

# EMC Proto192

## Simulation and Reconstruction

Torsten Schröder  
Ruhr-Universität Bochum

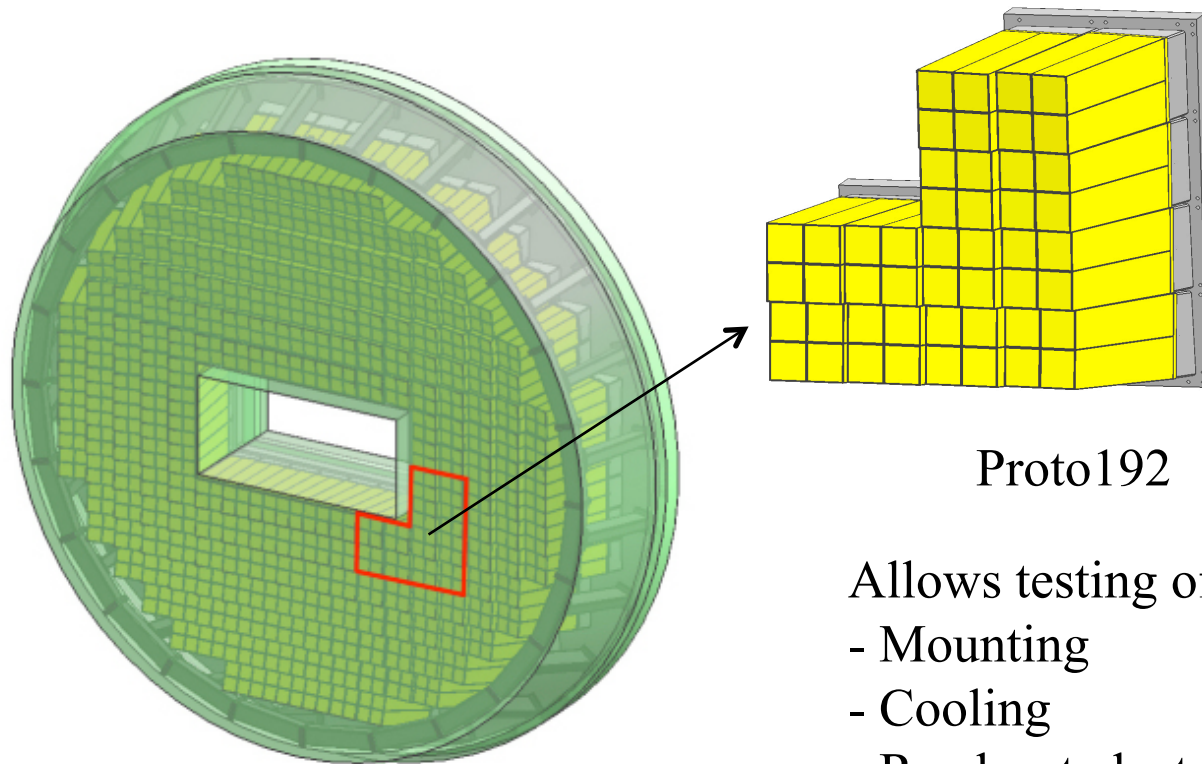
XXX. PANDA Collaboration Meeting  
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# Proto192 Overview

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## Prototype of the EMC Forward Endcap



192 PWO crystals  
12 alveoles,  
16 crystals each

Proto192

Allows testing of

- Mounting
- Cooling
- Read-out electronics
- Temperature and humidity monitoring
- Simulation and reconstruction

EMC Forward Endcap



## Proto192 Software

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- Reconstruction and analysis of Proto192 data obtained at test beams
- Monte Carlo data production and reconstruction for Proto192
  - shower shape studies
  - energy resolution/spatial resolution studies
  - calibration
  - ...



## Proto192 Software

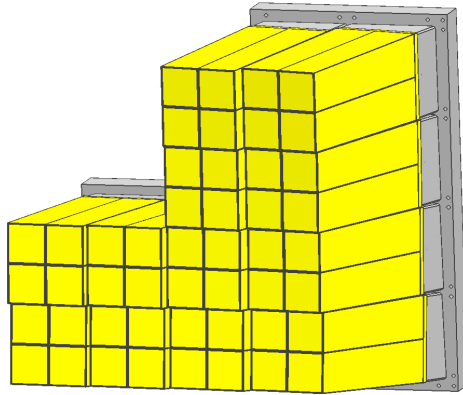
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Simulation and reconstruction code based on software release  
0.15.12 used for the Physics Book (Babar-like code)

- Proto192 geometry (✓)
  - Event Simulation (SingleParticle generator, Cosmics generator) ✓
  - Propagation of particles through Proto192 ✓
  - Digitization of EMC hits (in work)
  - Reconstruction (in work)
- } Disable all other detector components, magnetic field, tracking

# Geometry & Materials

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## Crystal Section

- 12 alveoles with 16 PWO crystals each
- Alveoles material (carbon fibre) between crystals (currently not included in simulation)
- To do: individual alignment of crystals



## Cooling Section in front of EMC

- Vacuum shield: carbon fibre
- Front Cooling: carbon fibre cooling liquid

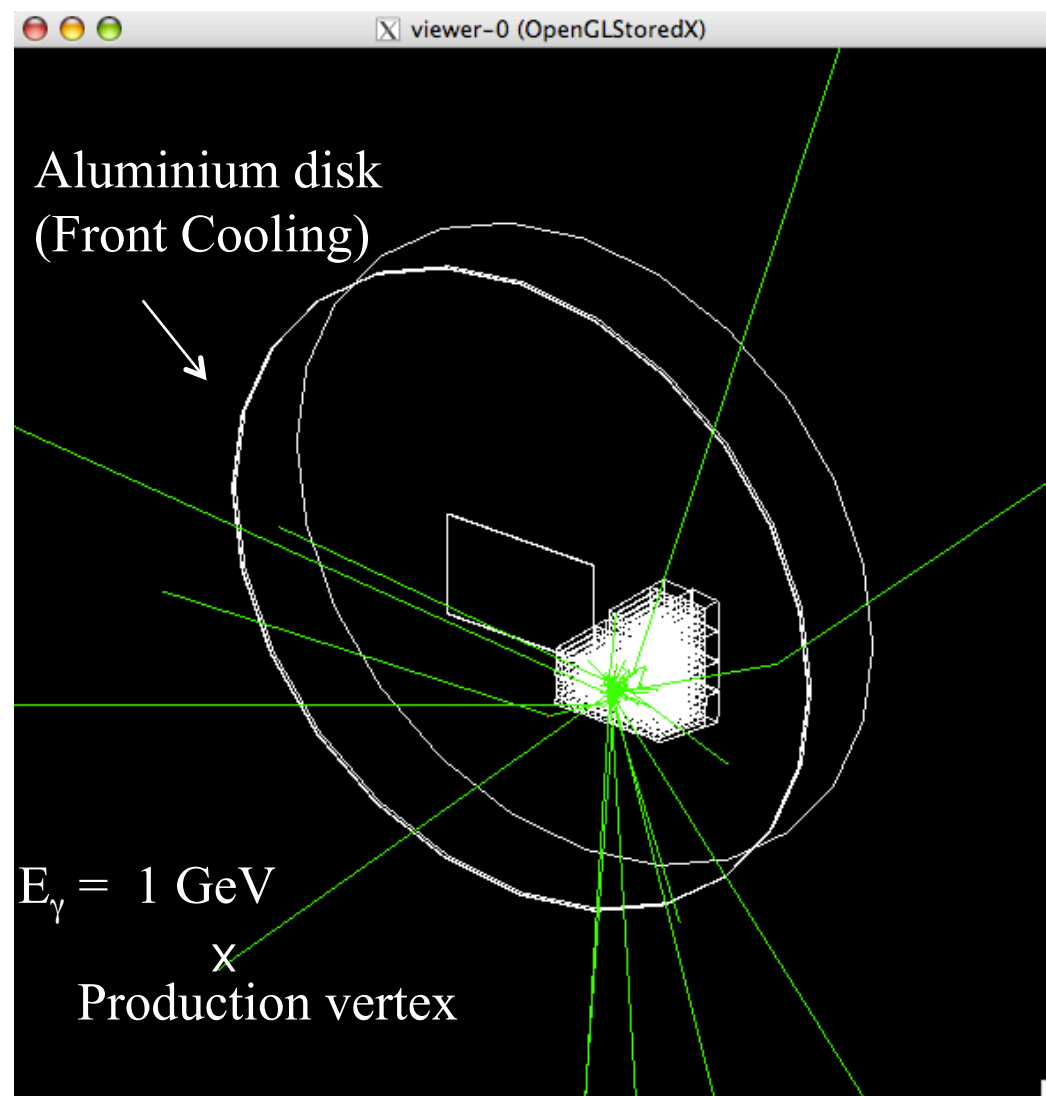
## Material in Simulation:

Aluminium disk, thickness corresponding to total radiation length of cooling section

# Generating Events

## SingleParticle Generator

- Simulate test beams
  - single  $\gamma$ , e, ...
  - within user-defined energy/angular range
- beam origin position set by user
  - allow crystal scans...

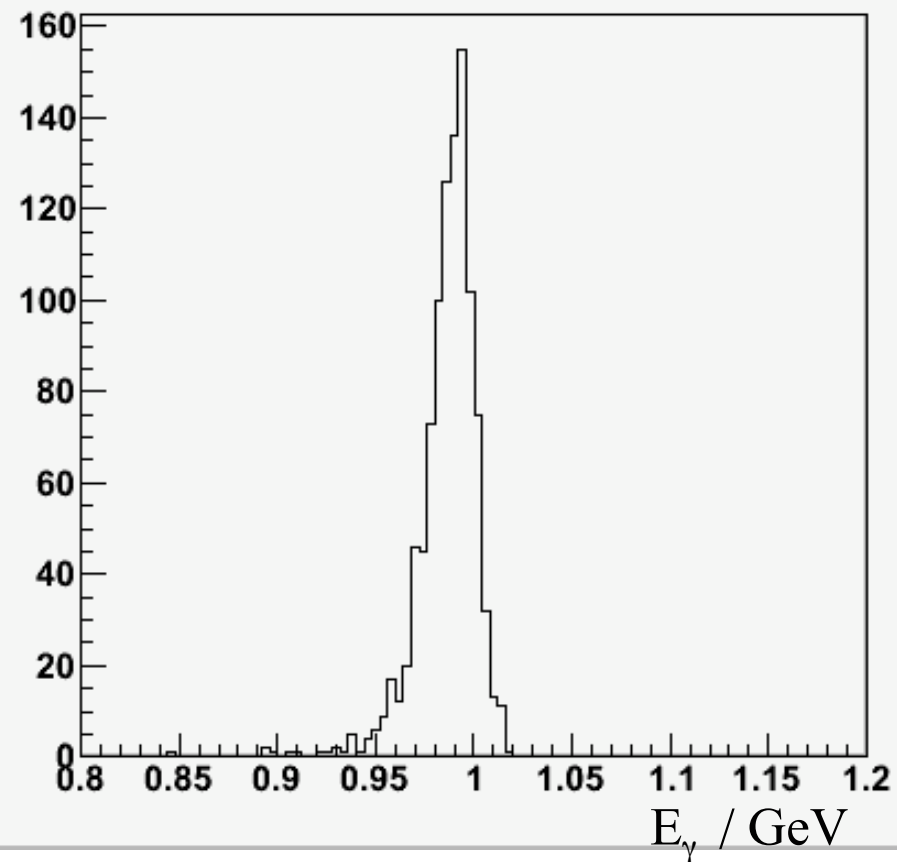




# Digitization

- Current setup based on Physics Book studies
  - resolution only
  - no waveforms
- Example:
  - 1000 events from SingleParticle generator
  - $E_\gamma = 1 \text{ GeV}$
  - $\cos\theta = 1 \quad \phi = 0$

Entries





## New Prototype-related Software Packages

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- Geometry:  
PANDAConfEmcFwCap.xml  
emcFwCapProto.xml, emcFwCooling.xml  
(new package: PndGeom V00-13-00)
- Propagation:  
BgsApp -> BgsEmcProtoApp, BgsEmcProtoQaApp  
(new package: BgsEmcProto V00-00-00)
- Digitization: SimApp -> SimEmcProto  
(new package in progress)
- Reconstruction: Pandora/Monolisa  
(new packages in progress)





# Outlook

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To do/in work:

- Prototype alignment
- Digitization
- Full reconstruction
- Calibration
  - make use of conditions database
- ...?