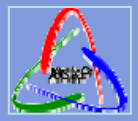
universitätbonn

panda

Agenda

MVD panda

09:00 - 09:20	D.-L. Pohl, Juelich	ToT digitalization.
09:20 - 09:50	G. Mazza, Torino	Status report of the readout architecture design for the silicon pixel detectors.
09:50 - 10:20	G. Giraudo, Torino	Mechanics update.
10:30 - 11:00	Coffee	
11:00 - 11:30	Th. Wuerschig, Bonn	Implementation of a dedicated routing concept for the updated MVD model.
11:30 - 13:00	KTB/all	Route towards the TDR for the MVD - discussion.



Towards the TDR

- Timeline: publish 1 year from now
- Select editorial team
  - Simulations
  - Electronics: Readout, Sensors
  - Mechanics
  - ...
- General outline, chapters etc. to be determined

Inspiration from earlier work: Meetings 2006/2007

Transparencies from Torino and Jülich meeting for reference

Turin, Oct 24/25, 2006

Simulation task sheet - I

- variation of pixel size and shape

  [50x400 µm²]; 100x100 µm²; 50x200 µm²; 200x50 µm²

(different relative orientations of layers)

- dead zones of sensors / overlap?

- strip optimization with respect to shape, pitch, ...

- structural support, services (cables, cooling,...) <-> R&D

(inhomogeneous distributions, areas to put things)

- rates, rate distributions, energy deposit, global and locally,

- variation of sensor thickness (less than 200 um -> 100 um?) including signal resolution

- positions of forward disks, number (and layout) of disks; strangeness vs. charm

- barrel layer radii

Simulation task sheet - II

- effect of target pipe hole – constant radius vs. constant angle
- time ordering (beam fluctuations on various timescales; overlapping)

(cf. electronics simulations)

- INPUT: efficiency / purity requirements -> optimize DD resolving power
- limited amount of variation -> key parameters ?
- keep a number of constraints that are already “established”, respect boundary conditions!
- optimize DD, then check background performance
-

Electronics simulation task

- latencies (simulation of readout chain)

Interfacing

DAQ group

- timing / latencies (simulation of readout chain) ?
- definition of interface to DAQ; preprocessing on detector ?
- “trigger” within triggerless environment / buffers on different levels and time constants; ordering of events ?
- slow control ? => collaboration / Lars
- calibration events

R&D task sheet

ATLAS

- thermal load for different pixel options (ATLAS vs. custom)

(x W, less for custom, vs. y W / module)

removal of power density; other issues with 90 MHz ATLAS

- full characterization of ATLAS @ 90 MHz
- redo MCC <-> readout controller
- (smaller sensor)

R&D task sheet

Custom .13 um

- input pixel cell size 100 x 100 / 50 x 200
- minimum pixel cell size 75 x 75 (CBM)
- feasibility of front end 2 cm wide vs. larger pixels in some rows and columns
- serial power scheme vs. parallel powering
-

R&D task sheet

Strips

- minimum thickness for double-sided process
-

R&D task sheet

General issues

- thinning sensors / front ends
- dead zones on sensors
- (pixel) sensor should be 2 cm x X cm (target pipe!)
- readout
- cooling
- cables
- structural support, services, cables, cooling <-> simulations
- grounding and shielding; outer cover for the structure (aluminized mylar O(10u with wire support))
- two halves, more sections <- beam
- slow control, e.g. hardware interlocks, monitoring
-

MVD task sheet

Sensor - Pixel	
silicon	Jülich/Torino
epitaxial silicon	Torino/Trento
SiC:H	Catania
GaAs:Cr	Protvino
Sensor - Strip	
silicon	Dresden/Trento

Decision, 1(+1) option 07/ 2008 -> TDR 12/2008

MVD task sheet

Frontend - Pixel	
analog and digital	Torino/Jülich (ATLAS?)
bumping, thinning	
Frontend - Strips	Dresden /”commercial”/ (GSI with CBM)

MVD task sheet

Hybridization - Pixel

analog and digital — Torino/Jülich (ATLAS?)

bumping, thinning

Hybridization - Strips — Dresden /"commercial"/ (GSI)

low mass cable, cooling

MVD task sheet

Readout controller – Pixel Jülich

Readout controller – Strip (with front end)

Opto-transmitter

MVD task sheet

Mechanics	Dresden, FZJ, Torino
Cooling	Dresden, FZJ, Torino

Off-detector electronics

Power supply system

Detector control system

Strips

Front End:

- Xyter: evaluation of (next generation) version for PANDA

~ 100 chips needed

• aim for / look at: power dissipation, dynamic range, speed, energy + time resolution (noise), radiation tolerance

• define minimum requirements acceptable for PANDA MVD

(keep an eye on other options)

Strips

Sensor:

- number of strips / pitch / orientation
- D reco: 100 / 150 / 200 µm
- track deviation by angular scattering
- track matching with cables/services at different radii (between tracking layers or all collected at max. radius) [in particular for the forward disks]
- homogeneous vs. inhomogeneous
- disks as separate structures / building blocks? (large disks, disks including the pixel wall)

Strips

Sensor:

- baseline thickness 200 µm
- SIMULATION:
- pitch -> simulations of D secondary vertices (separation of secondary vertices)
- $D\bar{D}$ $D^{+}D^{-}$ $D\bar{D}^{*}$
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