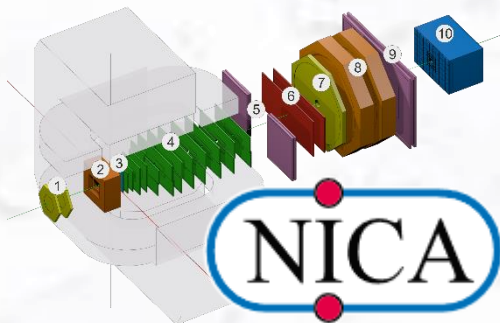


Current status of the Geometry Database for the BM@N experiment

Akishina E.P.¹, Alexandrov E.I.¹, Alexandrov I.N.¹,
Chebotov A.I.¹, Filozova I.A.¹, Gertsenberger K.V.¹,
Ivanov V.V.¹

¹JINR, Dubna



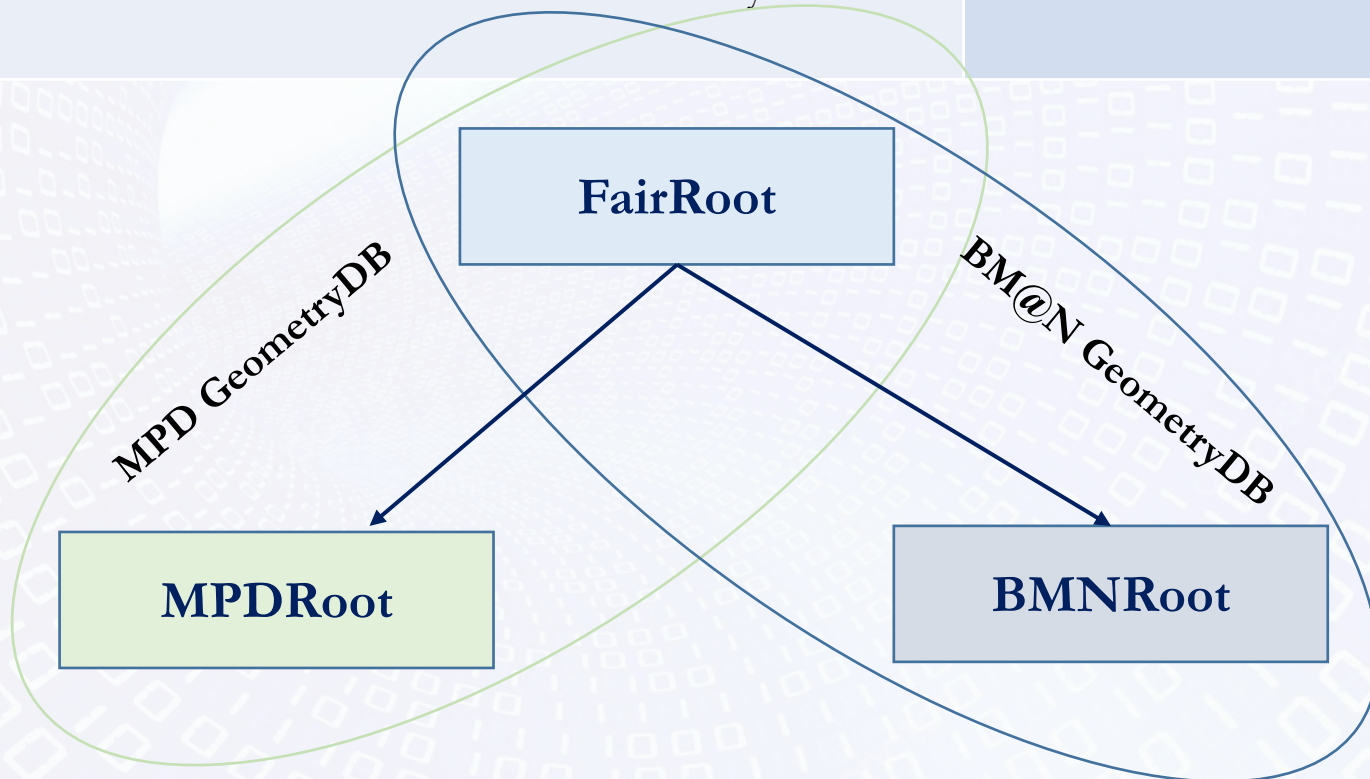
10th Collaboration Meeting of the
BM@N, 14-19 May



Joint Institute for Nuclear Research

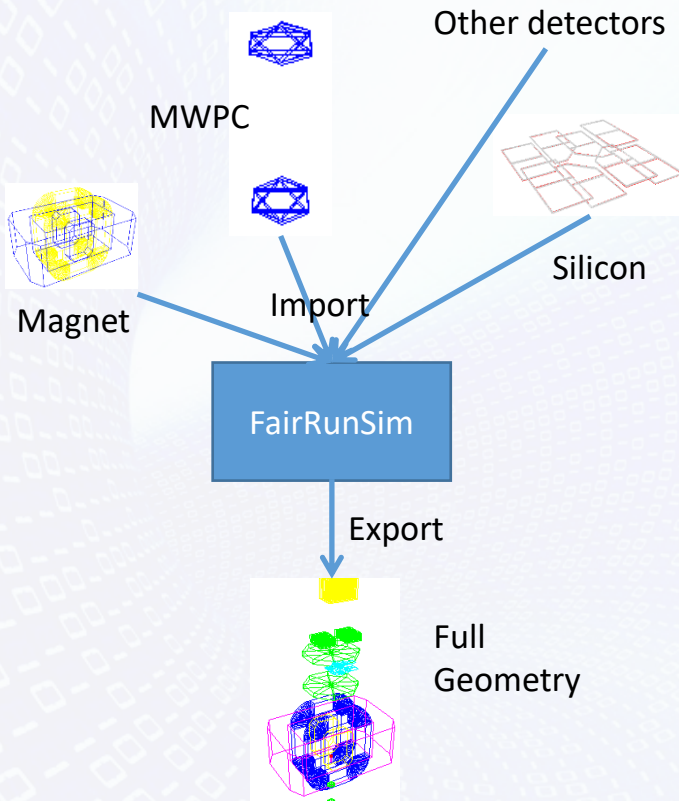
BM@N & MPD

Common features	Differences
Approaches to the methods of simulations and reconstructions	The sets of Detectors
Software: FAIRSOFT, FAIRROOT	
RunManager: <ul style="list-style-type: none">➤ FairRunSim for the simulation runs➤ FairRunAna for the reconstruction or analysis runs	

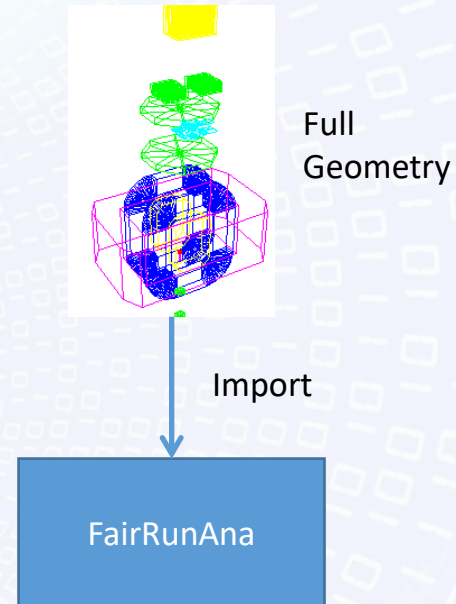


RunManager & Geometry

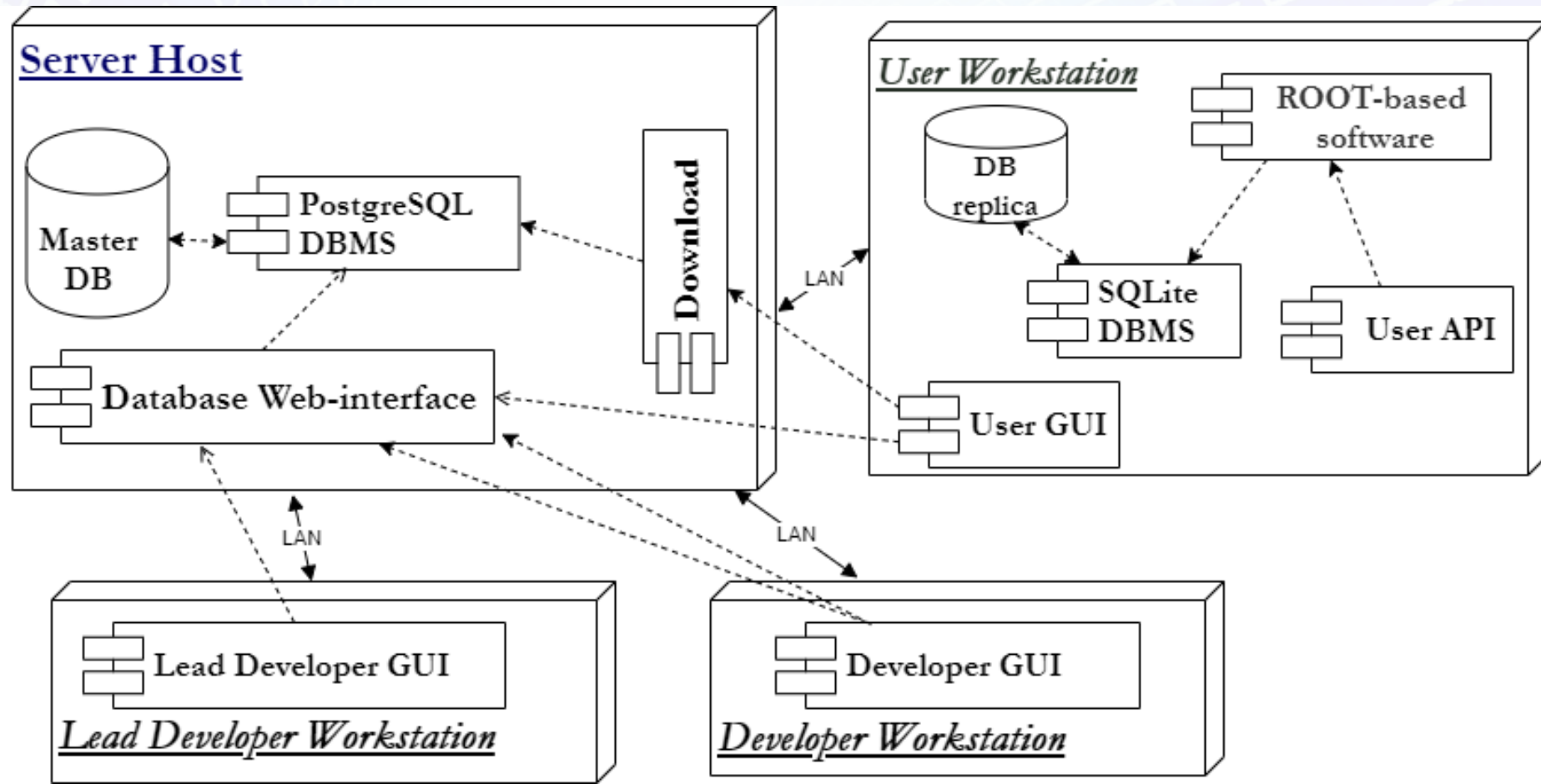
Simulation



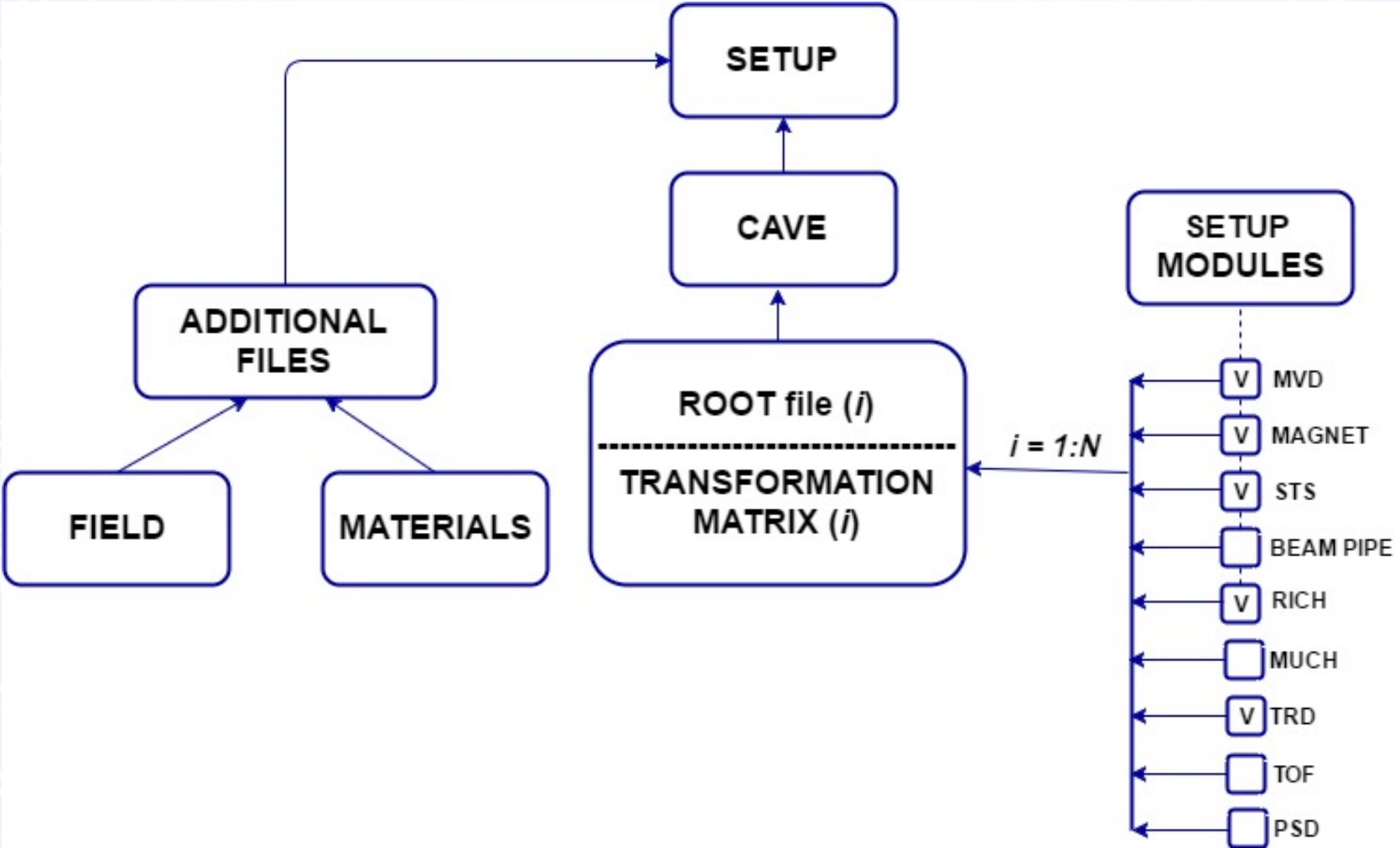
Reconstruction



General architecture of the Geometry Information System

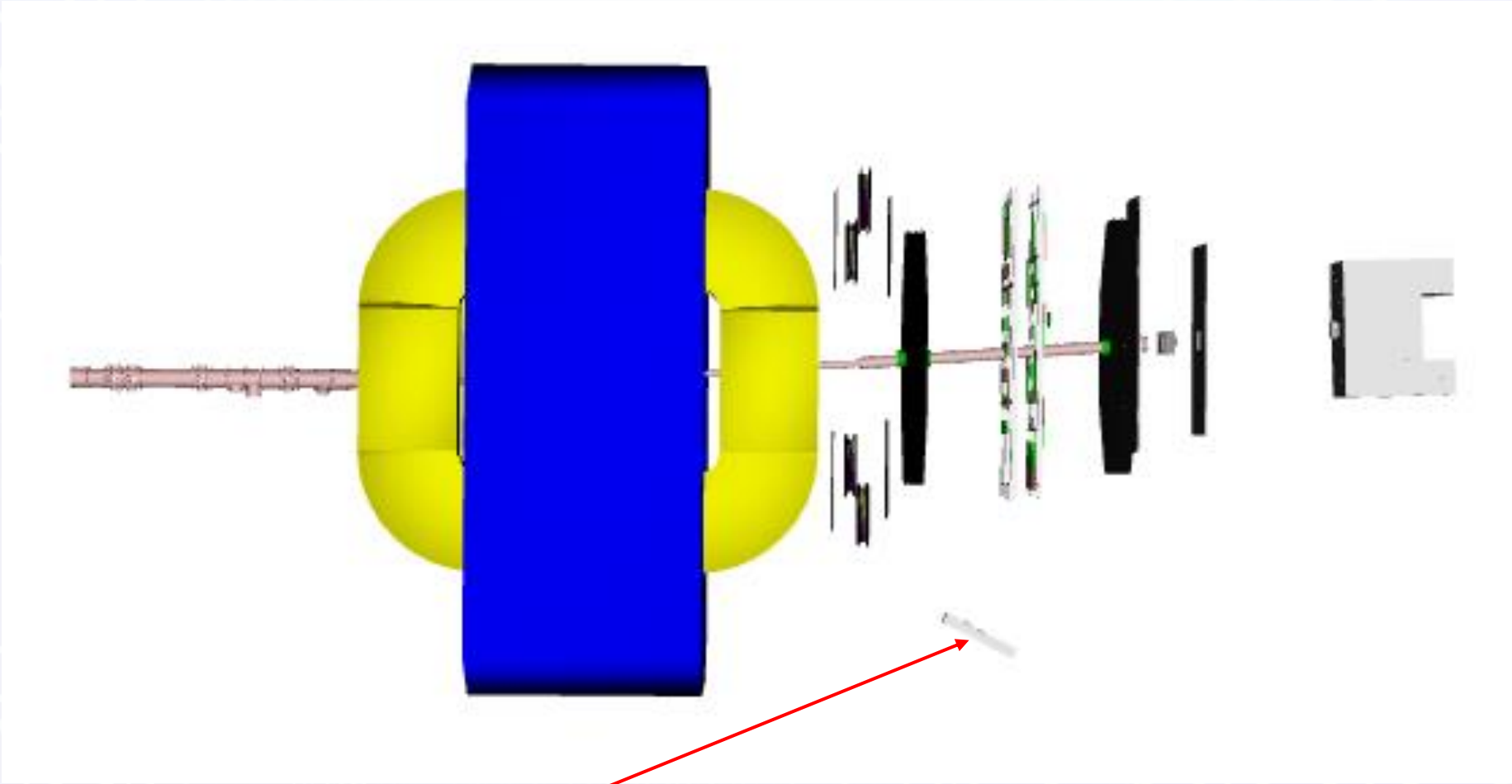


Setup Structure



For run <8:
Setup can not have more than 1 instance of each module.

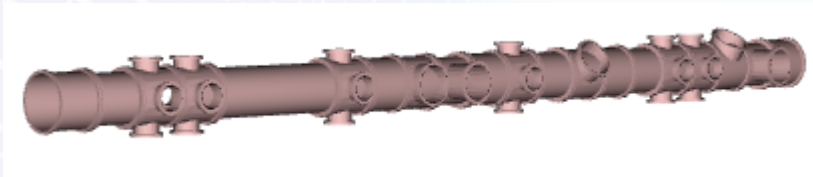
Geometry of Run8



NDET – for geometry DB removed because has hardcode in load script. After move hardcode from load it will added in geometry DB.

Structure Pipe for run8

VacuumPipe



```
20 FairModule* pipe1 = new FairPipe("Pipe_sec1");  
21 pipe1->SetGeometryFileName("VacuumPipe_section1_Run8.root");  
22 fRun->AddModule(pipe1);  
23  
24 FairModule* pipe2 = new FairPipe("Pipe_sec2");  
25 pipe2->SetGeometryFileName("VacuumPipe_section2_Run8.root");  
26 fRun->AddModule(pipe2);  
27  
28 FairModule* pipe3 = new FairPipe("Pipe_sec3");  
29 pipe3->SetGeometryFileName("VacuumPipe_section3_Run8.root");  
30 fRun->AddModule(pipe3);  
31
```

The same class. Only the arguments are different.

GUI: Add revision of module



Module Type: PIPE	Module Name: <input type="text" value="PIPE"/>	Revision Number:* <input type="text" value="4"/>
Sensitivity:* <input type="text" value="Active"/>		Class Name:* <input type="text" value="BmnPIPE"/>























[ADD REVISION](#) [CANCEL](#)

GUI: Add/edit setup

<input type="checkbox"/>	TOF	tof700_run7_with_support_upd	2023-04-28	aleksand	tof700_run7_with_support_upd	1.000	0.000	0.000	0.000	CAVE	tof700_run7_with_support_upd (full description on file)
						0.000	1.000	0.000	0.000		
						0.000	0.000	1.000	0.000		
<input checked="" type="checkbox"/>	TOF	tof700_run8_with_support	2023-05-12	aleksand	tof700_run8_with_support	1.000	0.000	0.000	0.000	CAVE	Corrections for TOF-700 geometry according to geodetic measurements added
						0.000	1.000	0.000	0.000		
						0.000	0.000	1.000	0.000		
PSD											
PIPE											
	Type	Tag	Date	Author	File Tag	Transformation				Parent	Description
<input checked="" type="checkbox"/>	PIPE	VacuumPipe_section1_Run8	2023-05-11	aleksand	VacuumPipe_section1_Run8	1.000	0.000	0.000	0.000	CAVE	Vacuum Beam Pipe: geometry of the first section (before the target) of the beam pipe added (positions of elements accord to the measurement scheme)
						0.000	1.000	0.000	0.000		
						0.000	0.000	1.000	0.000		
<input checked="" type="checkbox"/>	PIPE	VacuumPipe_section3_Run8	2023-05-11	aleksand	VacuumPipe_section3_Run8	1.000	0.000	0.000	0.000	CAVE	Vacuum Beam Pipe: geometry of the third section (after the magnet) added position of the second section corrected
						0.000	1.000	0.000	0.000		
						0.000	0.000	1.000	0.000		
<input checked="" type="checkbox"/>	PIPE	VacuumPipe_section2_Run8	2023-05-11	aleksand	VacuumPipe_section2_Run8	1.000	0.000	0.000	0.000	CAVE	Vacuum Beam Pipe: geometry of the third section (after the magnet) added position of the second section corrected
						0.000	1.000	0.000	0.000		
						0.000	0.000	1.000	0.000		

Geometry Setups

Geometry Setups

Tag	Revision	Date	Description	Author	Status	Last Modified	Download Setup	Download Root File
src_run7	21.08.0	2021-09-20	21.08.0	aleksand	Approved			
src_run7	19.10.0	2021-09-14	Run7 version	aleksand	Approved			
src_run7	19.05.0	2021-07-27	Run7a version	aleksand	Approved			
run8	dev_28.04.2023	2023-05-12	Dev version from 01.05.2023	aleksand	Approved	2023-05-16		
run7	dev_28.04.2023	2023-04-28	Update tof detector (was wrong)	aleksand	Approved	2023-05-18		
run7	21.08.0	2021-09-14	21.08	aleksand	Approved			
run7	19.10.0	2021-09-13	Run7 version	aleksand	Approved			
run7	19.05.0	2021-07-27	Run7a version	aleksand	Approved			
run6	21.08.0	2021-09-14	Revision 21.08	aleksand	Approved			
run6	19.10.0	2021-09-07	Run6 version	aleksand	Approved			
run6	19.05.0	2021-07-27	Run6 version	aleksand	Approved	2021-09-14		

Tags:

run8

src_run7

run7

run6

Revisions:

dev_28.04.2023

21.08.0

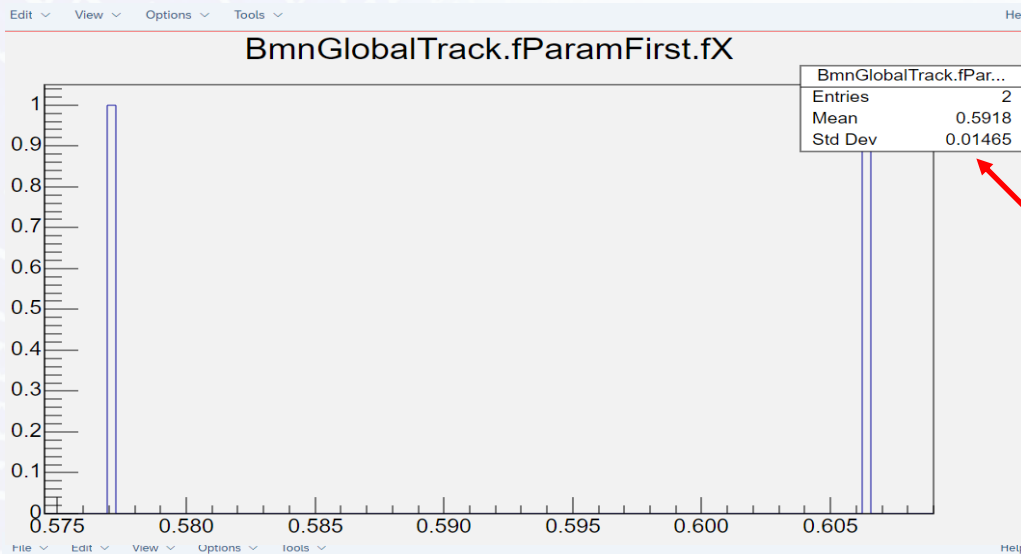
19.10.0

19.05.0

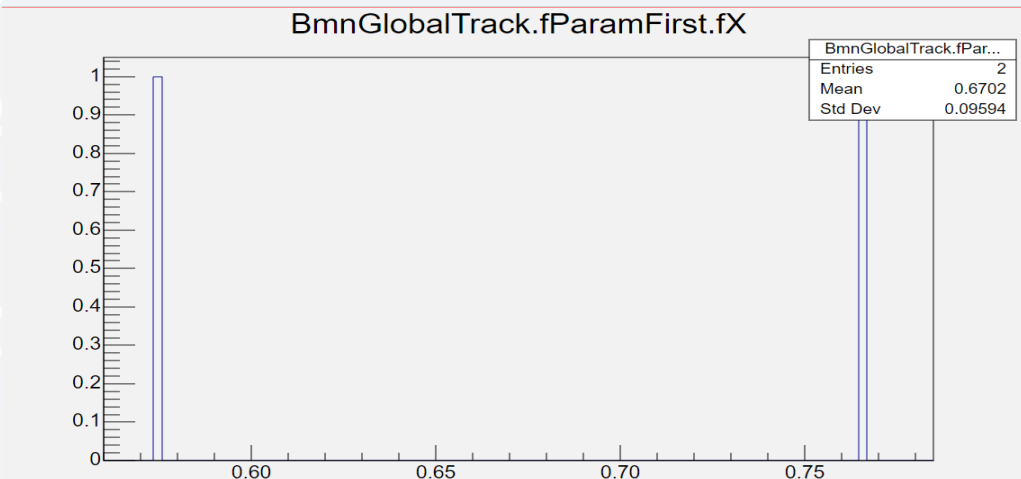
 Plan to hide it.

Verification geometry of Run7

The set of detectors in macro and the names of the corresponding files are the same for revisions "21.08.0" and "dev".



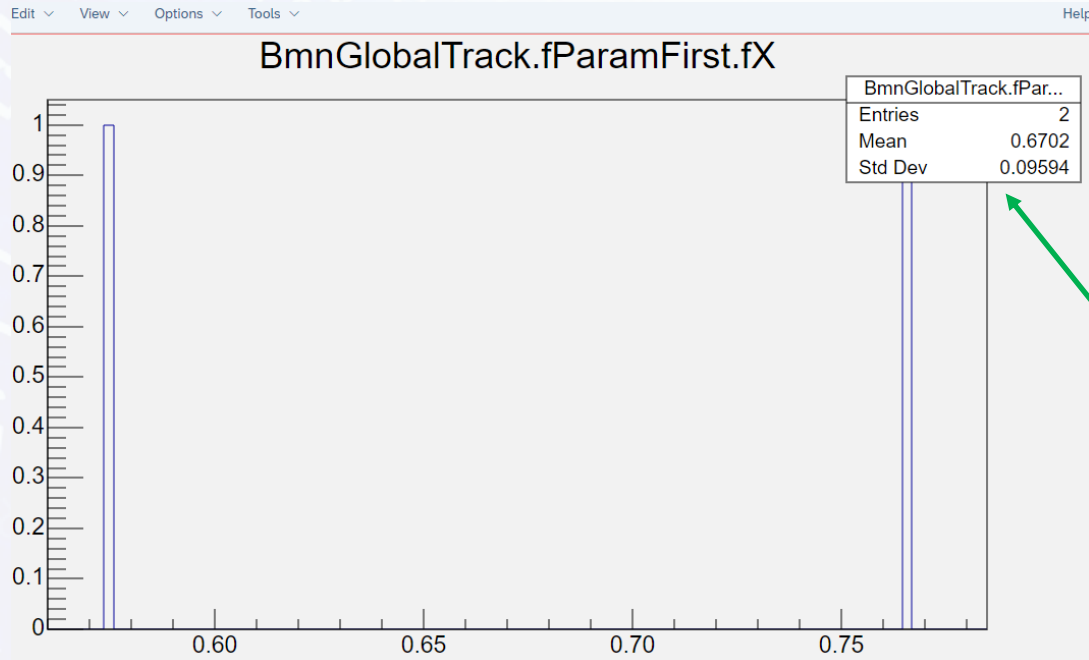
Run: 7
Revision: 21.08.0
Use DB: YES



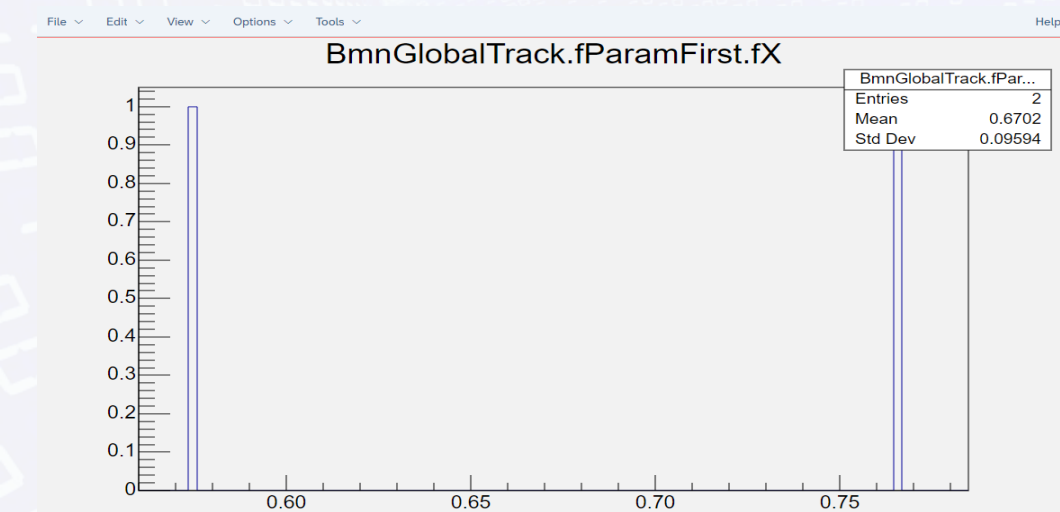
Run: 7
Revision: Dev
Use DB: NO

Different

Verification geometry of Run7



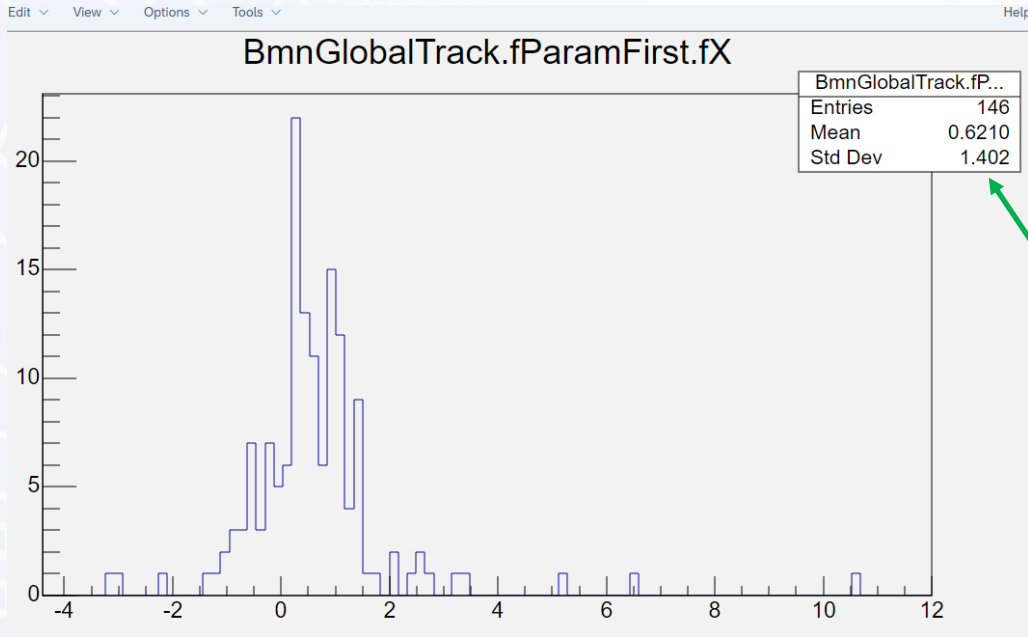
Run: 7
Revision: dev_28.04.2023
Use DB: YES



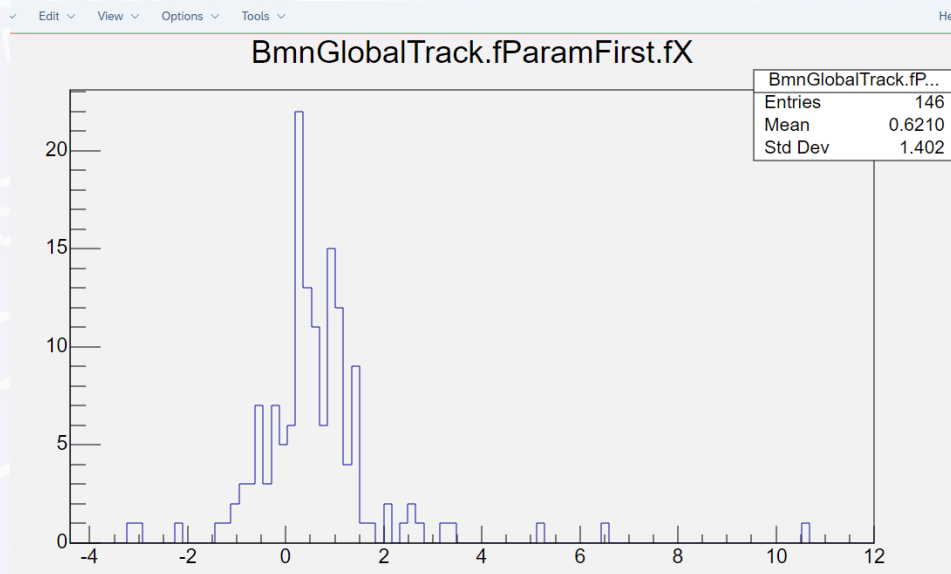
Run: 7
Revision: Dev
Use DB: NO

Identical

Verification geometry of Run8



Run: 8
Revision: dev_28.04.2023
Use DB: YES



Run: 8
Revision: Dev
Use DB: NO

Identical

C++ implementation

Class GeoSetup

```
static GeoSetup* Instance();  
const char* getParFilePath(TString& mName);  
BmnFieldMap* getFieldMap(bool isSim=true, double  
scale=-1);
```

Load for simulation

```
bool loadSimSetupFromServer(const char*  
setupTag, const char* url, const char*  
revision = NULL);  
bool loadSimSetup(const char* setupTag,  
const char* revision = NULL, const char*  
localSettings = NULL);
```

Load for reconstruction

```
bool loadRecoSetupFromServer(const  
char* setupTag, const char* url, const  
char* revision = NULL);  
bool loadRecoSetup(const char* setupTag,  
const char* revision = NULL);
```

Examples of using

- Load setup

```
GeoSetup* gSetup = GeoSetup::Instance();  
gSetup->loadSimSetup("src_run7", "21.08.0");
```

- Create/get magnetic field (load inside)

```
Double_t fieldScale = 1800. / 900.; //for sim can be remove
```

```
BmnFieldMap* magField = gSetup->getFieldMap(true, fieldScale);
```

- Get Parameter file

// at the moment it is only possible to get the full path to the file,
because there is no general use case

```
gSetup->getParFilePath("csc");
```

Macros

<i>Signature</i>	<i>Description</i>	<i>Call Example</i>	<i>Comment</i>
<code>void getSetupList();</code>	Get the list of available setups. Print the list of available setups including tag, date of creation, author and description parameters for each approved setup.	<code>getSetupList.c();</code>	Require set variable DBL_FILE_PATH before use.
<code>void installLocalDB.C (const char* urlServer);</code>	Install local database from server to client. Download replica of central database to client computer.	<code>installLocalDB ("http://bmn-geodb.jinr.ru");</code>	Require set variable DBL_FILE_PATH before use.
<code>void installServerDB.C ();</code>	Install new server instance. Install and init PostgreSQL database server, install and init WEB part of Geometry DB to Apache server.	<code>installServerDB ();</code>	Required config file with name geodb.config.xml

Next steps

- **Move to new server and new DB**
- **Add new revision after creating**
- **Test C++ implementation**
- **Implement REST version**