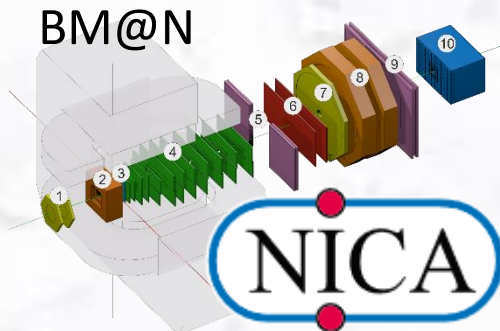


# Development of a geometry database for the BM@N experiment of mega- project NICA

Akishina E.P.<sup>1</sup>, Alexandrov E.I.<sup>1</sup>, Alexandrov I.N.<sup>1</sup>,  
Filozova I.A.<sup>1</sup>, Gertsenberger K.V.<sup>1</sup>, Ivanov V.V.<sup>1,2</sup>,  
Pryahina D.I.<sup>1</sup>, Shestakova G.V.<sup>1</sup>

<sup>1</sup>JINR, Dubna

<sup>2</sup>MEPhi, Moscow



Joint Institute for Nuclear Research

## *Guidelines*

- **manage module geometries as ROOT binary objects**
- **for each module keep: tag, version, transformation matrix, mother module**
- **manage the pre-defined setups as combinations of module geometries**
- **manage module version**

## *Tasks*

- **Store the modules of BM@N**
- **Load the geometry modules for setup construction**
- **Construct setup from the stored modules**
- **Present the BM@N setup**
- **Support different versions of module**

# Basic Definitions

## Geometry Module

File in ROOT format with content of detector geometry

## Setup Module

Geometry module, link to the mother geometry module, its placement in the mother module (transformation matrix or object of class TGeoMatrix)

## Setup

Combination of setup modules which represents the full geometry

# Web-interface: News.

← → ↻ Не защищено [bmn-geodb.jinr.ru/main.php](http://bmn-geodb.jinr.ru/main.php)

Приложения Bookmarks Темы диссертаций... Броуки в цифр... Флибуста | Книжн... VS | VegaSat.ru Open Source softw... Directory Bind -...

New address of service

BM@N  
Baryonic Matter  
at Nuclotron  
NICA

Geometry DataBase

Run 6 and Run7 available

Tag	Revision	Date	Description	Author	Status	Download
run6	2	2019-12-25	version 19.04.0 with error description	aleksand@jinr.ru	Approved	
run6	1	2018-07-26	version 17.04.0	aleksand@jinr.ru	Approved	
run7	1	2020-04-19	run7 uploaded 19.04.2020	aleksand@jinr.ru	Approved	

View Setups  
View Setup Modules  
View Files  
View Materials  
Download GeometryDB

- 1) New address of service: [bmn-geodb.jinr.ru/main.php](http://bmn-geodb.jinr.ru/main.php)
- 2) New setups available: run6 (version 17.04), run6 (version 19.04), run7
- 3) Bug fix and some improvements.



# API: News.

- Changes of some APIs
- Added revision of setup
- All macros available in git  
([https://git.jinr.ru/nica\\_db/geodb](https://git.jinr.ru/nica_db/geodb))

# Macros

<i>Signature</i>	<i>Description</i>	<i>Call Example</i>	<i>Comment</i>
<code>void installLocalDB();</code>	<b>Install local database from server to client.</b> Download replica of central database to client computer.	<code>installLocalDB();</code>	Require set variable DBL_FILE_PATH before use.
<code>void getSetupList();</code>	<b><i>Get the list of available setups.</i></b> Print the list of available setups including tag, date of creation, author and description parameters for each approved setup.	<code>getSetupList.c();</code>	Return the available setups' list

# Macros

<i>Signature</i>	<i>Description</i>	<i>Call Example</i>	<i>Comment</i>
<code>bool loadSetup(const char* setupTag, const char* revision);</code>	<b>Load setup into the BM@N ROOT framework.</b> The Geometry can be used in ROOT framework afterwards. Return FALSE if setup is not loaded, and TRUE if the loading is successful.	<code>bool res = loadSetup("run7", "1");</code>	Revision can be empty or NULL. It gets last setup by date in this case .
<code>bool loadSetup(const char* setupTag, const char* revision, const char* xml);</code>	<b>Load setup into the ROOT environment.</b> Geometry can be used in the ROOT environment after this operation. User can use xml file in order to move any setup module during loading. Return false if setup was not loaded because of errors and true if load is successful.	<code>loadSetup("run7", "1", "local.xml")</code>	xml file contains information on the setup modules and their shifts.

# Load setup into BMNRoot environment with possibility to move any module (1)

**Description:** Load setup into the ROOT environment. Geometry can be used in the ROOT environment after this operation. User can use xml file in order to move any setup module during loading.

**Signature:** `bool loadSetup(const char* setupTag, const char* revision, const char* xml);`

**Parameter *setupTag*:** Tag of the setup that should be loaded.

**Parameter *revision*:** Revision of setup. Empty or NULL is get last setup by date.



# Load setup into BMNRoot environment with possibility to move any module (2)

**Parameter *xml*:** URL to xml-file that contains information on the setup modules and their shifts. The loaded module is shifted by X, Y, Z if the value of parameter “enable” is TRUE. The loaded module is not shifted if the value of parameter “enable” is FALSE.

**type:** short name of setup module. The possible values are the same as for moduleName parameter excluding value “\*”.

**enable:** moveX, moveY and moveZ values will be taken into account during loading only if the value of **enable** parameter is “true”.

**moveX:** the possible type of this value is integer. It sets the value of module shift in X direction.

**moveY:** the possible type of this value is integer. It sets the value of module shift in Y direction.

**moveZ:** the possible type of this value is integer. It sets the value of module shift in Z direction.

# Load setup into BMN ROOT environment with possibility to move any module (3)

XML file content:

```
▼ <setup>
  <setupModule type="SILICON" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="DCH" enable="true" moveX="0" moveY="0" moveZ="500"/>
  <setupModule type="BD" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="MWPC" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="TOF1" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="STS" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="TOF" enable="false" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="MAGNET" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="ZDC" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="CSC" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="FD" enable="true" moveX="0" moveY="0" moveZ="0"/>
  <setupModule type="ECAL" enable="true" moveX="0" moveY="0" moveZ="0"/>
</setup>
```

If some module type that belongs to setup is absent in XML file the correspond module will be loaded without additional moving.

**Return value:** Return *false* if setup was not loaded because of errors and true if load is successful.

**Example:** `loadSetup("run6", "1", "local.xml")`

# Next steps

- Improvements of WEB view
- Add rotation in xml file
- Move into production