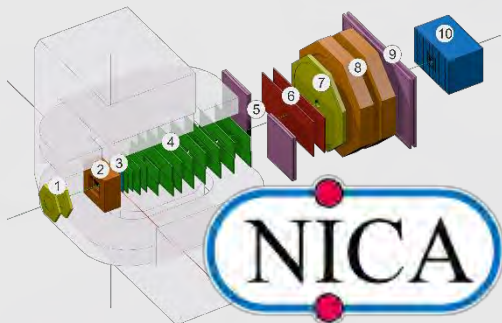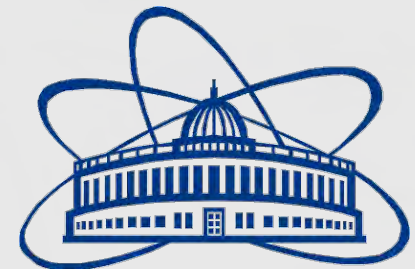# Current status of the Geometry Database for the BM@N experiment

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]
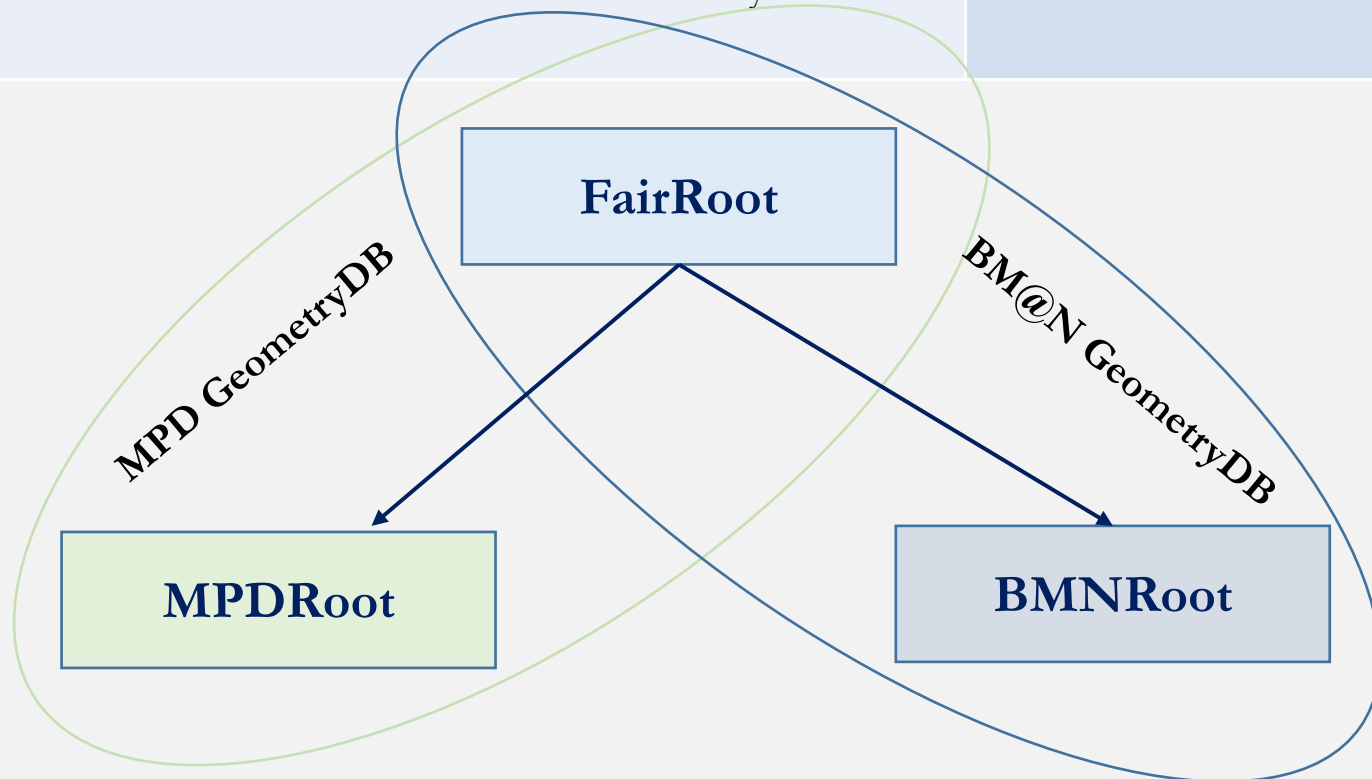
[1]JINR, Dubna
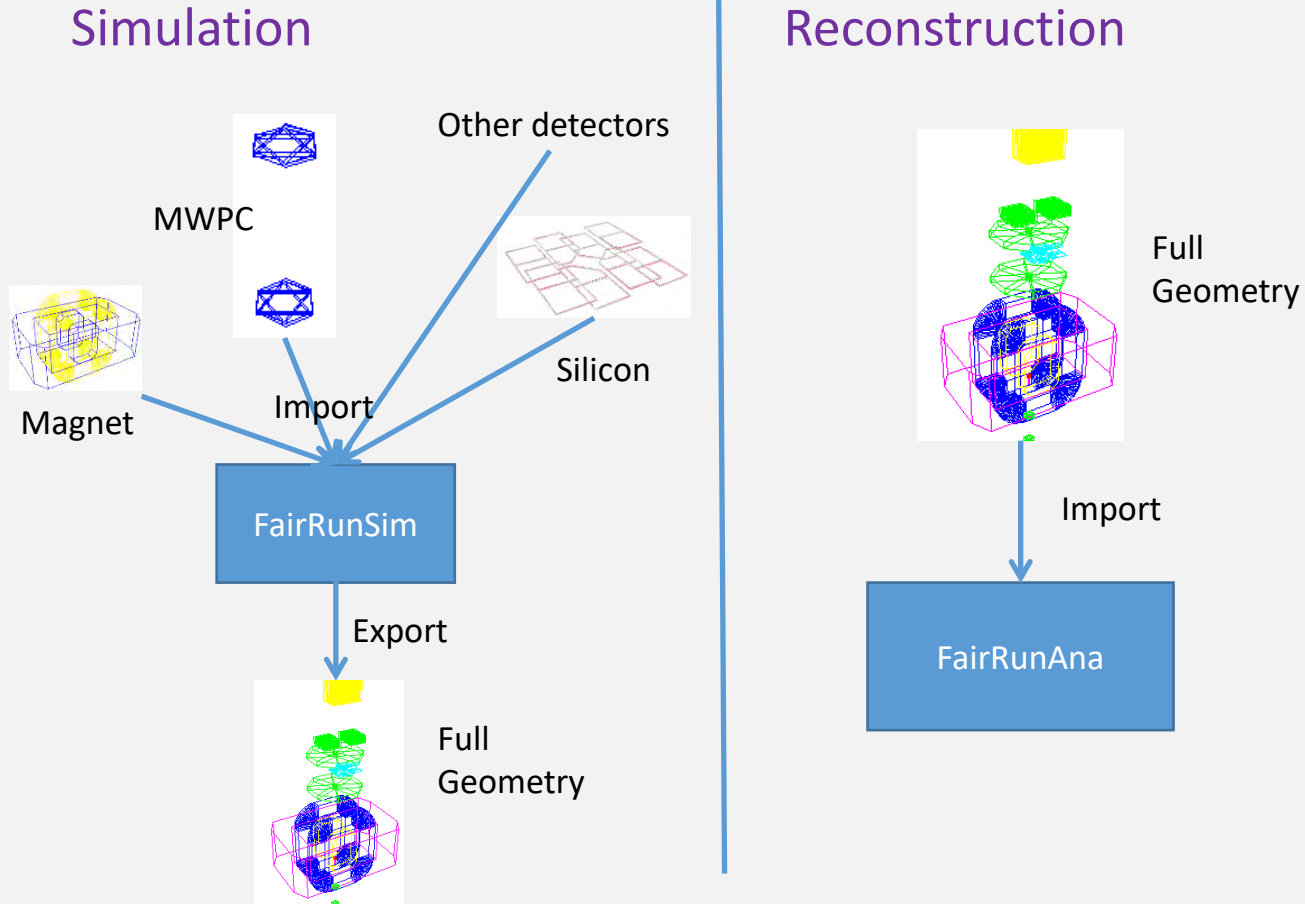
10th Collaboration Meeting of the BM@N, 14-19 May
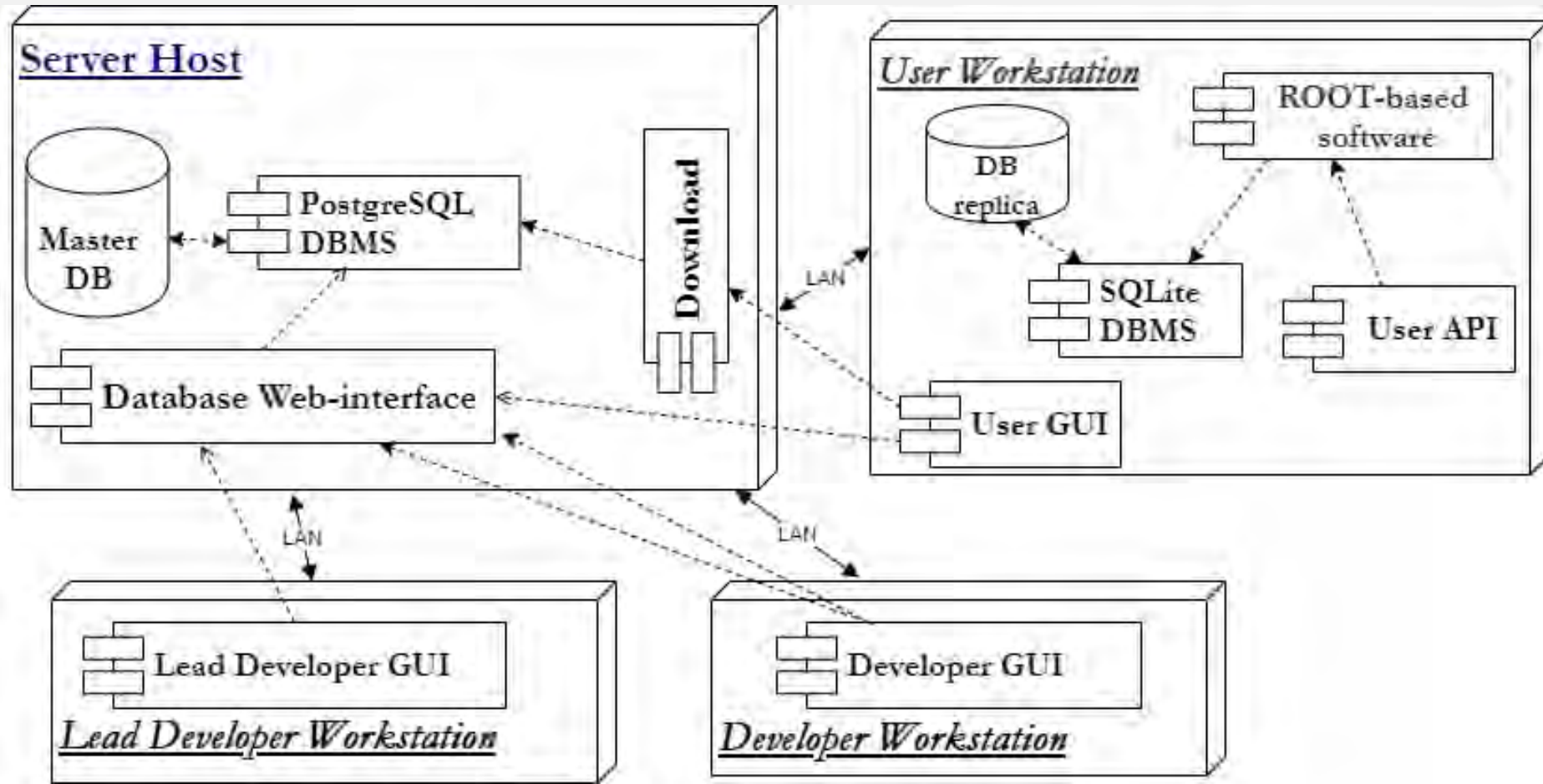
Joint Institute for Nuclear Research

BM@N & MPD

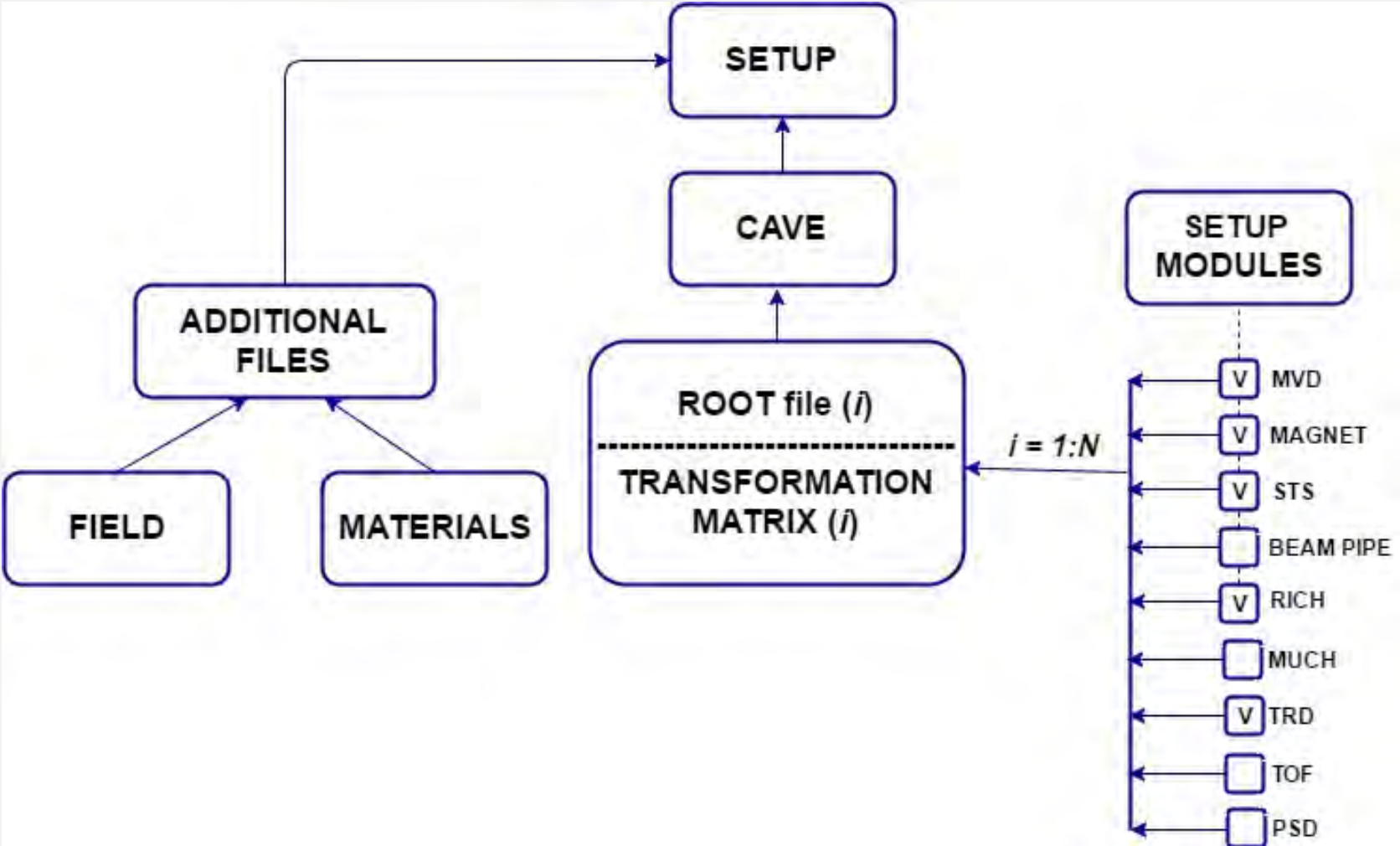| Common features	Differences
Approaches to the methods of simulations and reconstructions	
Software: FAIRSOFT, FAIRROOT **RunManager:** ➢ **FairRunSim** for the simulation runs ➢ **FairRunAna** for the reconstruction or analysis runs	The sets of Detectors

FairRoot

MPD GeometryDB

BM@N GeometryDB

MPDRoot

BMNRoot

RunManager & Geometry

Simulation

MWPC

Other detectors

Magnet

Import

Silicon

FairRunSim

Export

Full
Geometry

Reconstruction

Full
Geometry

Import

FairRunAna

General architecture of the Geometry Information System

Setup Structure

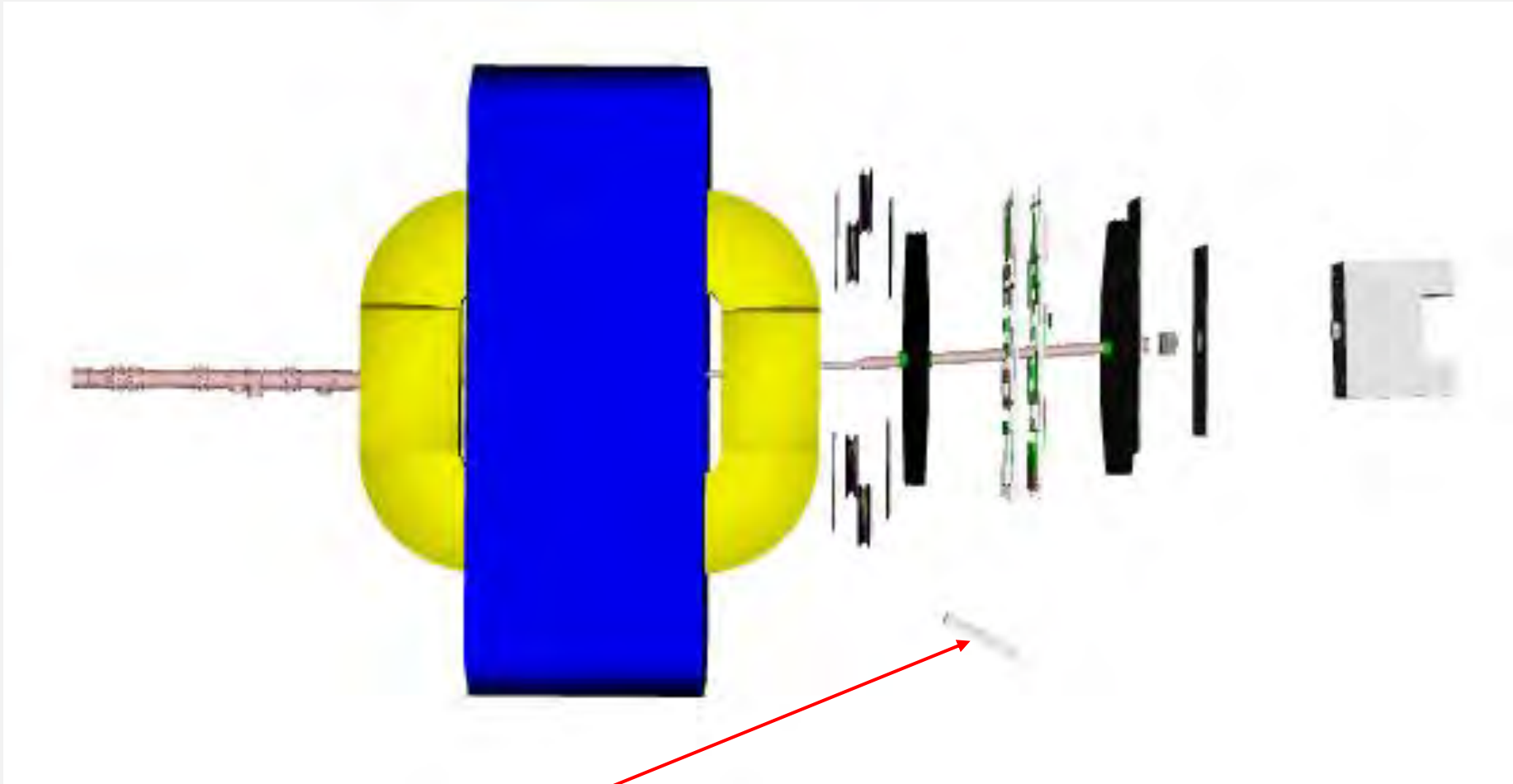
For run <8:
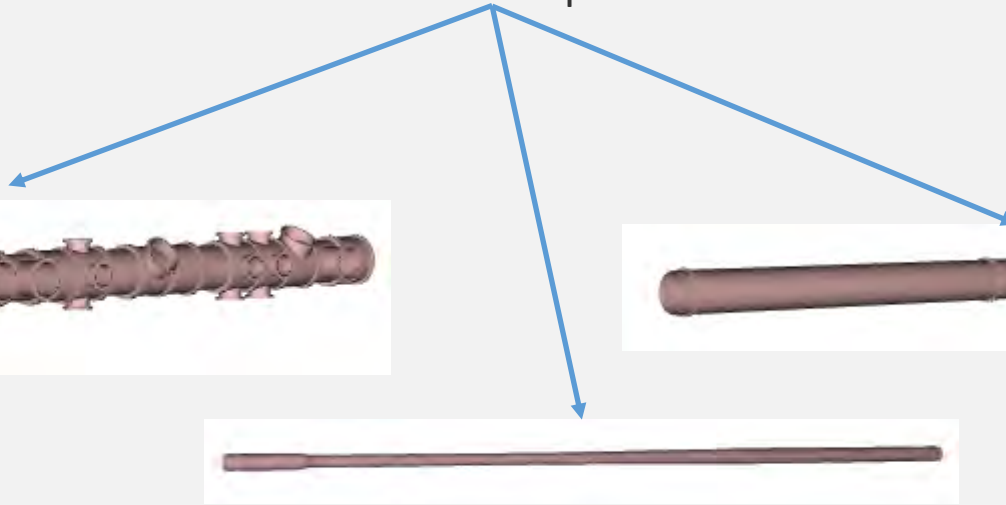**Setup can not have more than 1 instance of each module.**

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

GUI: Add/edit setup

	Type	Tag	Date	Author	File Tag	Transformation				Parent	Description
☐	TOF	tof700_run7_with _support_upd	2023-04-28	aleksand	tof700_run7_with _support_upd	1.000 0.000 0.000 0.000	0.000 1.000 0.000 0.000	0.000 0.000 1.000 0.000		CAVE	tof700_run7_with_support_upd (full description on file)
☑	TOF	tof700_run8_with _support	2023-05-12	aleksand	tof700_run8_with _support	1.000 0.000 0.000 0.000	0.000 1.000 0.000 0.000	0.000 0.000 1.000 0.000		CAVE	Corrections for TOF-700 geometry according to geodetic measurements added

PSD ⊕

PIPE ⊖

	Type	Tag	Date	Author	File Tag	Transformation				Parent	Description
☑	PIPE	VacuumPipe_section1_Run8	2023-05-11	aleksand	VacuumPipe_section1_Run8	1.000 0.000 0.000 0.000	0.000 1.000 0.000 0.000	0.000 0.000 1.000 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)
☑	PIPE	VacuumPipe_section3_Run8	2023-05-11	aleksand	VacuumPipe_section3_Run8	1.000 0.000 0.000 0.000	0.000 1.000 0.000 0.000	0.000 0.000 1.000 0.000		CAVE	Vacuum Beam Pipe: geometry of the third section (after the magnet) added position of the second section corrected
☑	PIPE	VacuumPipe_section2_Run8	2023-05-11	aleksand	VacuumPipe_section2_Run8	1.000 0.000 0.000 0.000	0.000 1.000 0.000 0.000	0.000 0.000 1.000 0.000		CAVE	Vacuum Beam Pipe: geometry of the third section (after the magnet) added position of the second section corrected

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".
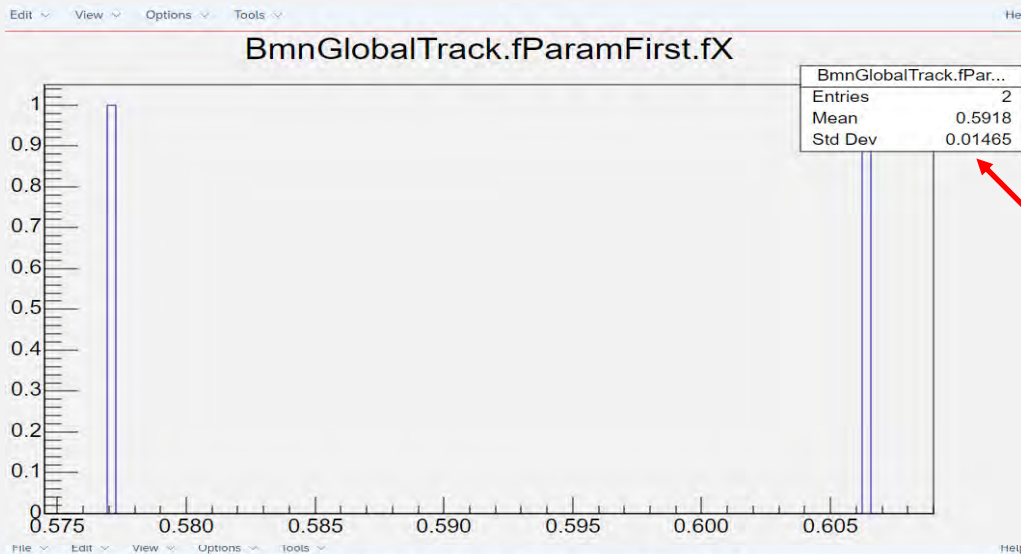
Run: 7
Revision: 21.08.0
Use DB: YES
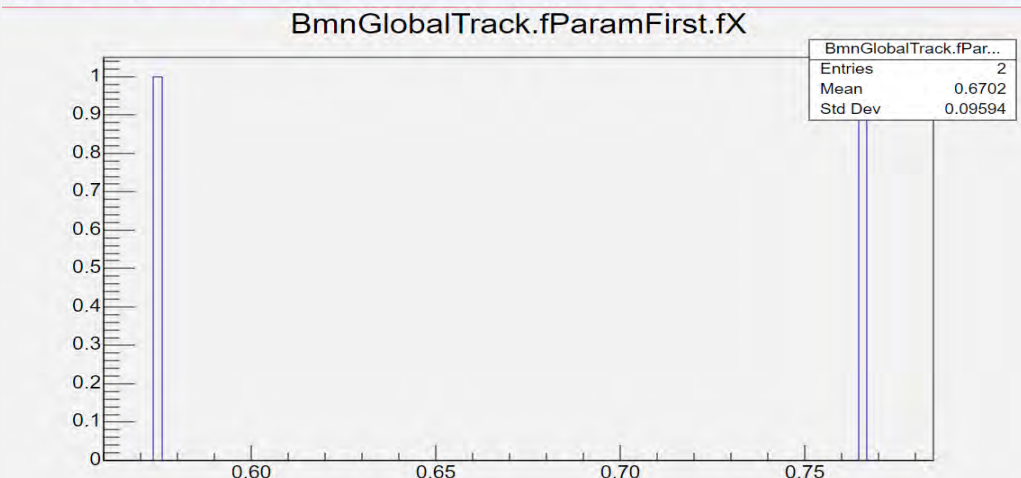
Different

Run: 7
Revision: Dev
Use DB: NO

Verification geometry of Run7

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

Identical

Run: 7
Revision: Dev
Use DB: NO

Verification geometry of Run8
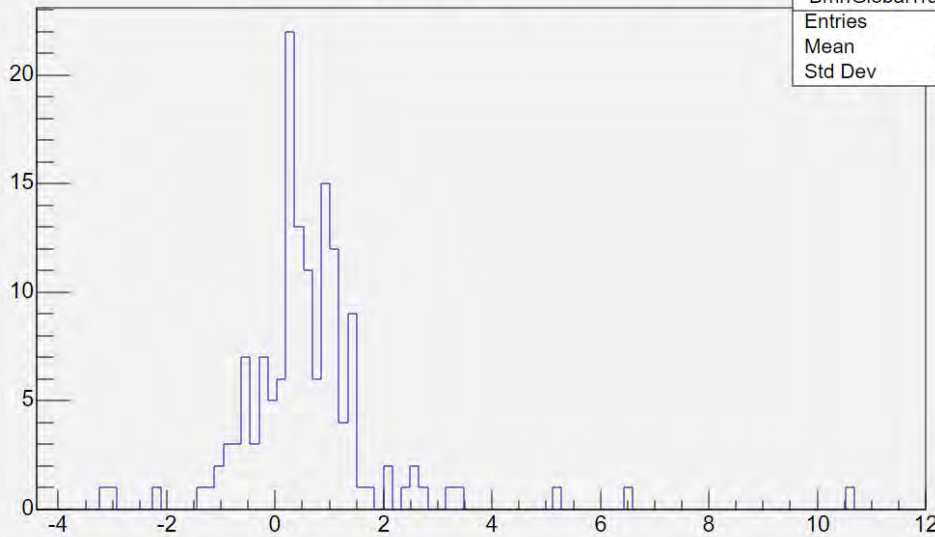
Run: 8
Revision: dev_28.04.2023
Use DB: YES

Identical

Run: 8
Revision: Dev
Use DB: NO

C++ implementation

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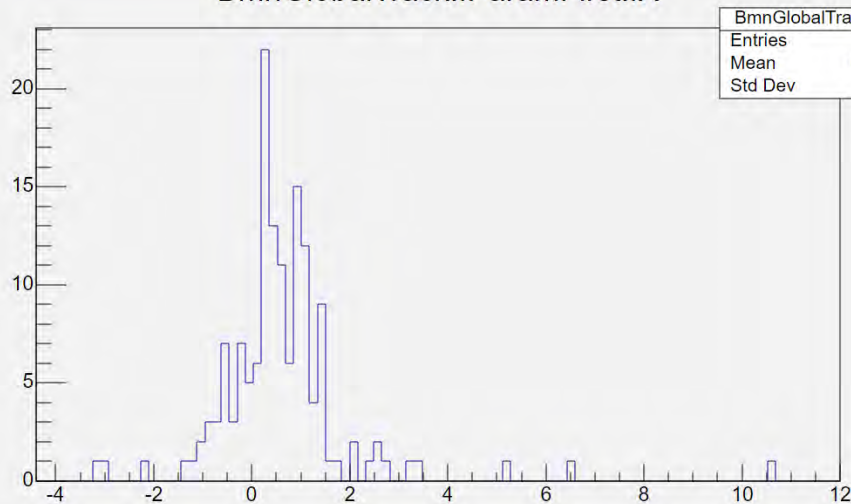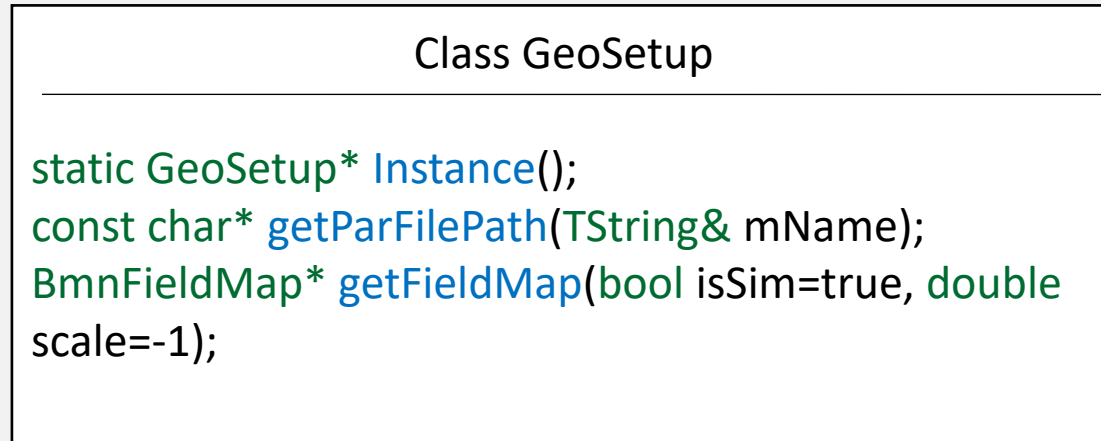
Load for simulation

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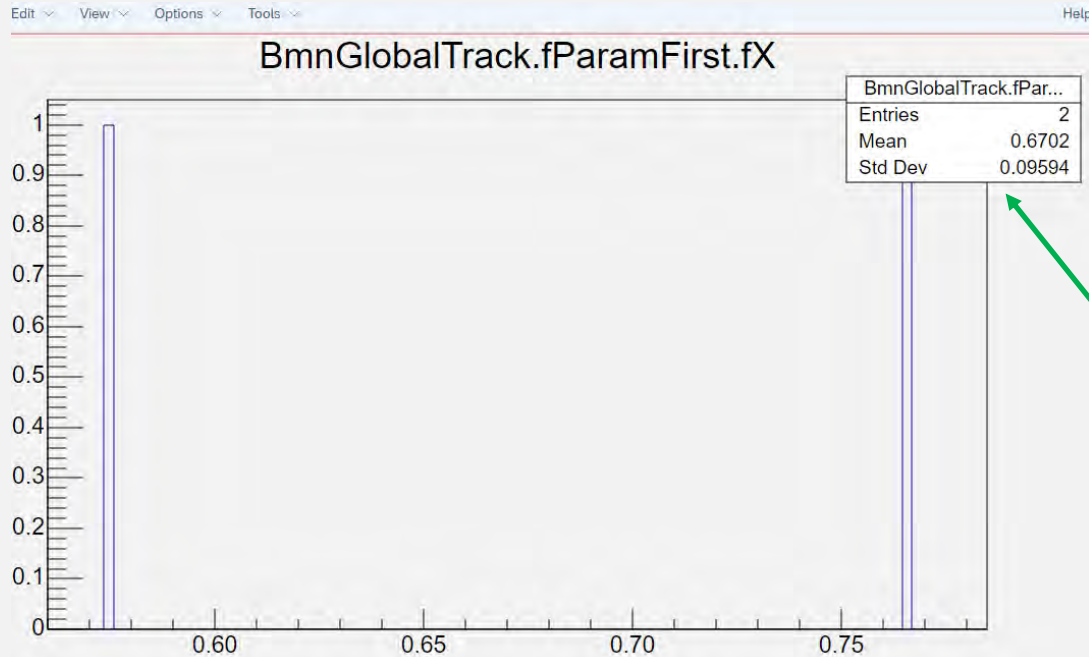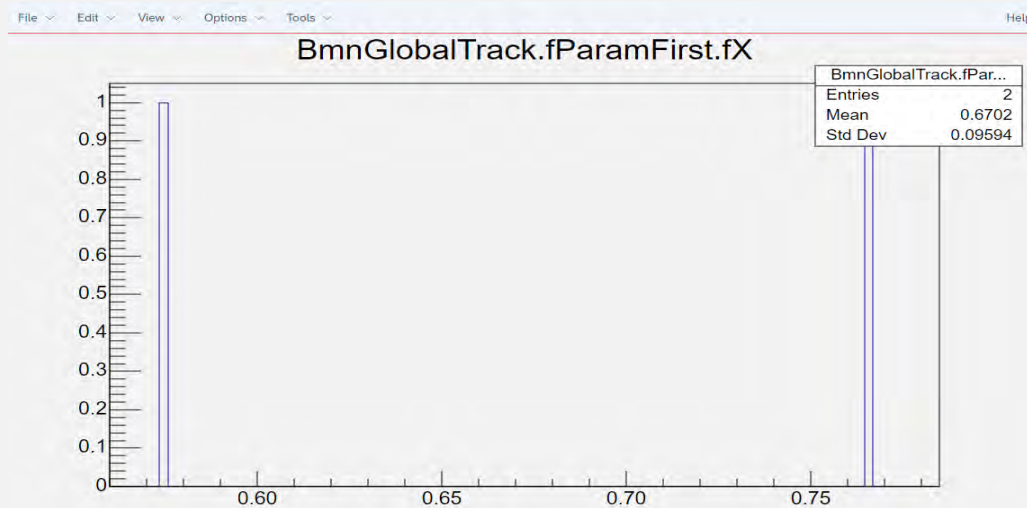bool loadSimSetup(const char* setupTag, const char* revision = NULL, const char* localSettings = NULL);

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

Signature	Description	Call Example	Comment
`void getSetupList();`	***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.	getSetupList.c();	Require set variable **DBL_FILE_PATH** before use.
void installLocalDB.C (const char* urlServer);	***Install local database from server to client.*** Download replica of central database to client computer.	**installLocalDB** ("http://bmn-geodb.jinr.ru");	Require set variable **DBL_FILE_PATH** before use.
void installServerDB.C ();	***Install new server instance***. Install and init PostgreSQL database server, install and init WEB part of Geometry DB to Apache server.	**installServerDB** ();	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**