

Online monitoring system for the BM@N experiment

Ilnur Gabdrakhmanov, Sergei Merts

Joint Institute for Nuclear Research, Laboratory of High Energy Physics

Budva, NEC 2017

NICA Complex

General characteristics:

Beams - $p, d \dots {}^{197}\text{Au}^{79+}$

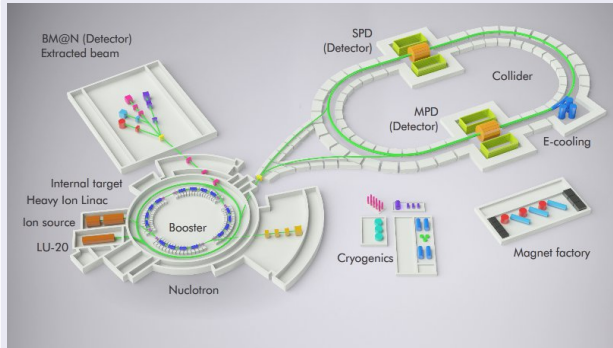
Collision energy:

$$\sqrt{s_{NN}} = 4 - 11 \text{ GeV} \quad E_{lab} = 1 - 6 \text{ AGeV}$$

Luminosity: $10^{27} \text{ cm}^{-2} \text{ s}^{-1}$ (Au), 10^{32} (p)

Experiments:

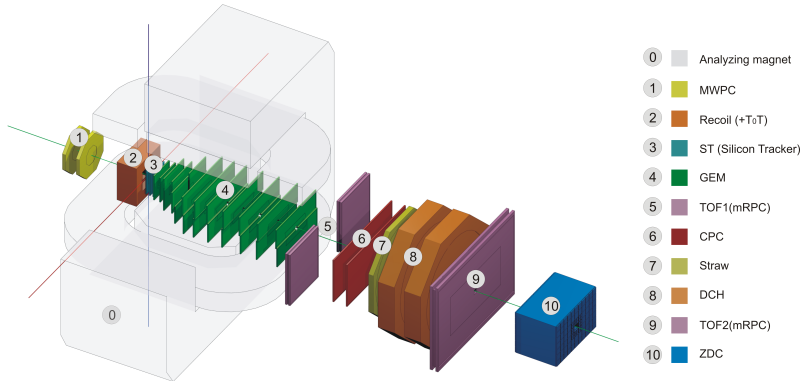
- 2 interaction points - **MPD** and **SPD**
- Fixed target experiment - **BM@N**



- **2017**: extracted beams of heavy ions are available within the BM@N experiment
- **2019**: a first configuration of the MPD setup available.
- **2023**: commissioning of the fully designed NICA-complex is foreseen.

The general contractor is **STRABAG** (Bodostal-3 & PCJ are the sub-contactors)

The BM@N Experiment



<http://nica.jinr.ru/ru/projects/bman.php>

Main objectives

Implement convenient and reliable monitoring system

- Uniform for all detector subsystems

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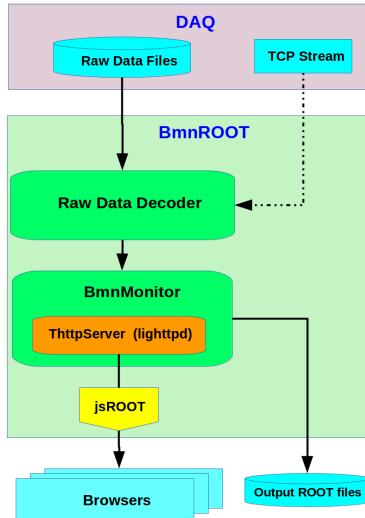
- Uniform for all detector subsystems
- Flexible

Main objectives

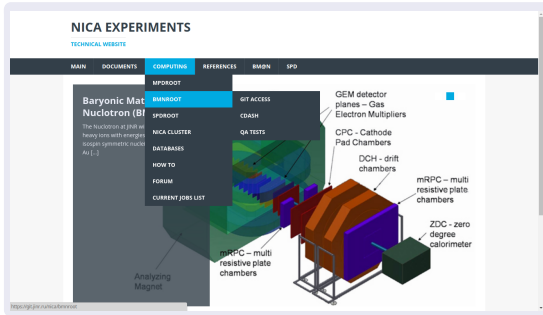
Implement convenient and reliable monitoring system

- Uniform for all detector subsystems
- Flexible
- Platform independent

Monitoring workflow



BM@N Framework BMNROOT



NICA experiments home web-page:

<http://mpd.jinr.ru>

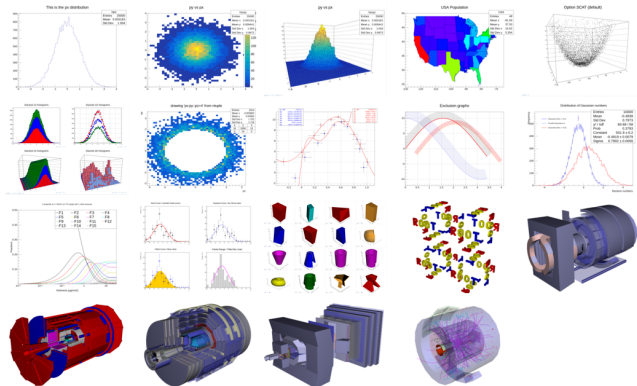
- News
- Software repositories
- Software tests
- Forums
- Database for physics run
- E.t.c.

Benefits:

- Inherits basic properties from FairRoot (<https://fairroot.gsi.de/>), C++ classes
- Extended set of event generators for heavy-ion collisions
- Detector composition and geometry; particle propagation by GEANT3/4
- Advanced detector response functions, realistic tracking and PID included
- Event display for Monte-Carlo and experimental data

BmnROOT repository

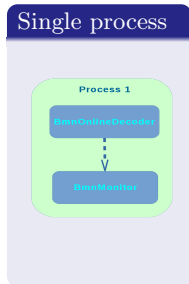
<https://git.jinr.ru/nica/bmnroot>



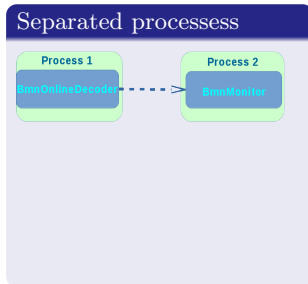
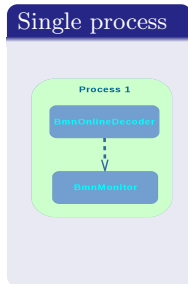
jsROOT website

<https://root.cern.ch/js/>

Choose the system architecture

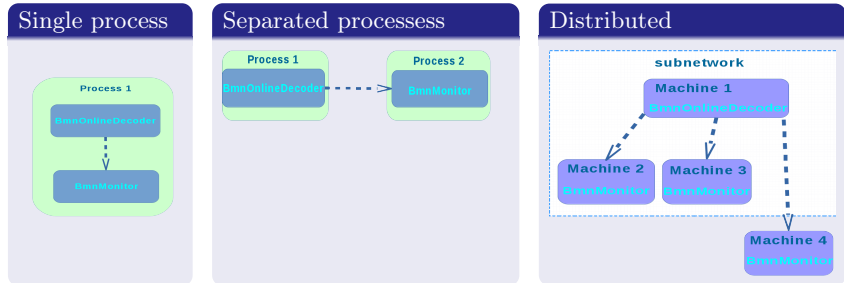


Choose the system architecture



<http://zeromq.org/>

Choose the system architecture

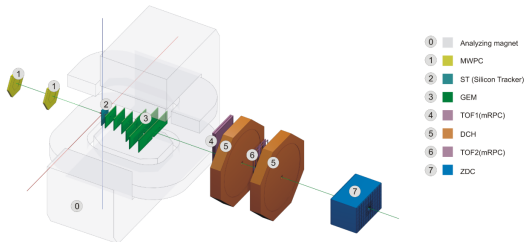


<http://zeromq.org/>

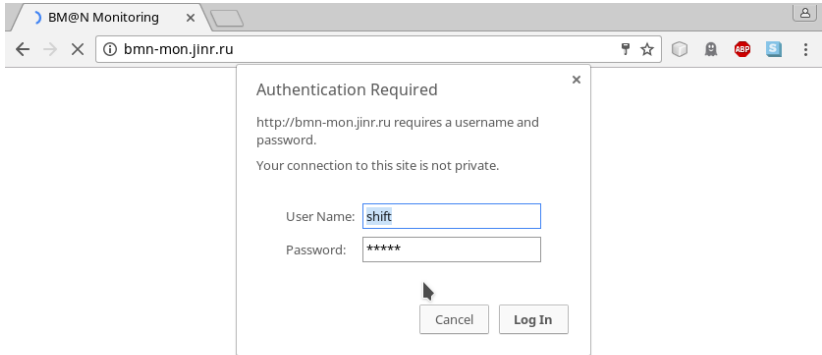
System overview

Welcome to the BM@N Experiment Triggers GEM Silicon ToF400 ToF700 DCH MWPC ZDC

BM@N: Winter Run in 2016



System overview



System overview

BM@N Triggers

Run: 1448

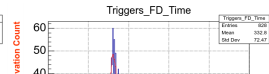
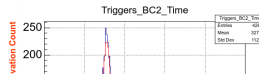
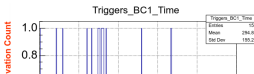
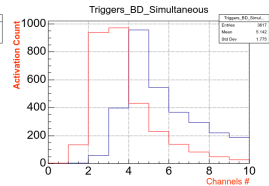
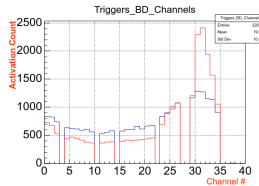
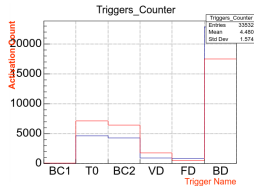
Event: 7307

Run Type: target

Reset

1438

Select Reference Run



System overview

BM@N MWPCs

Run: 1975

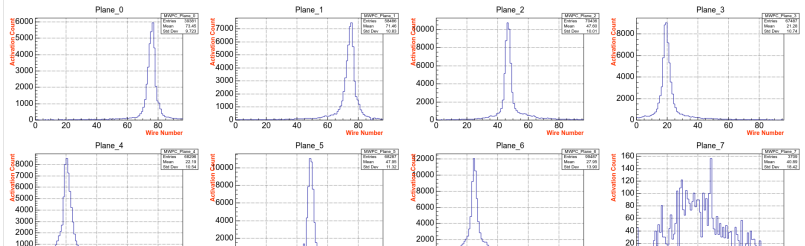
Event: 15994

Run Type: target

Reset

Select Reference Run

2D Profile Wires Times



System overview

BM@N GEMs

Run: 1506

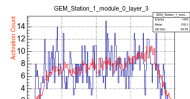
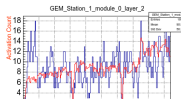
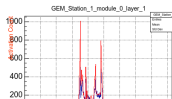
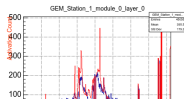
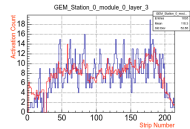
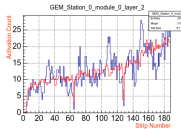
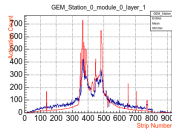
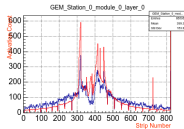
Event: 9329

Run Type: target

Reset

1411

Select Reference Run



System overview

Run Type: target

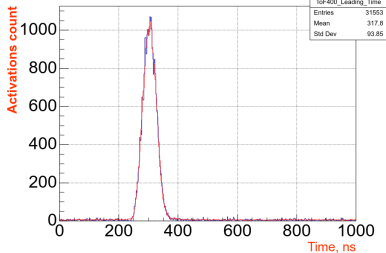
Reset

Plane Index
Strip Index
Side Index
Run Index

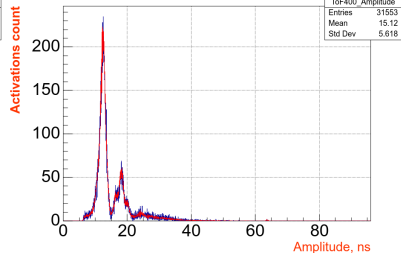
Change Selection (-1 => All)

Select Reference Run

ToF400_Leading_Time



ToF400_Amplitude



System overview

Run: 1502

Event: 92733

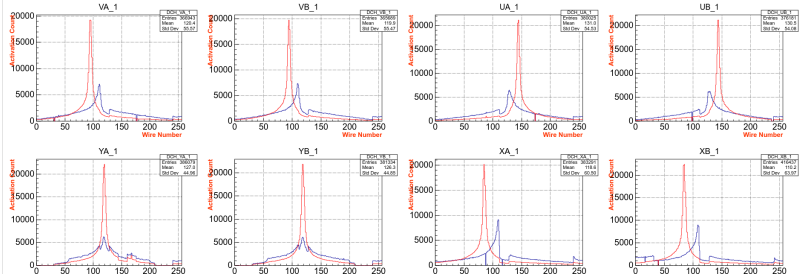
Run Type: target

Reset

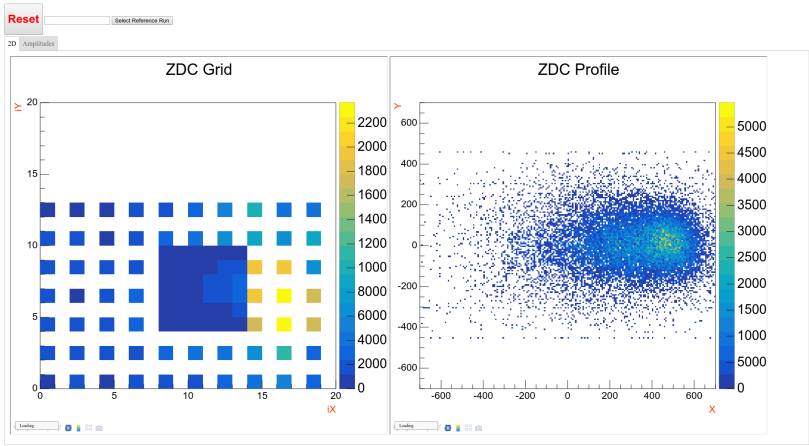
1411

Select Reference Run

Wires Times



System overview



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- Further parallelize data processing
- Improve reference run selection automation
- Implement full reconstruction chain including EventMonitor.

Thanks for your attention!