Status of the Mainz Lumi activities

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PANDA Collaboration Meeting

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Overview

- Simulations
- Computing Cluster
- Experimental Setup

Simulation

- Diploma student Mathias Michel started six weeks ago
- MVD software (modified by 2-3 lines)
  - Using the MVD-Strip part
  - Our own Geofile
  - Our own Macros

    → Plan: We want to have only one official package for MVD and Lumi
- Possibility MVD and Lumi detektor could be set to ‘active’
- All other components accessible via Geofiles as passive material

- Our design by now:
  - 4 silicon discs starting at 10.5 m behind the IP
  - 3-8 mrad
  - 50 cm between
  - 600 µm thick
- Generators:
  - Box-Generator
  - DPM-Generator: Old and new version

Beampipe

- Box-Generator
  - 6.2 GeV/c fixed momentum
  - 3-8 mrad
  - fixed interaction point (IP)
- 4 hits or more required in 4 the layers

→ Cutting our acceptance

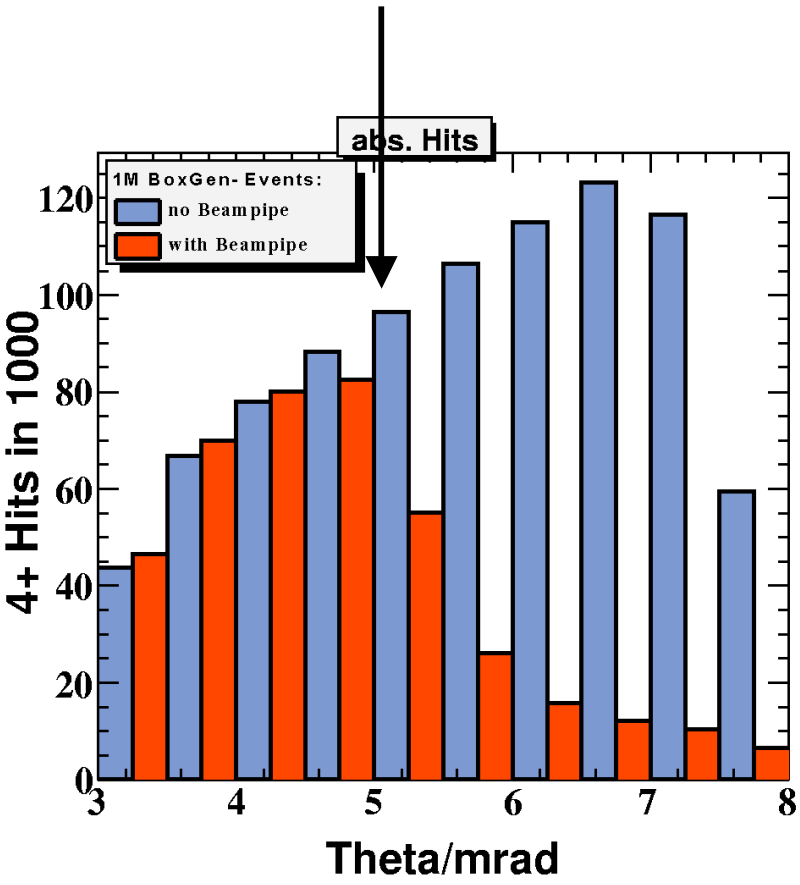
→ Iluminate the forward spectrometer with elastic scattering

Urgent to speak with people from

- forward spectrometer
- accelerator
- target

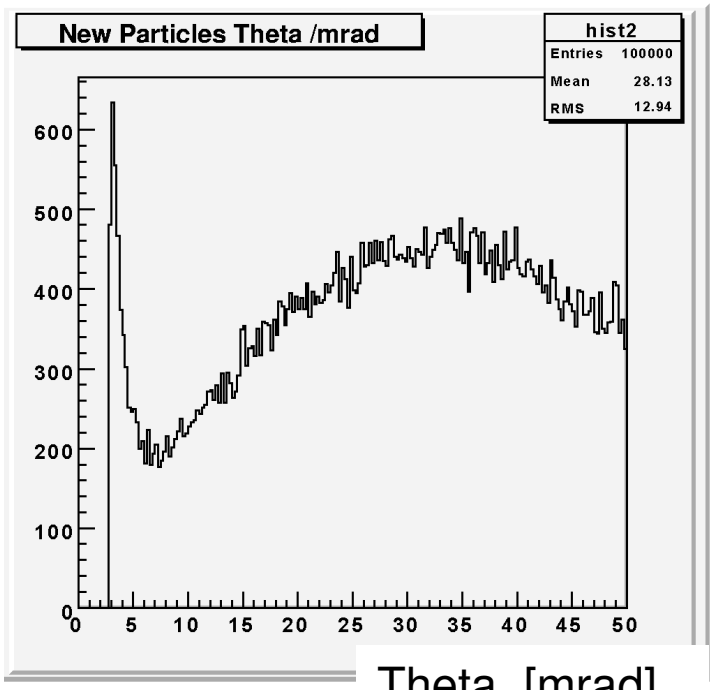
in order to get a design for the beampipe

Beampipe at 5 mrad !!



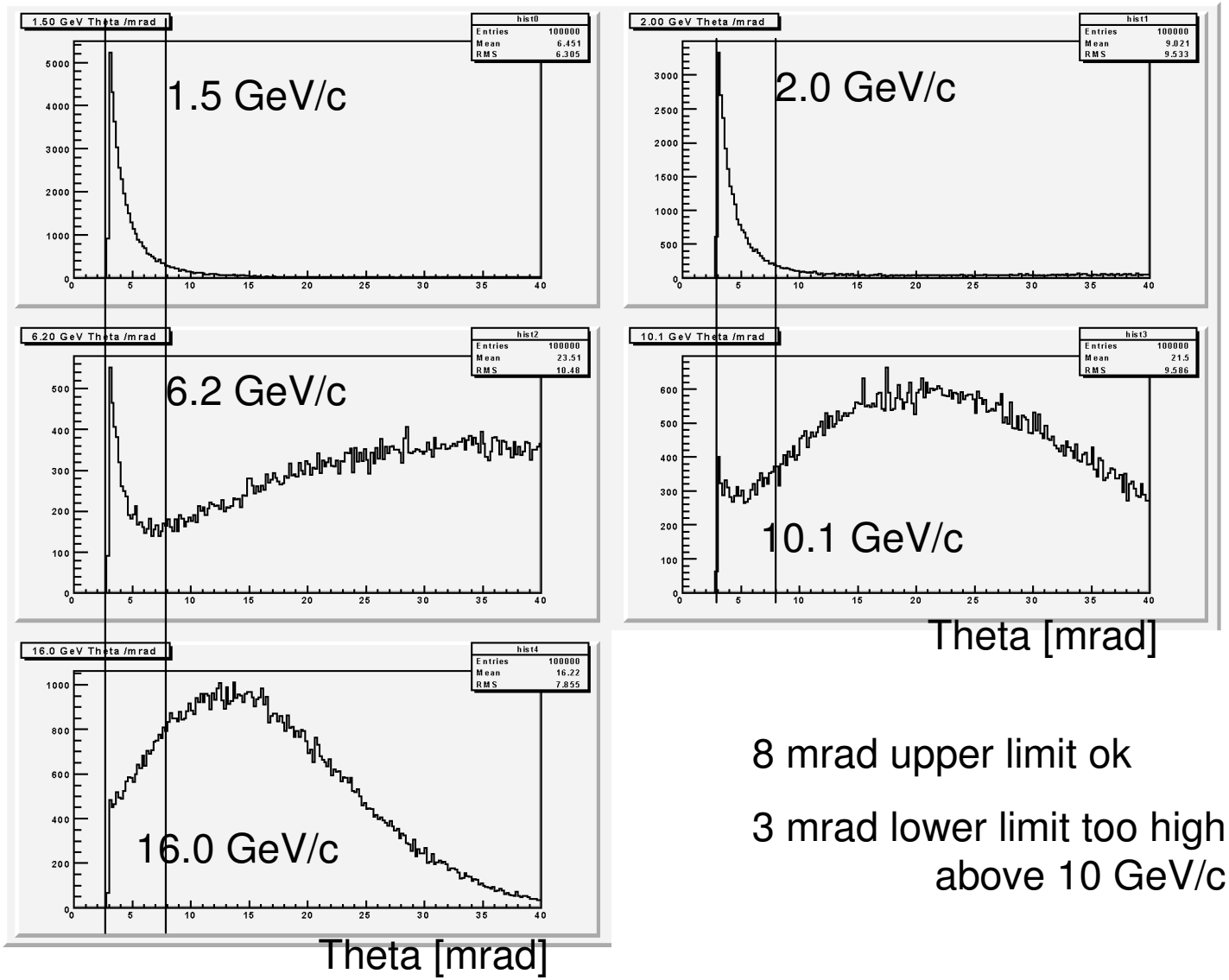
DPM-Generator

- Old version: Source code with options
  - elastic events (only hadronic part)
  - elastic events (only hadronic part) and inelastic events
  - inelastic events
- New version: Aida generated events
  - elastic scattering (coulomb and hadronic part)
  - our requirement minimum angle 2.8 mrad
  - Source code not available due to a missing minimum angle in the class definition ($\rightarrow$ Mohammed)



DPM-Generator (different beam momenta)

Different beam momenta generated starting 3 mrad

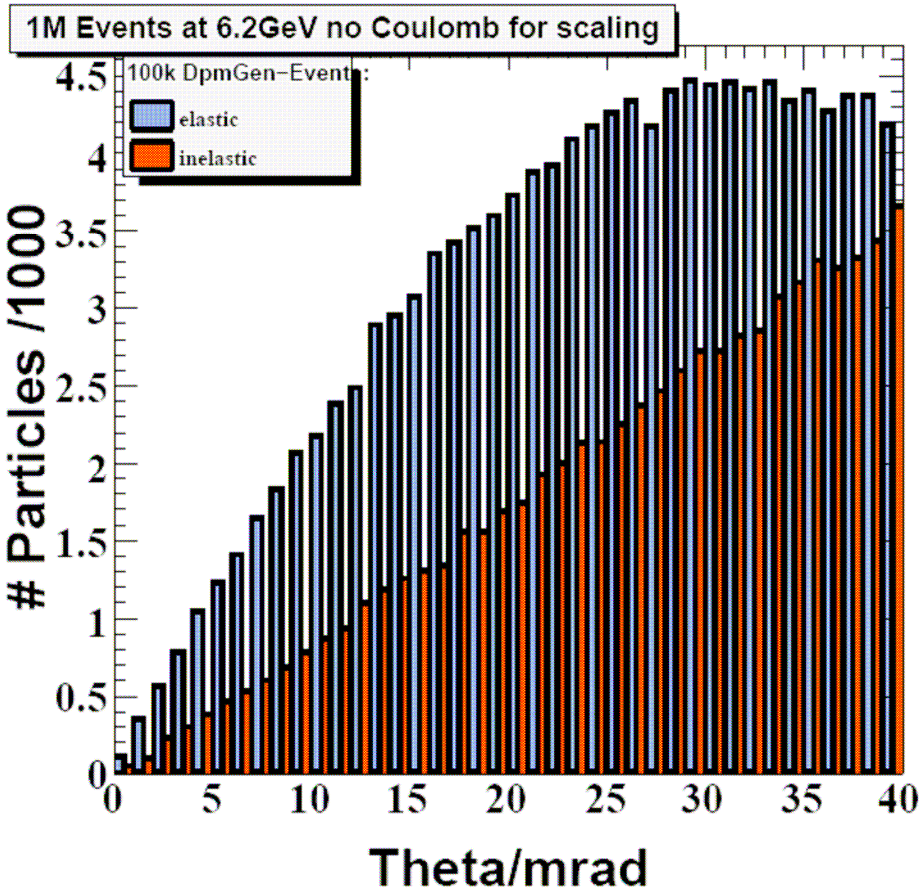


8 mrad upper limit ok

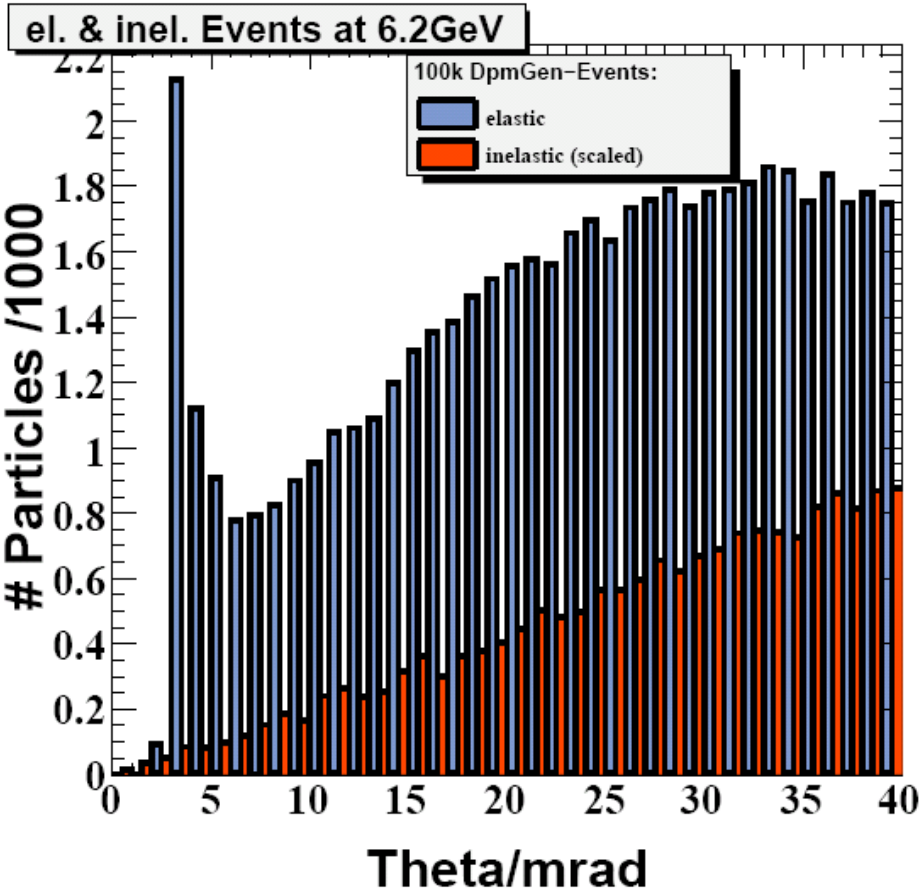
3 mrad lower limit too high for momenta above 10 GeV/c !!

DPM-Generator (elastic/inelastic)

Old version



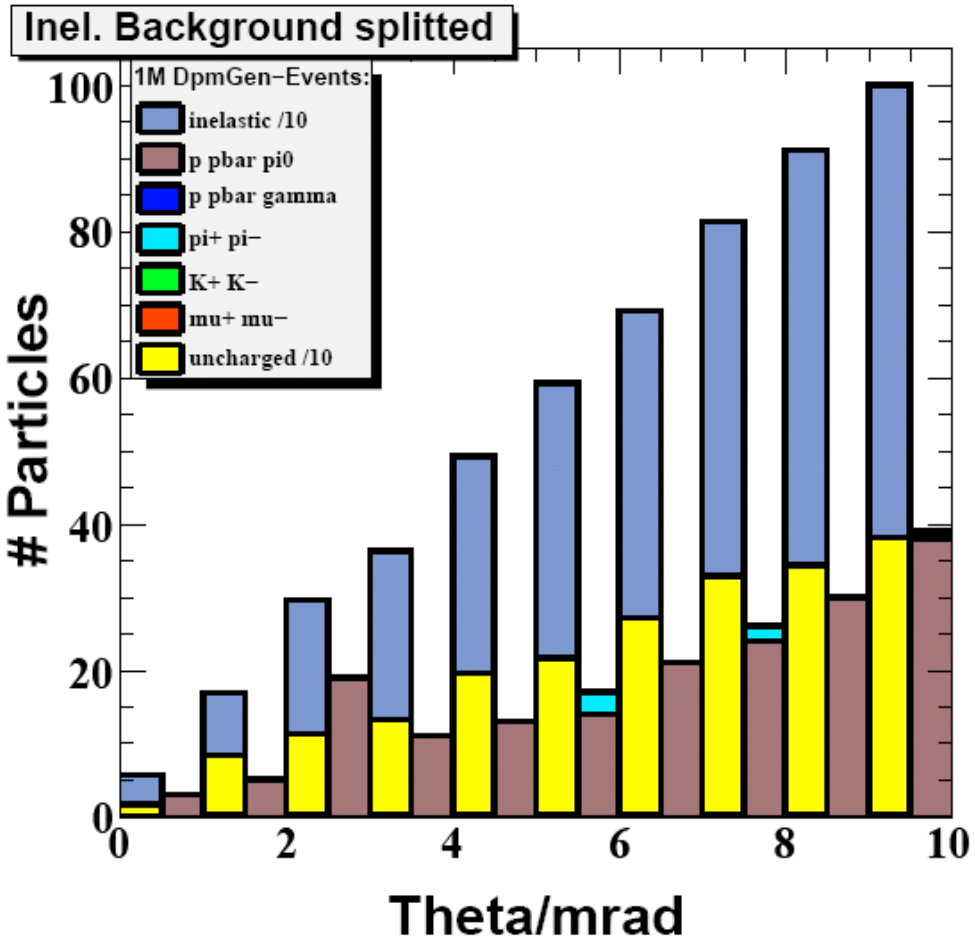
New version scaled



- All tracks (charged and neutral) counted
- Inelastic contribution seems to be small in Coulomb region
- Below 3 mrad no Coulomb elastics generated

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



Simulations ToDo list

- Get a beampipe design
- Get the minimum angle for the DPM-Generator into the software
- Check about background from decay of neutral particles
- Put ppγ events into the simulation

Cluster in Mainz

For simulation for PANDA and analysis for BaBar

- 10 blades a 8 cores $\rightarrow$ 80 independent processes
- 1 login computer
- 10 TB raid array

- Using a queue system for submitting jobs
- Different versions of LINUX available e.g. Gentoo, SL

Helmholtz Institut Mainz is planning to extend this cluster

Experimental Setup

Collecting information:

- MVD (K. Brinkmann)
- Recoil dectector of HERMES (F. Stinzing, Erlangen)

Results:

- Setup (DAQ and Amplifiers) should be close to MVD and Hypernuclei (PANDA)
- HERMES recoil group solved the problems about detectors in vacuum esp. cooling
- HERMES used sensors from MICRON SEMICONDUCTORS:
  300 (and 136 µm), double-sided, Pitch: 750 µm, made for satellites

Experimental Setup

Next steps:

- Sensors

  Looking for thin (<300 µm) double-sided sensors

- Amplifiers

  Goal: Using the same like MVD and Hyp (first step APV 25)

- DAQ for tests

  Goal: Same like MVD and Hyp

- Vacuum chamber and connectors

  Hopefully some stuff from HERMES

- Cooling system

  Alcohol cooling like HERMES was using it

An intern starts mid of July for building up the test setup