



MSU Contribution to MPD and **BM@N** Part 2. Computing

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SINP MSU computer facilities



Cluster

- 25 twins 1U computers.
Total number of computers is 50.
- Each computer has 8 cores with 4GB per core RAM

Interconnect

- 1Gbps ethernet

Disk storage

- 350 TB
- RAID6

Internet connection

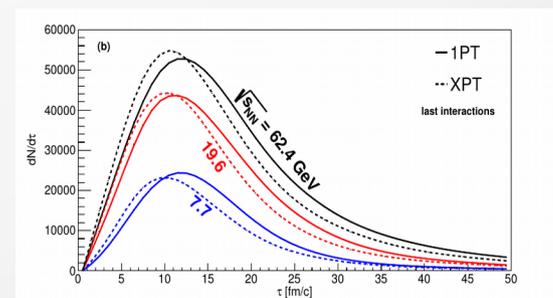
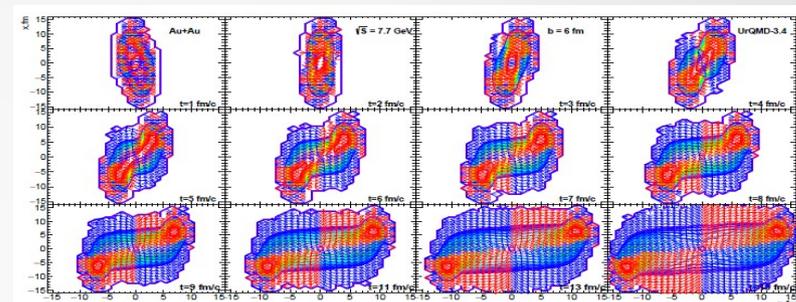
- 10GB to M9



MC and modeling calculations



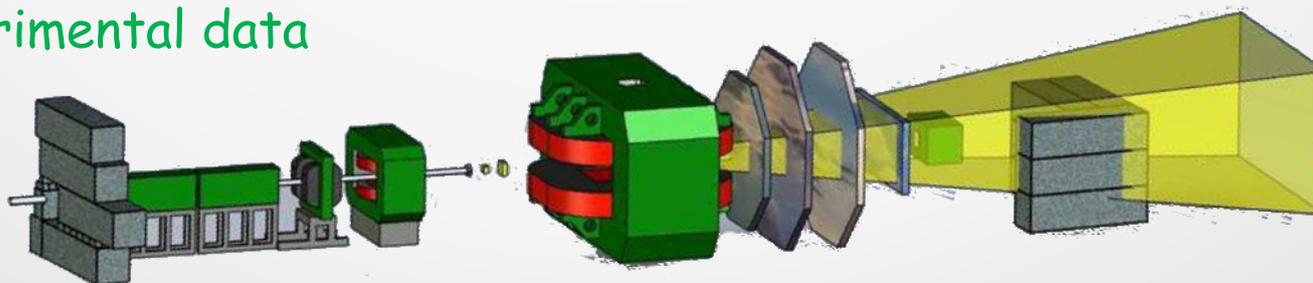
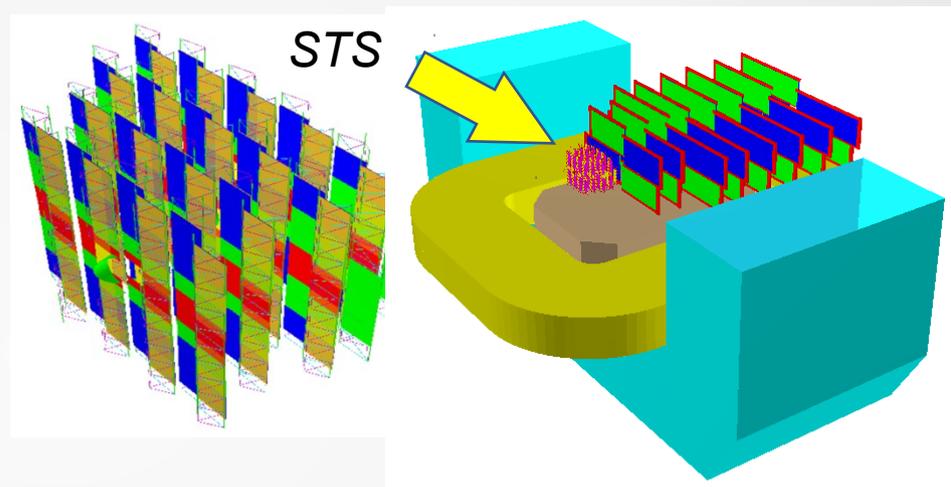
- flow effects and early dynamics
- femtoscopic observables in HI collisions
- relaxation of quark-hadron matter
- multiplicity of charged particles
- exotic multiquark hadrons in QCD at the nonzero chemical potential
- diphoton and dipion diagnostics of the hot and dense matter
- neutron stars and production of cascade-hyperons at BM@N.
- exotic hypernuclei at MPD



Detector modeling and simulation



- development of techniques of tracking
- detector control system for tracking components
- sensor visual control system
- development of stands, assembly and testing of modules of track system
- alignment of track detectors for BM@N and MPD by use test experimental data



ROC – Remote Operational Center



- The Remote Operational Center (ROC-MSU), created at SIMP MSU for monitoring of experiments at LHC, allows the operators on duty to control the quality and validate the status of experimental information coming from the detectors
- **Central shifts** – the most crucial and important as concerns data acquisition and operation.
- **Detector Control System shift** – the main technical duty includes monitoring of the power supply and cryogenic systems, as well as the general control of the detector operation.
- **Data Quality Monitoring shift** – monitoring of the data acquisition process, preliminary assessment of the data quality for its subsequent processing and analysis.
- **Beam Radiation Instrumentation and Luminosity shift** – monitoring of the collider beam luminosity.
- **Computing shift** – monitoring of the distributed computing system used for the data processing and analysis.

Remote Operational Center



The operational complex ROC includes an operative communication post, and three operational posts (A,B and C) each equipped with a panoramic multi-monitor panel (2x4 monitors with 2100x6720 overall resolution) and a demonstration 50" UltraHD monitor.



April 11-13, 2018

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Collaboration facilities



- Important part of the ROC is a videoconference complex providing
 - Multi user Internet connection
 - Visualization of rich graphics and video content
- The video conference complex include:
 - Professional HDX audio/video terminal
 - Licensing software with required applications
 - Two FullHD PTZ camera and high sensitive microphones.
 - Two UltraHD 85” monitors

Collaboration facilities



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Education activity



- ROC will be actively used for education.
 - Lectures, seminars
 - Practices both for phenomenology physics on NICA and experimental equipment
 - Training for shifters

Conclusions



- Computer facilities dedicated for NICA can support all direction of NICA activity in SINP including
 - Physics (MC simulation and modeling calculations)
 - Experiments (Detector development and simulation)
- Remote control of NICA facilities
 - Different shift to contro functionality both experimental equipment and computers.
- There are rich communication infrastructure providing collaborating work
 - Video and audio conferencing
- Education and training
 - Lectures, seminars
 - Practices, training



Thank you!