Status of the Mainz Lumi activities

Achim Denig, Michael Distler, Miriam Fritsch,
Werner Lauth, Mathias Michel

PANDA Collaboration Meeting

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Institut für Kernphysik
JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Simulation

- Our design by now:
  - 4 silicon discs starting at 10.5 m behind the IP
  - 3-8 mrad
  - 50 cm inbetween
  - 150/300 µm thick
- Software
  - New track finder for Lumi
  - New track fitter for Lumi

  Discussion with Jülich group:
  - Digitalisation MVD/Lumi
  - Effects from magnets esp. Solenoid

Plan:

- Implement track finder and track fitter in PANDAroot
- Only one official package for all Silicon Strip Detector at PANDA

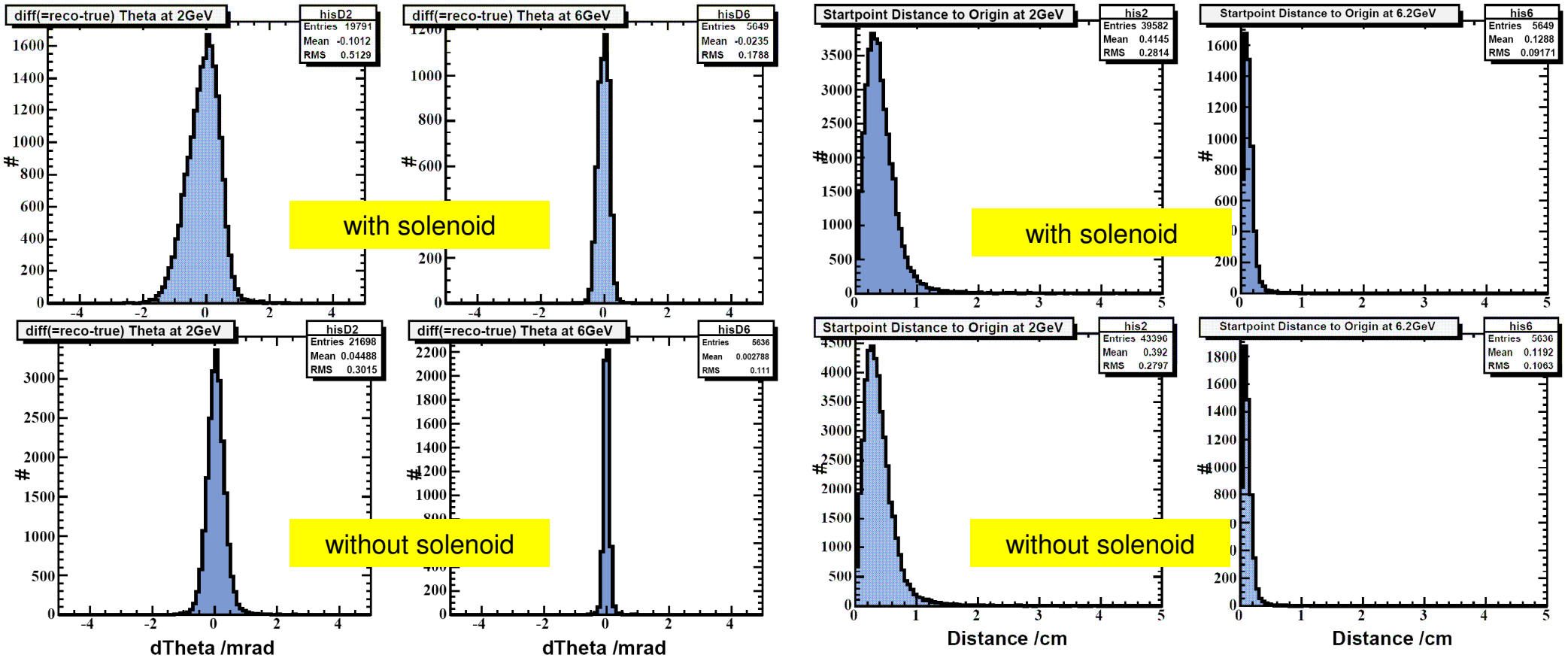
Resolution

Problems with bad resolution in theta and distance from IP (z=0):

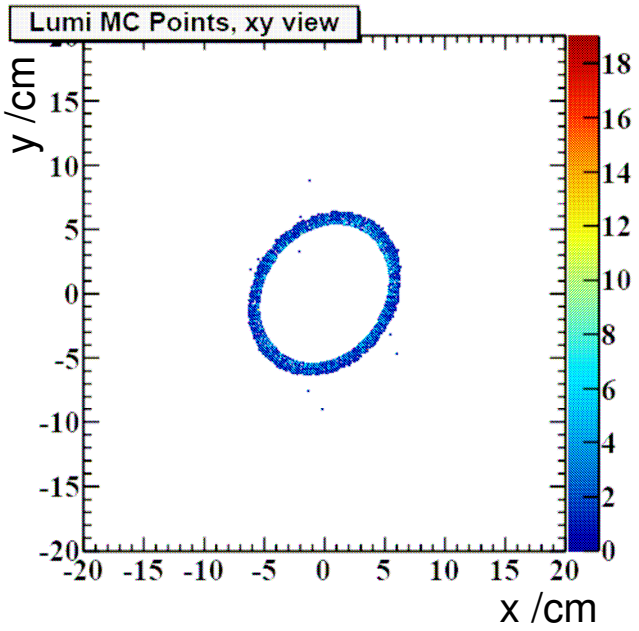
- Air instead of vacuum, if you comment out the beampipe !!
- Soleniod (Dipol not used yet)

Theta resolution

Distance from IP

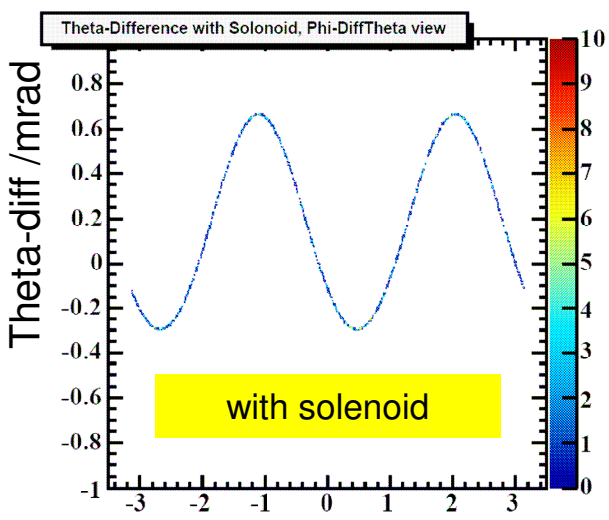


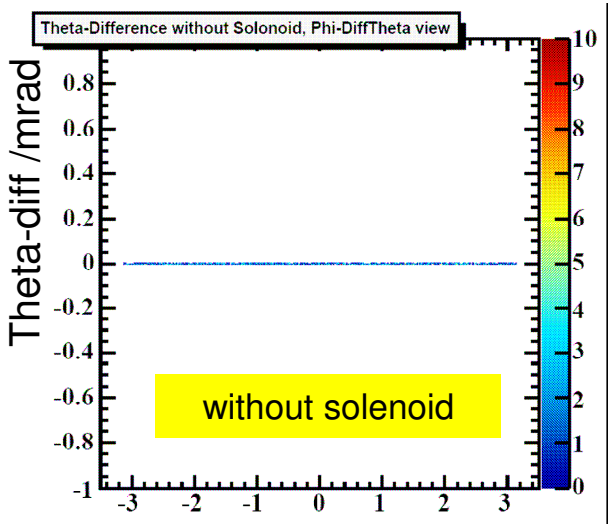
Theta and Phi deviations with solenoid

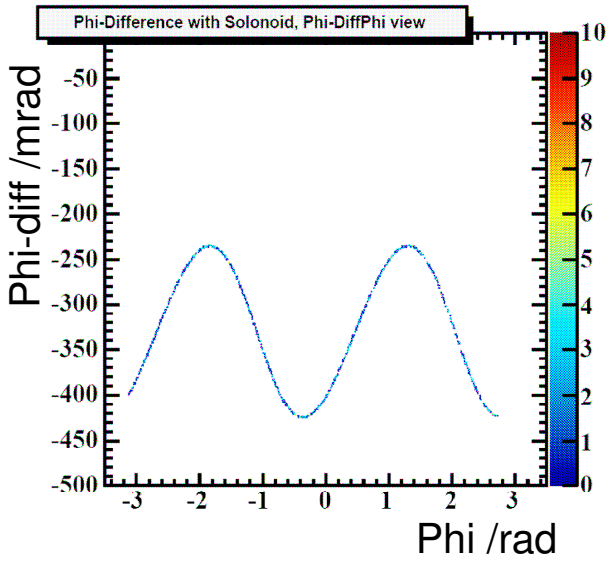


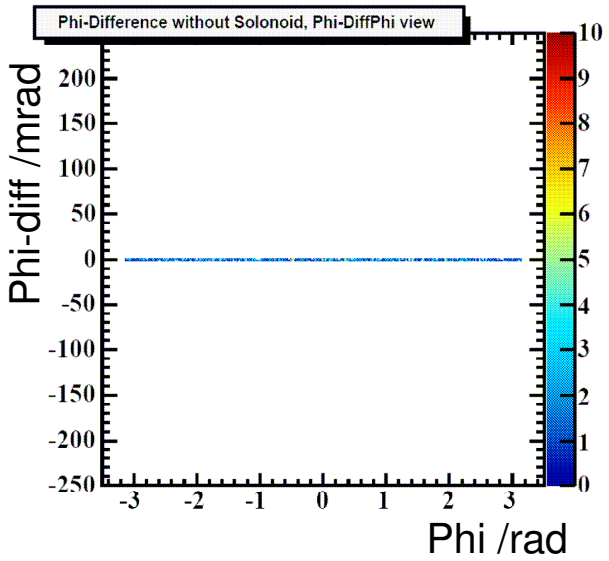
Box generator: momentum 2 GeV/c

theta 0.3 deg (5.2 mrad)

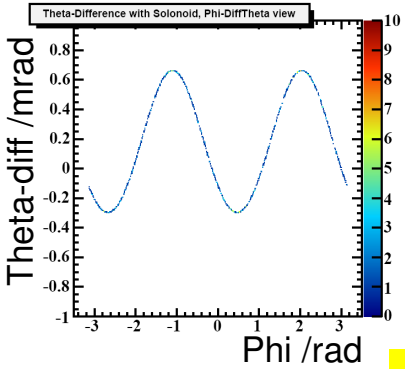








Theta and Phi deviations with solenoid

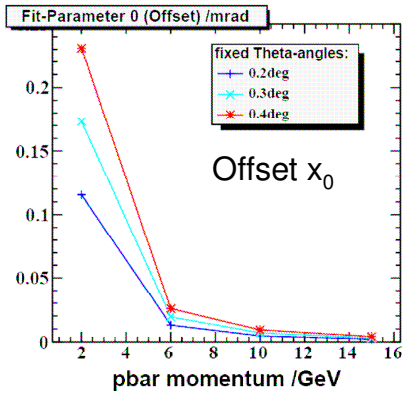


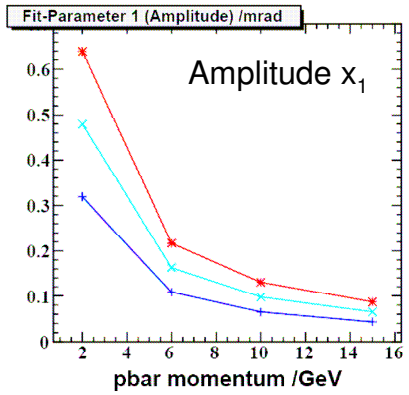
$$f(\varphi) = x_0 + x_1 \sin(x_2 + x_3\,\varphi)$$

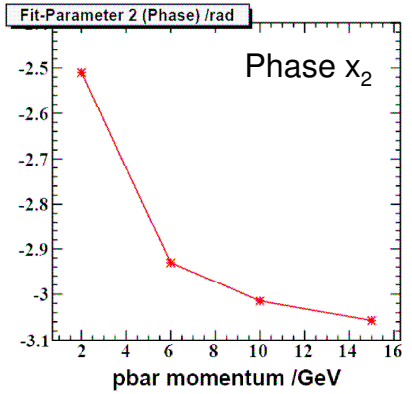
Box generator:
momentum: 2-15 GeV/c
theta: 0.2, 0.3, 0.4 deg
(3.5 - 7.0 mrad)

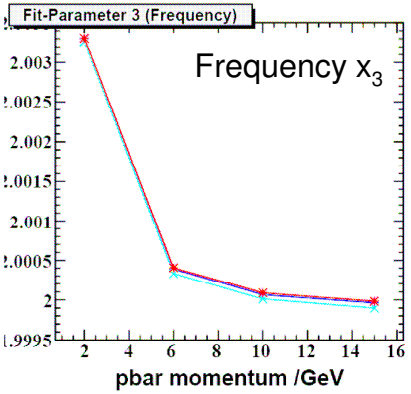
Redo the study with elastic events with beam momentum:
2-15 GeV/c

Theta-diff

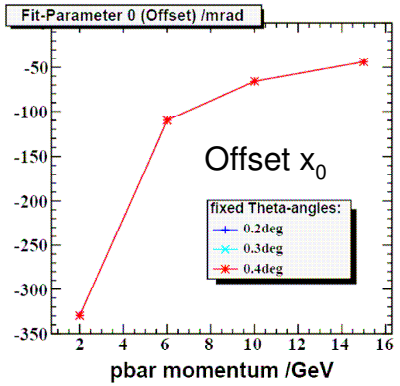


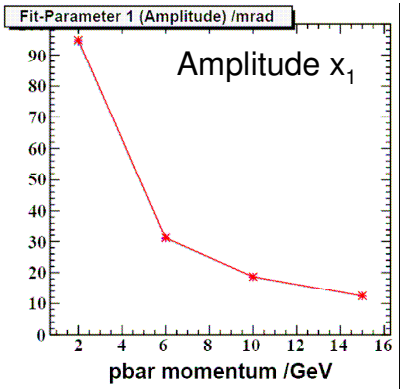


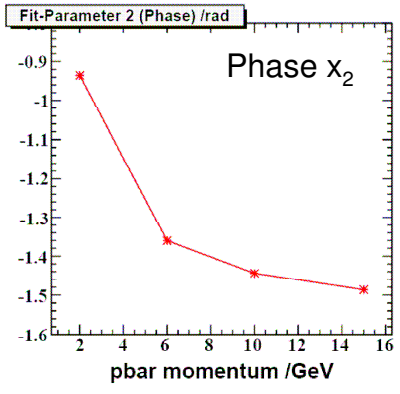


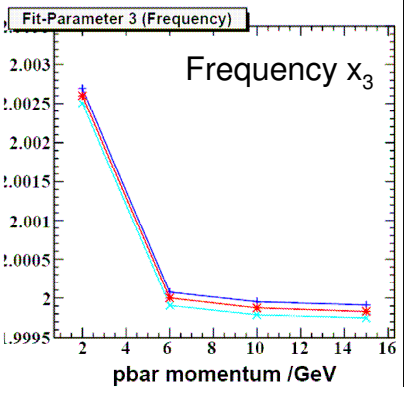


Phi-diff



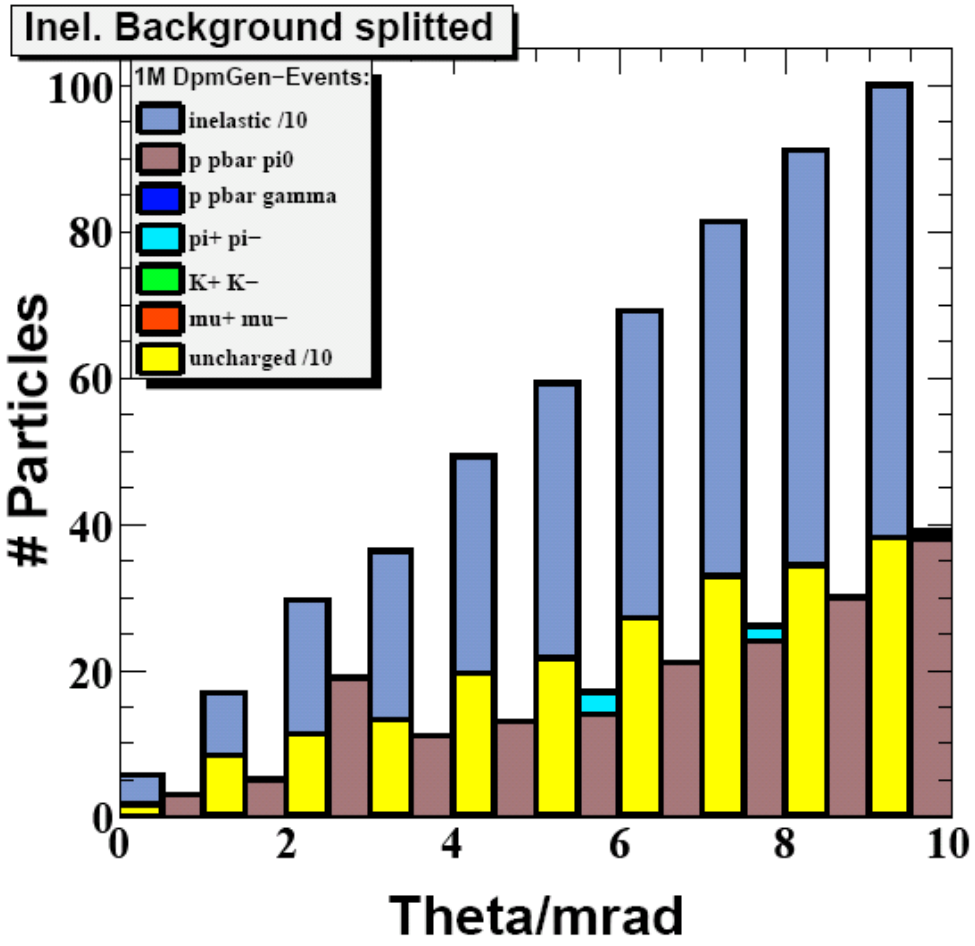






DPM-Generator (inelastic components)

- Splitted in charged and neutral particles
- $\bar{p}p \rightarrow \bar{p}p\pi^0$ ca. 5%
- Some $\bar{p}p \rightarrow \pi^+\pi^-$
- $\bar{p}p \rightarrow \bar{p}p\gamma$ missing



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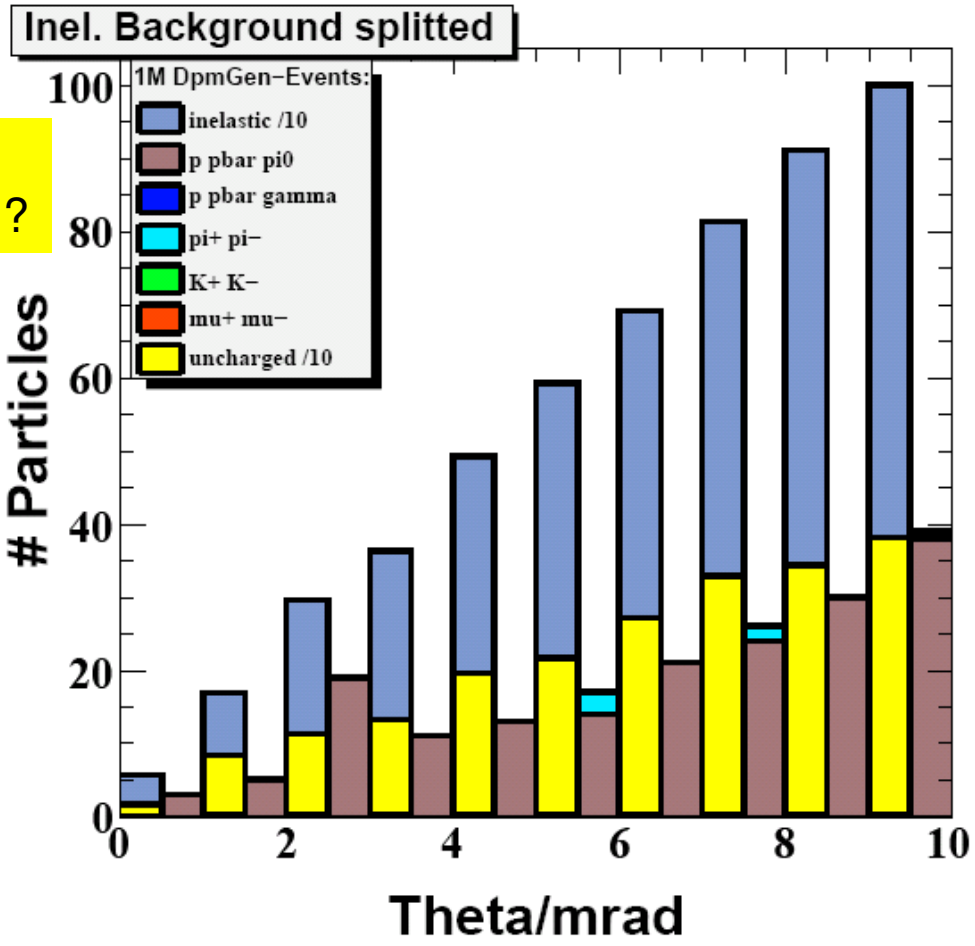
Correct implemented ?



Also missing:

- $\bar{p}p \rightarrow e^+e^-$
- $\bar{p}p \rightarrow \mu^+\mu^-$

$\rightarrow$ Info from the FF group

- $\bar{p}p \rightarrow K^+K^-$

New DPM with coulomb scattering and minimum angle available now !!

Backgrounds ToDo list

- Charged background
  - e^+e^- and $\mu^+\mu^-$
    Estimate for total cross section and angular distributions from FF group
  - $\pi^+\pi^-$
    Check angular distribution
  - K^+K^- ??
- Check about background from decay of neutral particles

Experimental Setup

- Vacuum Chamber from Erlangen
- Collecting information from MVD and Hyp
  - We started ordering electronics and DAQ parts
- Sensors
  - Looking for thin (<300 µm) double-sided sensors
  - Order together with MVD

Minutes June 2009

OPEN TOPICS:

1) Beampipe
   → Discussion starts in technical board on Thursday
2) B-Field
   → Investigation for solenoid started
3) DPM not available yet, because of missing interface
   → Done by Aida and Mohammed
4) Beamspotsize and divergence of the beam
   → Investigation started
5) Estimate the uncertainty for the DPM prediction
   → Open, see 8
6) Space allowed for the Lumi monitor
   → Solved
7) More communication
   → Started
8) pbar p gamma missing in DPM
   → Postponed, more missing reactions indentified
9) MVD, Lumi and Hyp should use the same software tool
   → Discussion with MVD started