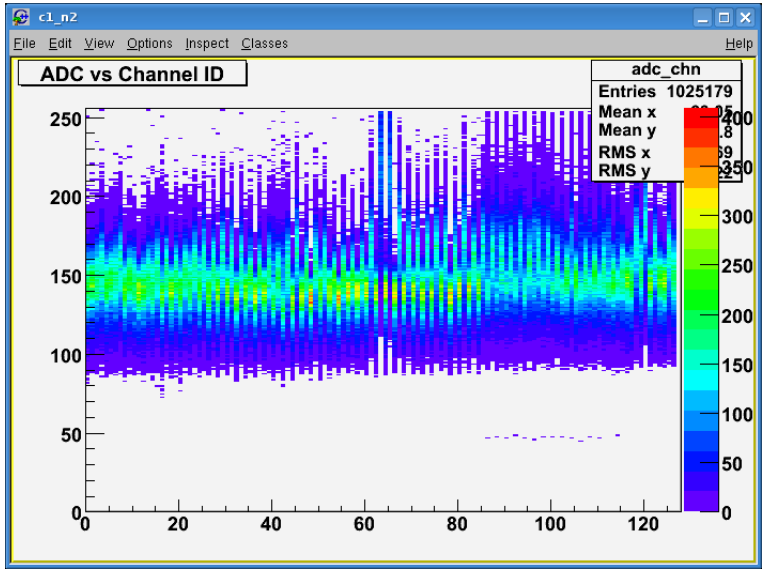
Readout card mounted on top of the sensor

Sensor not attached.

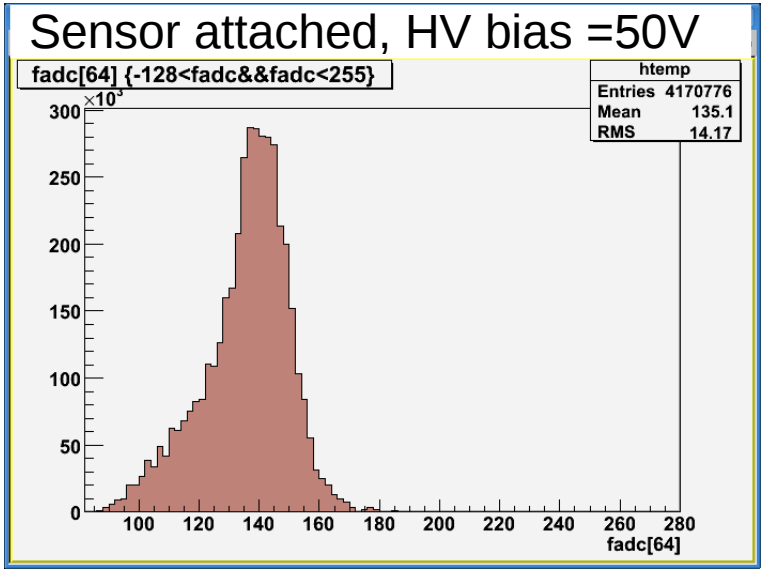


Sensor attached, HV bias =0.

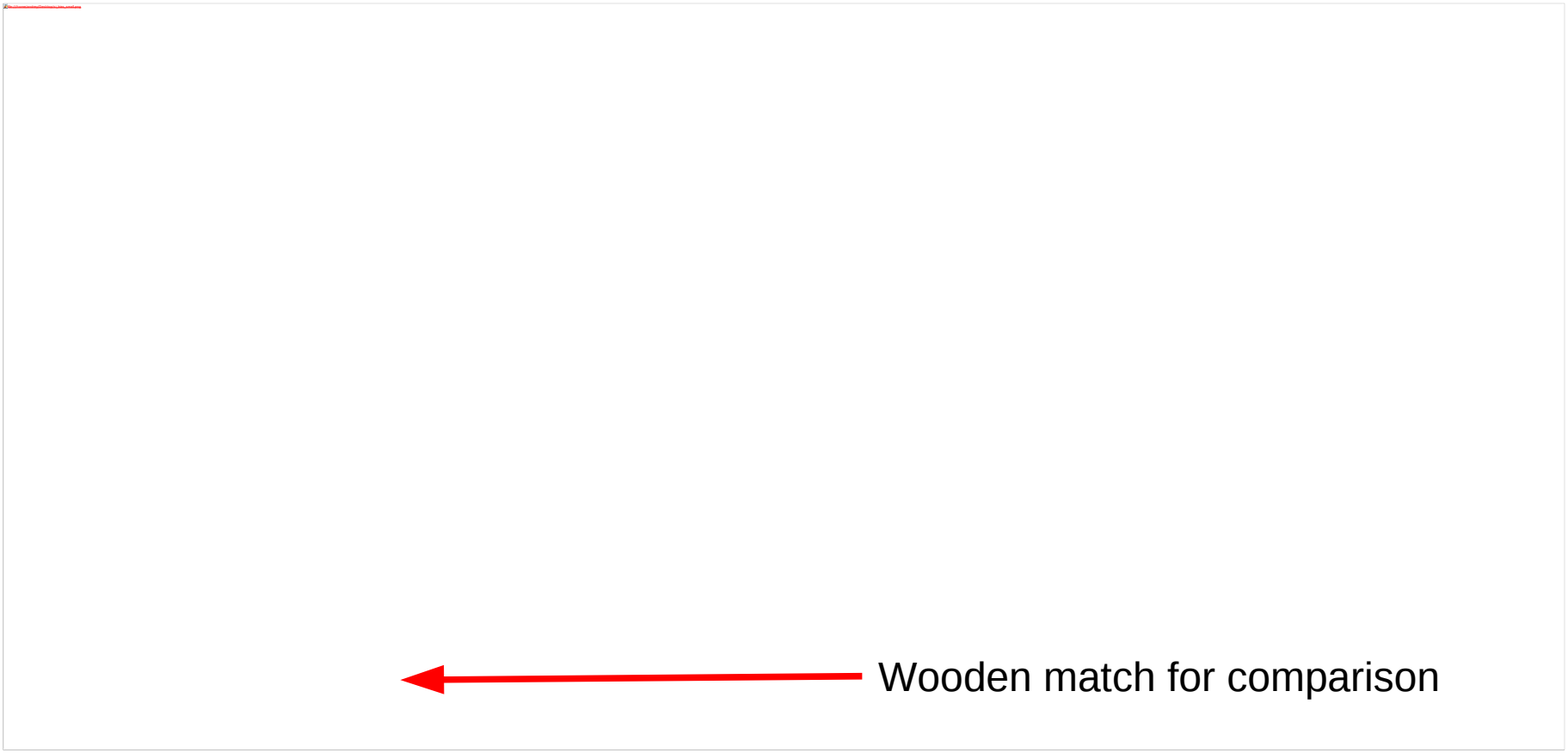




Sensor attached, HV bias =50V



Bias for Silicon Detector



8-channel Bias Module for Silicon Detectors

Product of HVSys, Dubna, Russia

This system is already in use for RHIC polarimeters at BNL.

Summary, Sys. Prototype Readiness

Pads

•Preamplifier hybrids: manufactured, and 50% tested.
•Carrier boards: ready.
•Pad Micromodules: assembled and tested.
•Motherboards and crate: ready, backplane – expected soon.
•ADC system: for prototype – HBD ADCs, PHENIX standalone, ready
•The whole system is ready for testing.

Strips

•Strip Readout Card: Issues with digital noise pickup, warpage. For production need of pitch adapters. Second batch being assembled.
•Strip Micromodules: Assembled 14 modules of first batch, needs wire bonding.
•FEM: manufactured and 2 units tested.
•Standalone (not PHENIX) DAQ.

FOCAL PCBs

Pads

1)CAR8
2)CAR10
3)INTC
4)Summing board, 5 versions
5)Flex Jumpers
6)Flex Cables
7)Preamp
8)Motherboard
9)Backplane
10)Preamp test board

Strips

1)SpRC, 2 versions
2)StripCAR8
3)StripCAR1
4)FEM
5)Cross connector 4->5
6)Flex cable rotator
7)Flex to twisted pairs