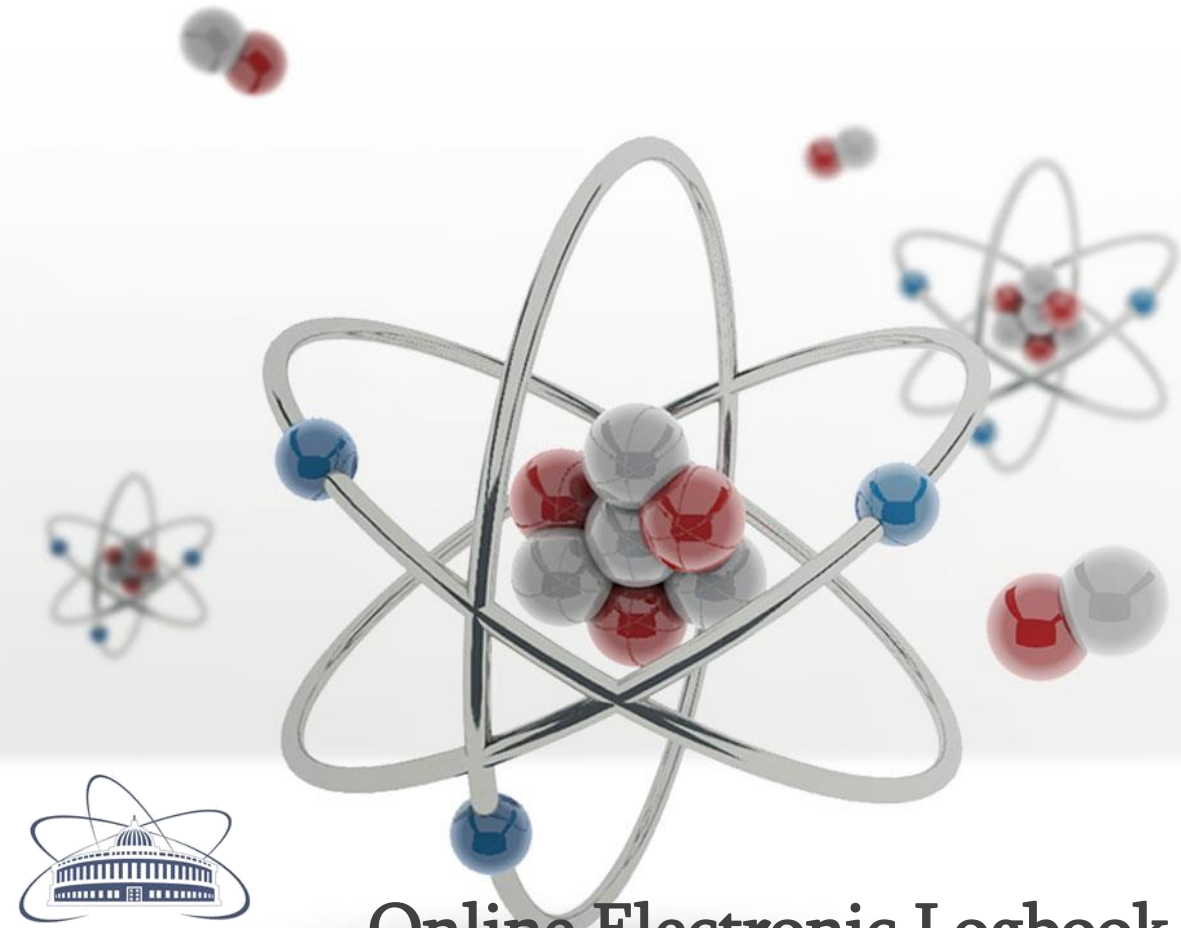
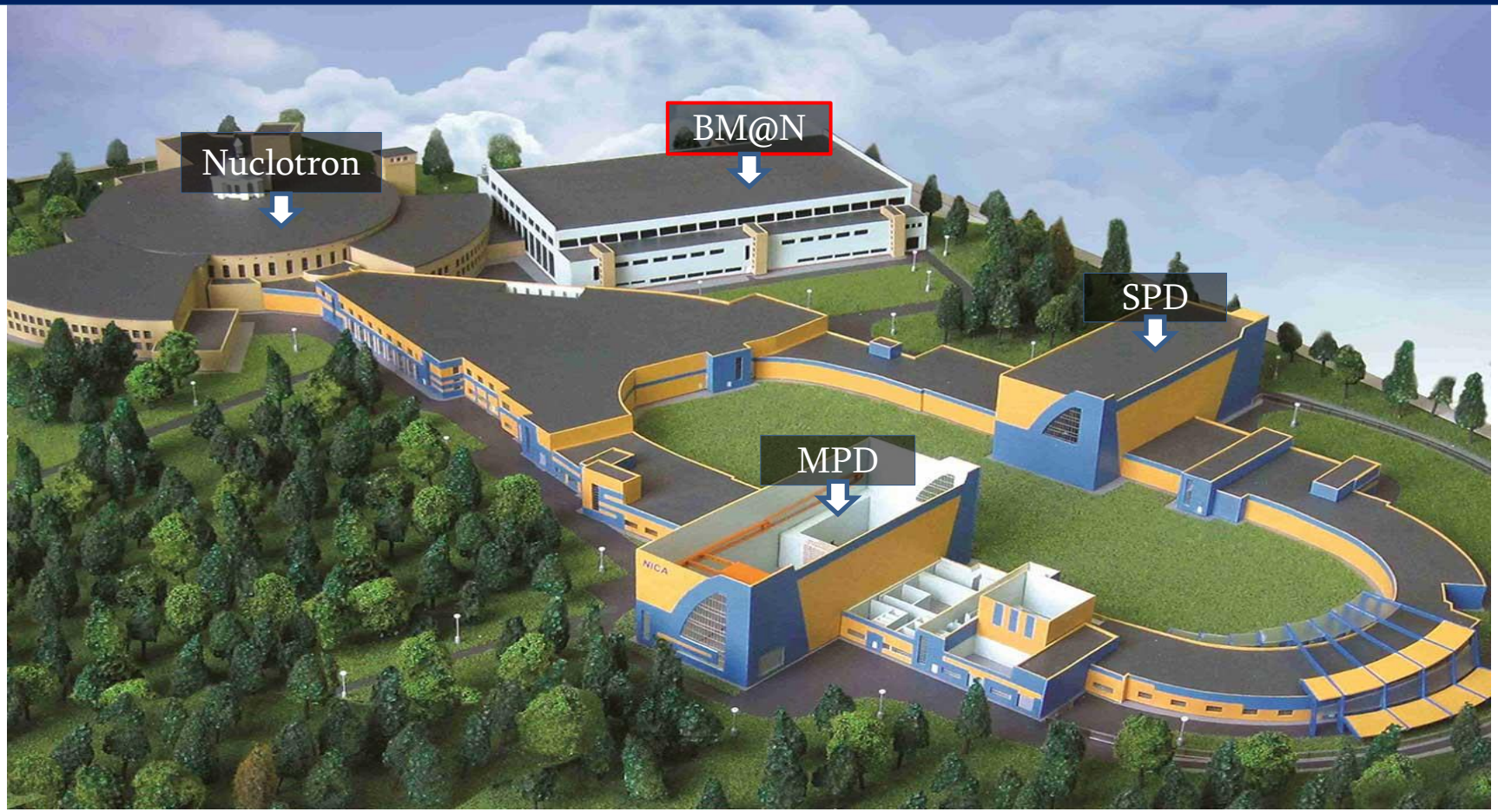


Online Electronic Logbook Improvement for the future BM@N runs

A. Chebotov, K. Gertsenberger, A. Moshkin

Veksler and Baldin Laboratory of High Energy Physics, JINR

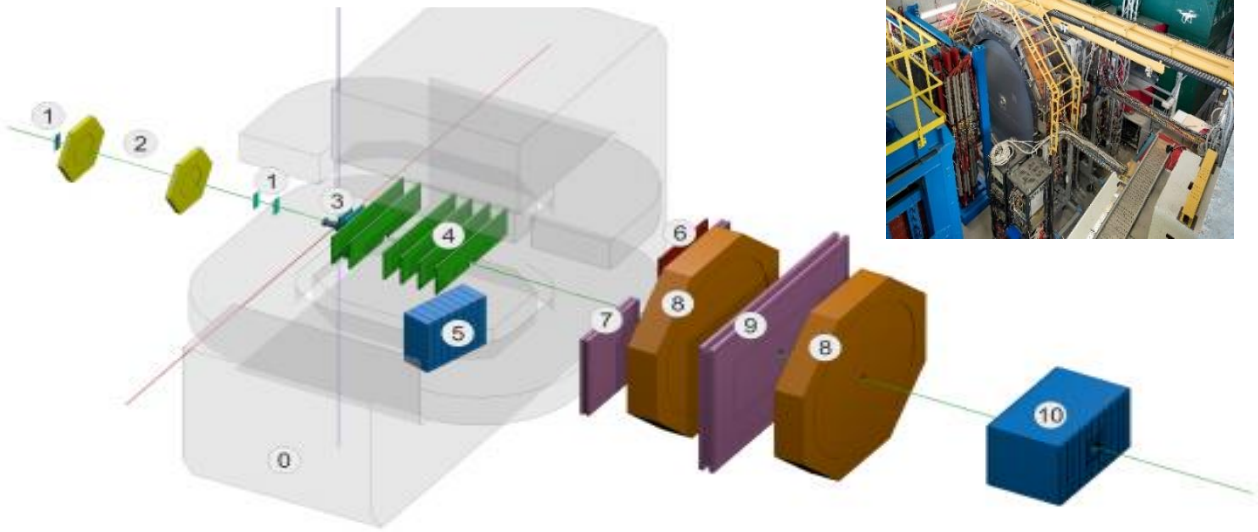
Nuclotron-based Ion Collider fAcility



- Fixed target experiment: BM@N (2018)
- Official site: *bmn.jinr.ru*

- Beams: from $d^{\uparrow}, C$ to Au^{79+}
- Trigger rate: up to $5 * 10^5$ (2022 – 2023)
- Collision energy: E_{lab} = *1 – 6 AGev*

Baryonic Matter @ Nuclotron

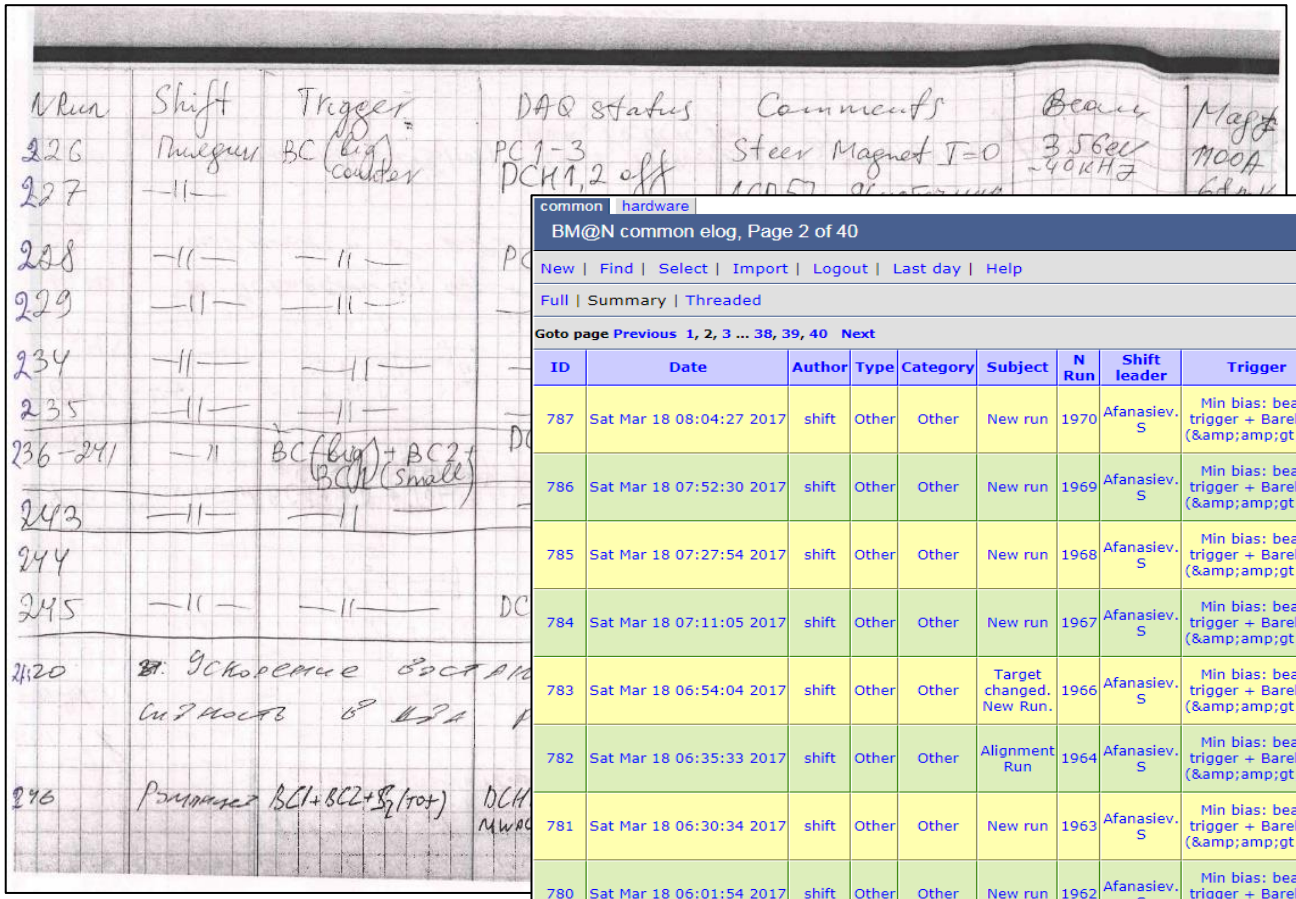


0 Analyzing magnet
1 Trigger detectors
2 MWPC (Multi-Wire Proportional Chamber)
3 ST (Silicon Tracker)
4 GEM (Gas Electron Multiplier)
5 ECAL (Electromagnetic Calorimeter)
6 CSC (Cathode Strip Chamber)
7 TOF1 (Time-Of-Flight detector)
8 DCH (Drift Chamber)
9 TOF2 (Time-Of-Flight detector)
10 ZDC (Zero-Degree Calorimeter)

BM@N Sessions (2015 – 2018)

- Session №51 (**d,C**) *Feb. 22 – Mar. 15, 2015*
- Session №52 (**d**) *June 29 – June 30, 2016*
- Session №53 (**d, $d^{\uparrow}$**) *Dec. 9 – Dec. 23, 2016*
- Session №54 (**C**) *Mar. 7 – Mar. 18, 2017*
- Session №55 (**C,Ar,Kr**) *Mar. 3 – Apr. 05, 2018*

Old Version of the logbook: electronic Web-table



common | hardware

BM@N common elog, Page 2 of 40 — Logged in as "shift" — ELOG

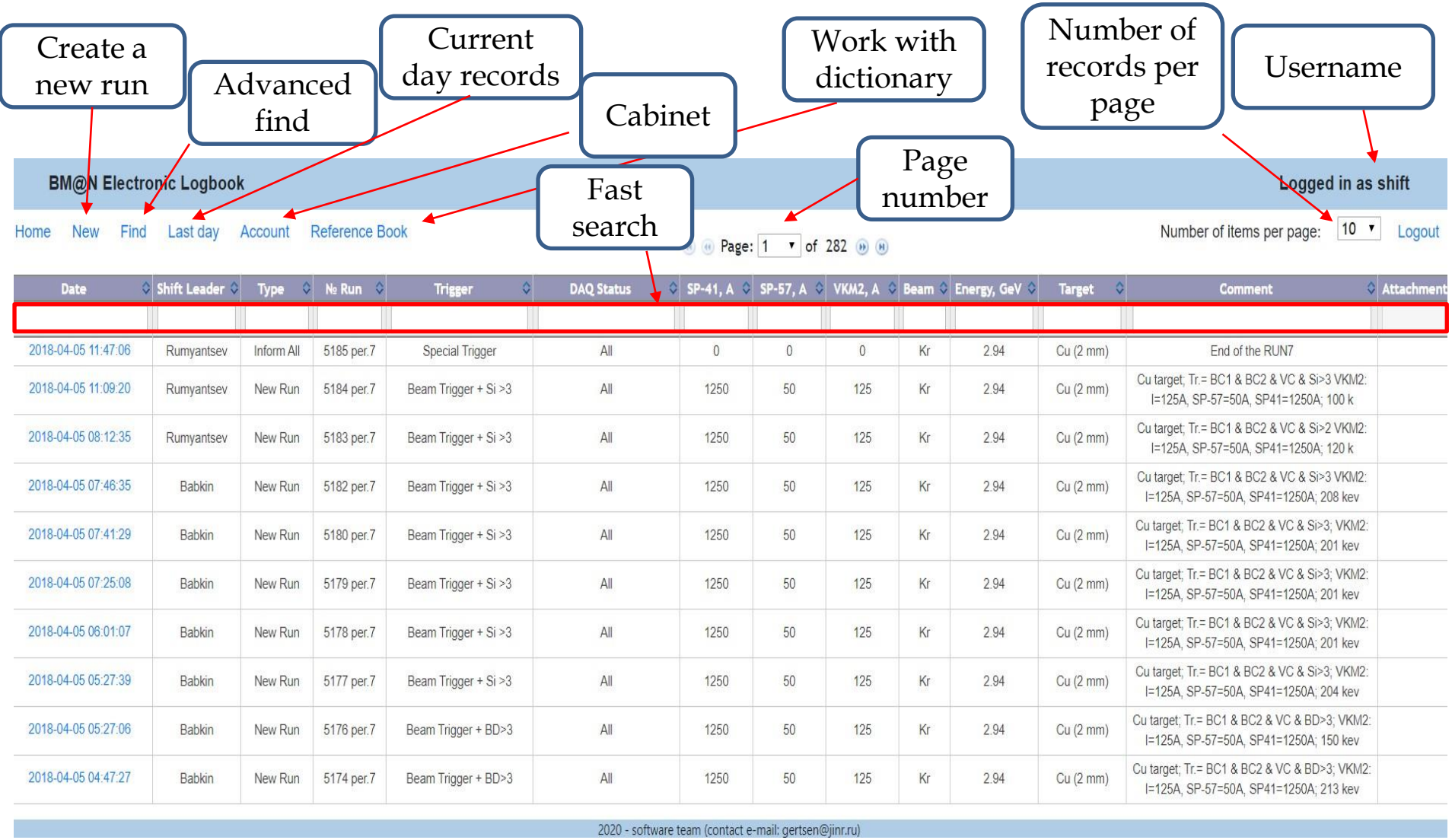
New | Find | Select | Import | Logout | Last day | Help

Full | Summary | Threaded — -- All entries -- — -- Type -- — 800 Entries

Goto page Previous 1, 2, 3 ... 38, 39, 40 Next

ID	Date	Author	Type	Category	Subject	N Run	Shift leader	Trigger	DAQ status	Mag. field	Beam	Text
787	Sat Mar 18 08:04:27 2017	shift	Other	Other	New run	1970	Afanasiev. S	Min bias: beam trigger + BarelDet (>=2)	All detectors in DAQ	1200A(75.8mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target C - 9mm)	200k events
786	Sat Mar 18 07:52:30 2017	shift	Other	Other	New run	1969	Afanasiev. S	Min bias: beam trigger + BarelDet (>=2)	All detectors in DAQ	1200A(75.8mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target C - 9mm)	200k events
785	Sat Mar 18 07:27:54 2017	shift	Other	Other	New run	1968	Afanasiev. S	Min bias: beam trigger + BarelDet (>=2)	All detectors in DAQ	1200A(76.2mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target C - 9mm)	200k events
784	Sat Mar 18 07:11:05 2017	shift	Other	Other	New run	1967	Afanasiev. S	Min bias: beam trigger + BarelDet (>=2)	All detectors in DAQ	1200A(76.2mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target C - 9mm)	200k events
783	Sat Mar 18 06:54:04 2017	shift	Other	Other	Target changed. New Run.	1966	Afanasiev. S	Min bias: beam trigger + BarelDet (>=2)	All detectors in DAQ	1200A(76.2mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target C - 9mm)	200k events
782	Sat Mar 18 06:35:33 2017	shift	Other	Other	Alignment Run	1964	Afanasiev. S	Min bias: beam trigger + BarelDet (>=3)	All detectors in DAQ	0A (0.2 mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target Cu - 5mm)	100k events
781	Sat Mar 18 06:30:34 2017	shift	Other	Other	New run	1963	Afanasiev. S	Min bias: beam trigger + BarelDet (>=3)	All detectors in DAQ	1200A(75.8mV) SP-57 = 0A, VKM2 = 0A	C 3.5Gev/nucl (Target Cu - 5mm)	205k events
780	Sat Mar 18 06:01:54 2017	shift	Other	Other	New run	1962	Afanasiev. S	Min bias: beam trigger + BarelDet (>=3)	All detectors in DAQ	1200A(75.8mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target Cu - 5mm)	214k event
779	Sat Mar 18 05:48:04 2017	shift	Other	Other	New run	1961	Afanasiev. S	Min bias: beam trigger + BarelDet (>=3)	All detectors in DAQ	1200A(75.8mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target Cu - 5mm)	200k events
778	Sat Mar 18 05:24:55 2017	shift	Other	Other	New run	1960	Afanasiev. S	Min bias: beam trigger + BarelDet (>=3)	All detectors in DAQ	1200A(75.8mV) SP-57 = 0A, VKM2 = 0A	C 4.5Gev/nucl (Target Cu - 5mm)	200k events

Current version of the logbook: electronic Web-table

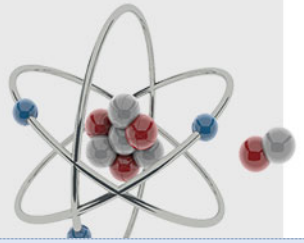


Date	Shift Leader	Type	№ Run	Trigger	DAQ Status	SP-41, A	SP-57, A	VKM2, A	Beam	Energy, GeV	Target	Comment	Attachment
2018-04-05 11:47:06	Rumyantsev	Inform All	5185 per.7	Special Trigger	All	0	0	0	Kr	2.94	Cu (2 mm)	End of the RUN7	
2018-04-05 11:09:20	Rumyantsev	New Run	5184 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3 VKM2: I=125A, SP-57=50A, SP41=1250A; 100 k	
2018-04-05 08:12:35	Rumyantsev	New Run	5183 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>2 VKM2: I=125A, SP-57=50A, SP41=1250A; 120 k	
2018-04-05 07:46:35	Babkin	New Run	5182 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3 VKM2: I=125A, SP-57=50A, SP41=1250A; 208 kev	
2018-04-05 07:41:29	Babkin	New Run	5180 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 201 kev	
2018-04-05 07:25:08	Babkin	New Run	5179 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 201 kev	
2018-04-05 06:01:07	Babkin	New Run	5178 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 201 kev	
2018-04-05 05:27:39	Babkin	New Run	5177 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 204 kev	
2018-04-05 05:27:06	Babkin	New Run	5176 per.7	Beam Trigger + BD>3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & BD>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 150 kev	
2018-04-05 04:47:27	Babkin	New Run	5174 per.7	Beam Trigger + BD>3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & BD>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 213 kev	

2020 - software team (contact e-mail: gertsen@jinr.ru)

What is an e-Log and why is it needed?

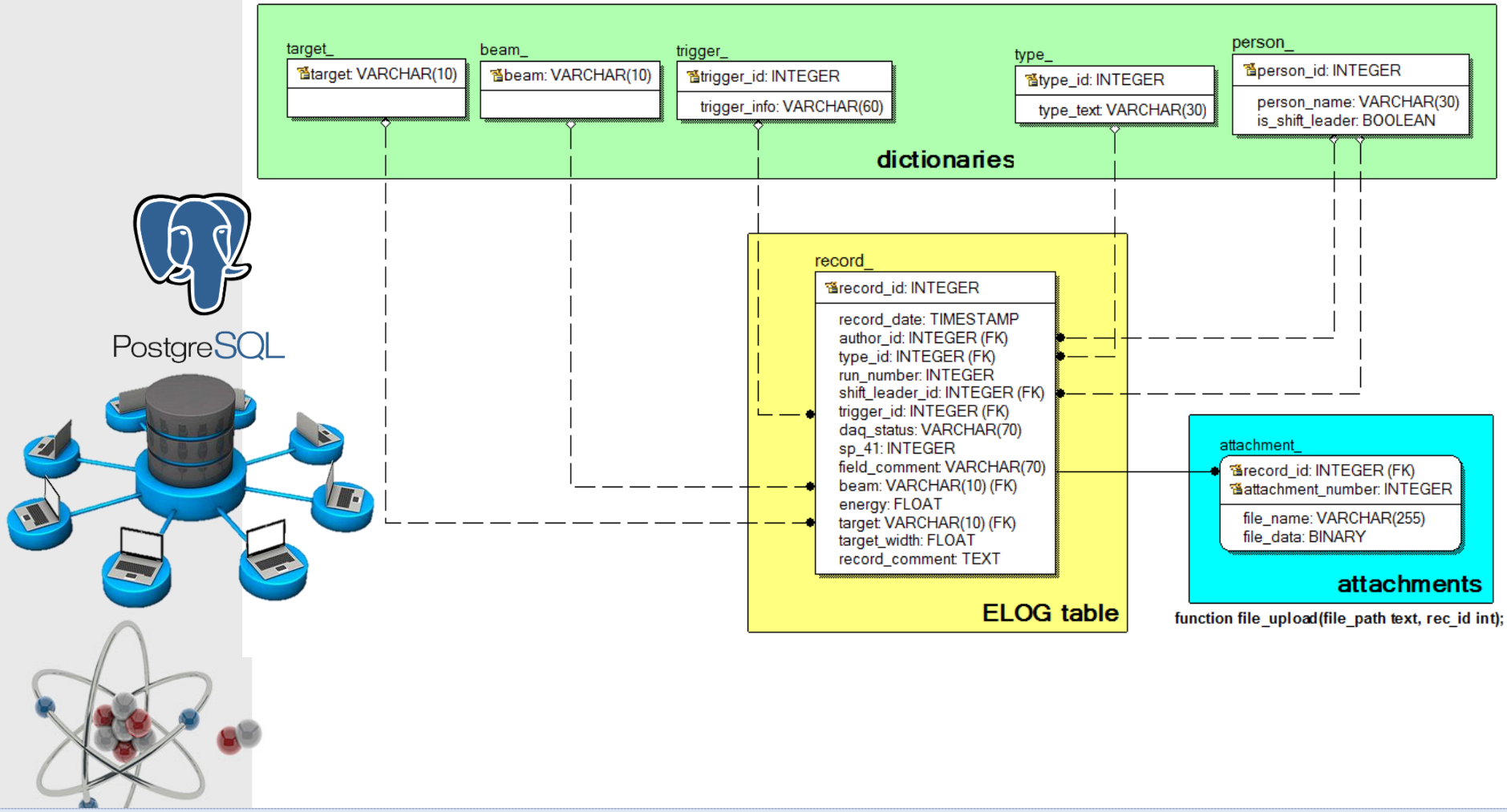
- The online electronic logbook allows shift members to record information on current events, states of various systems, operation conditions of detectors., which are further used in processing and physics analysis of the particle collision events.
- The system provides collaboration members with tools for convenient viewing, managing and searching for the required information in the logbook.



e-Log platform

- The e-Log platform uses a developed Logbook Database based on PostgreSQL.
- The e-Log uses the implemented Logbook Database to store the experiment logbook data, ensure correct multi-user access, data consistency, integrity and provide automatic regular data backup for cases of software errors or hardware failures.
- Developed interfaces provides an unified access to required logbook data for various online and offline systems, such as: BmnRoot and Online Monitoring
- A part of e-Log data is automatically transferred to the Unified Database of the experiment to use in offline analysis.

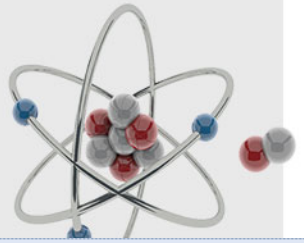
e-Log database scheme



e-Log dictionary

The main table with all logbook records (record_ table located in the center of the figure) uses the following set of dictionaries:

- a dictionary of all possible beam particles;
- a dictionary of all possible targets;
- a dictionary of all possible trigger types;
- a dictionary of record types, such as ‘shift started’, ‘problem report’, ‘configuration’, ‘new run’;
- a list of the collaboration members.



e-Log: Authentication/Authorization service

Three-step process

freeIPA
identity | policy | audit

Identification

Identification happens when a user claims an identity.

Authentication

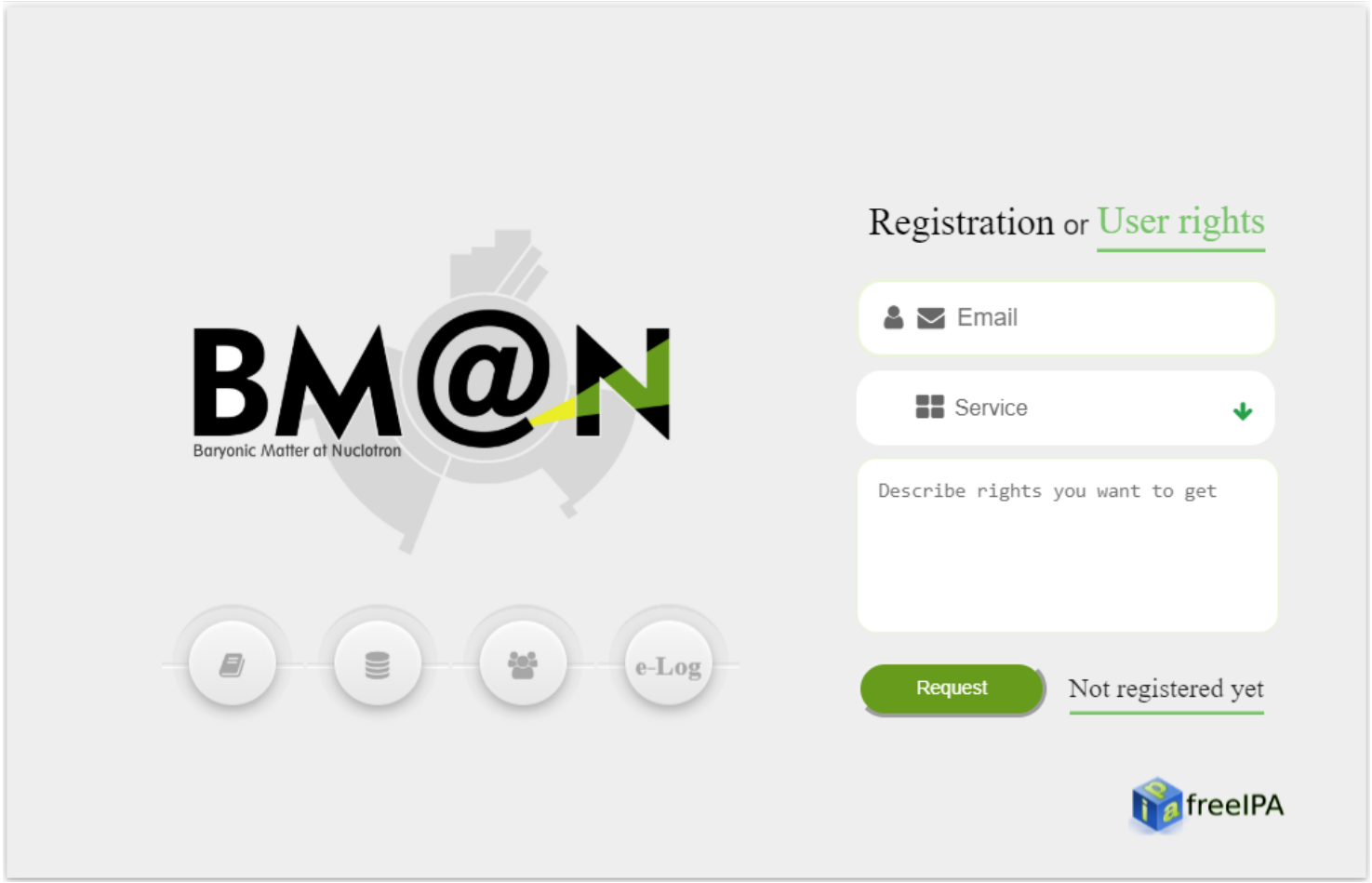
That is the authentication process: verifying a claimed identity.

Authorization

This stage provides access to functions the service (system) depending on access only do what you have permissions

Access control systems grants access to resources only to users whose identity has been proved and having the required permissions.

e-Log: Authentication/Authorization service

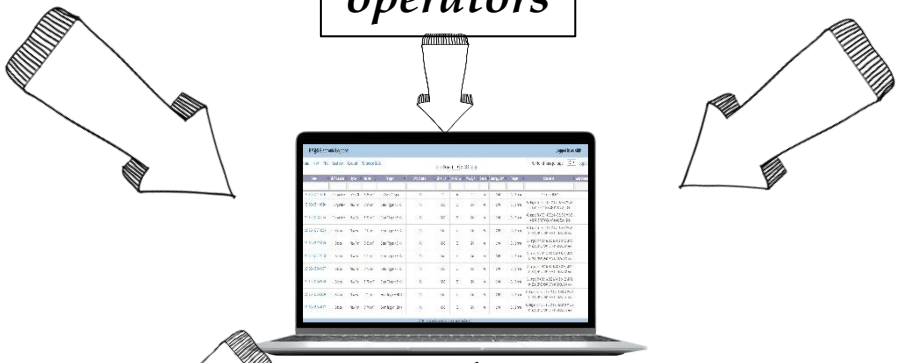


e-Log: Access scheme

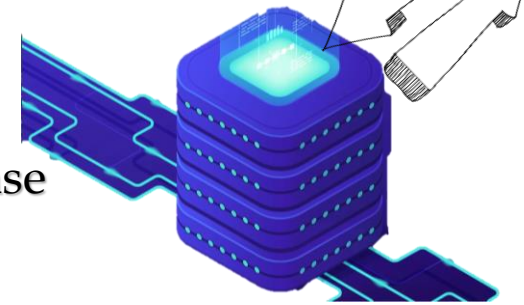
admins

shift operators

users

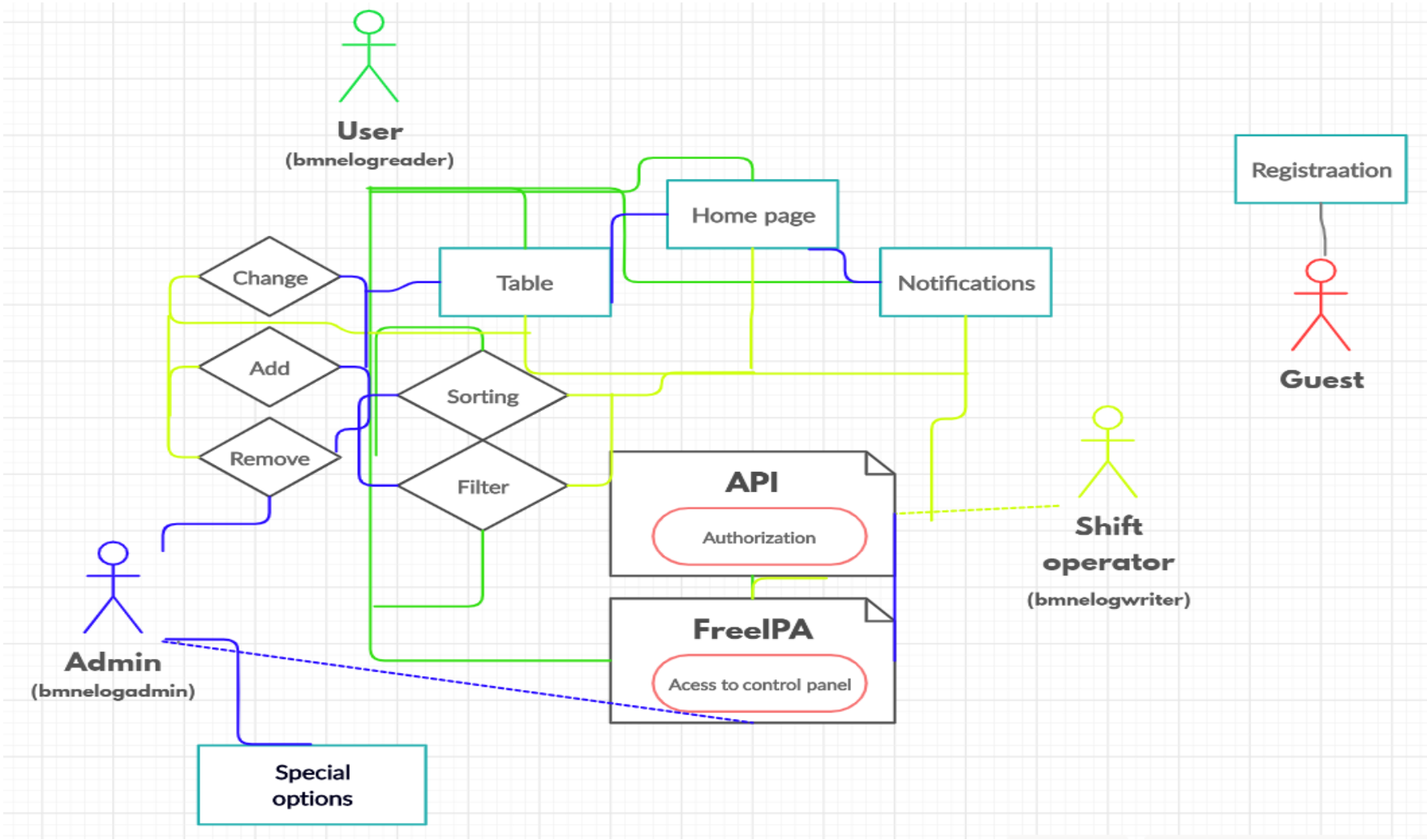


Web interface



Database

e-Log: Group users



e-Log: Functions

Administrator access

Home | New | Find | Last day | Account | Reference Book

Page: 1 of 282 | Number of items per page: 10 | Logout

Date	Shift Leader	Type	№ Run	Trigger	DAQ Status	SP-41, A	SP-57, A	VKM2, A	Beam	Energy, GeV	Target	Comment	Attachment	
2018-04-05 11:47:06	Rumyantsev	Inform All	5185 per.7	Special Trigger	All	0	0	0	Kr	2.94	Cu (2 mm)	End of the RUN7		Edit
2018-04-05 11:09:20	Rumyantsev	New Run	5184 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3 VKM2: I=125A, SP-57=50A, SP41=1250A; 100 k		Edit
2018-04-05 08:12:35	Rumyantsev	New Run	5183 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>2 VKM2: I=125A, SP-57=50A, SP41=1250A; 120 k		Edit
2018-04-05 07:46:35	Babkin	New Run	5182 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3 VKM2: I=125A, SP-57=50A, SP41=1250A; 208 kev		Edit
2018-04-05 07:41:29	Babkin	New Run	5180 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 201 kev		Edit
2018-04-05 07:25:08	Babkin	New Run	5179 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 201 kev		Edit
2018-04-05 06:01:07	Babkin	New Run	5178 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 201 kev		Edit
2018-04-05 05:27:39	Babkin	New Run	5177 per.7	Beam Trigger + Si >3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & Si>3; VKM2: I=125A, SP-57=50A, SP41=1250A; 204 kev		Edit
2018-04-05	Babkin	New Run	5176 per.7	Beam Trigger + BD>3	All	1250	50	125	Kr	2.94	Cu (2 mm)	Cu target; Tr.= BC1 & BC2 & VC & BD>3; VKM2: I=125A, SP-57=50A,		Edit

e-Log: Functions

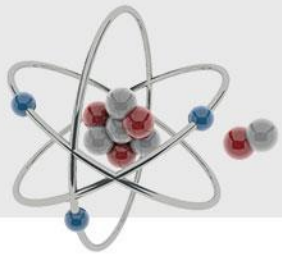
Dictionary of installed event type

Type

Type	
Configuration	0){?> Is used Delete
Inform All	0){?> Is used Delete
New Run	0){?> Is used Delete
Other	0){?> Is used Delete
Problem Fixed	0){?> Is used Delete
Problem report	0){?> Is used Delete
Routine	0){?> Is used Delete
Shift started	0){?> Is used Delete
Shift summary	0){?> Is used Delete
Software Installation	0){?> Is used Delete

Advanced administrator settings

e-Log: Functions



Dictionary of installed event triggers

Trigger

Trigger	
Beam	Is used
Beam BC1	Is used
Beam BC1 + BC2	Is used
Beam T0	Is used
Beam Trigger (BC1+BC2+T0+Veto)	Is used
Beam Trigger + BD (> 0) & Si (> 2)	Is used
Beam Trigger + BD(>=1)	Is used
Beam Trigger + BD(>1) and Si(>2)	Is used
Beam Trigger + BD(>=1) + FD	Is used
Beam Trigger + BD > 1 & Si > 3	Is used
Beam Trigger + BD(>=2)	Is used

Advanced administrator settings

e-Log: Functions

Dictionary of installed event beam

Type | Trigger | Beam | Target

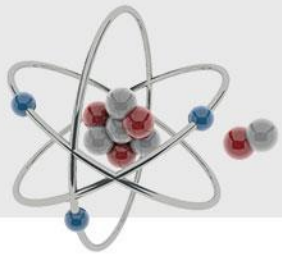
Beam

Beam	
Ar	0){?> Is used Delete
C	0){?> Is used Delete
d	0){?> Is used Delete
Kr	0){?> Is used Delete

Save changes | Add New >>

Advanced administrator settings

e-Log: Functions



Type | Trigger | Beam | Target

Dictionary of installed event target

Target

Target	
Al	0){?> Is used Delete
C	0){?> Is used Delete
C2H4	0){?> Is used Delete
Cu	0){?> Is used Delete
H2	0){?> Is used Delete
Pb	0){?> Is used Delete
Sn	0){?> Is used Delete
SRC Lead 1	0){?> Is used Delete
SRC Lead 2	0){?> Is used Delete
SRC Lead 3	0){?> Is used Delete

Advanced administrator settings

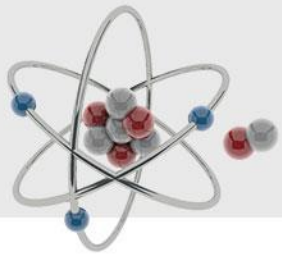
e-Log: Functions

Sort data by selected parameters

Date	Shift Leader	Type	№ Run	Trigger	DAQ Status	SP-41, A	SP-57, A	VKM2, A
2018-04-05								
2018-04-05 02:25:40	Babkin	New Run	5165 per.7	Beam BC1	All-ZDC	1200	50	200
2018-04-05 02:28:56	Babkin	New Run	5166 per.7	Beam BC1	All-ZDC	1250	50	200
2018-04-05 03:01:01	Babkin	New Run	5167 per.7	Beam Trigger + BD>3	All	1250	50	125

Date	Shift Leader	Type	№ Run	Trigger	DAQ Status	SP-41, A	SP-57, A
2018-04-05							
2018-04-05 11:47:06	Rumyantsev	Inform All	5185 per.7	Special Trigger	All	0	0
2018-04-05 11:09:20	Rumyantsev	New Run	5184 per.7	Beam Trigger + Si >3	All	1250	50
2018-04-05 08:12:35	Rumyantsev	New Run	5183 per.7	Beam Trigger + Si >3	All	1250	50
2018-04-05 07:46:35	Babkin	New Run	5182 per.7	Beam Trigger + Si >3	All	1250	50

e-Log: Functions



Fast data filtering

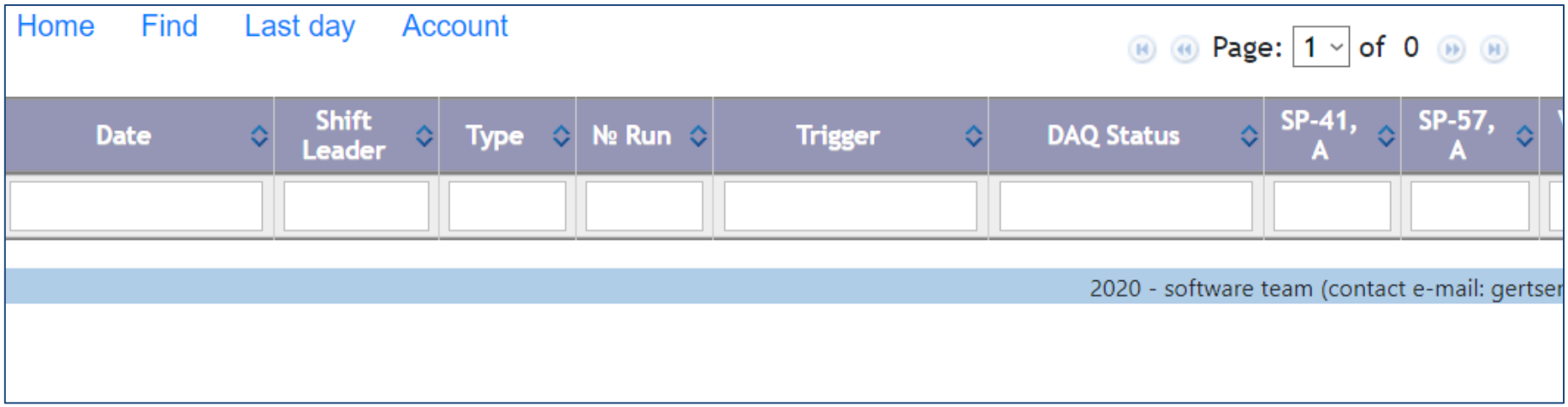
Date	Shift Leader	Type	№ Run	Trigger	DAQ Status	SP-41, A	SP-57, A	VKM2, A
2018-04-05 11								
2018-04-05 11:47:06	Rumyantsev	Inform All	5185 per.7	Special Trigger	All	0	0	0
2018-04-05 11:09:20	Rumyantsev	New Run	5184 per.7	Beam Trigger + Si >3	All	1250	50	125

2020 - software team (contact e-mail: gertsen@jinr.ru)

e-Log: Last day

is a useful feature during sessions

This is a table of current day events for shift work.



e-Log: Account

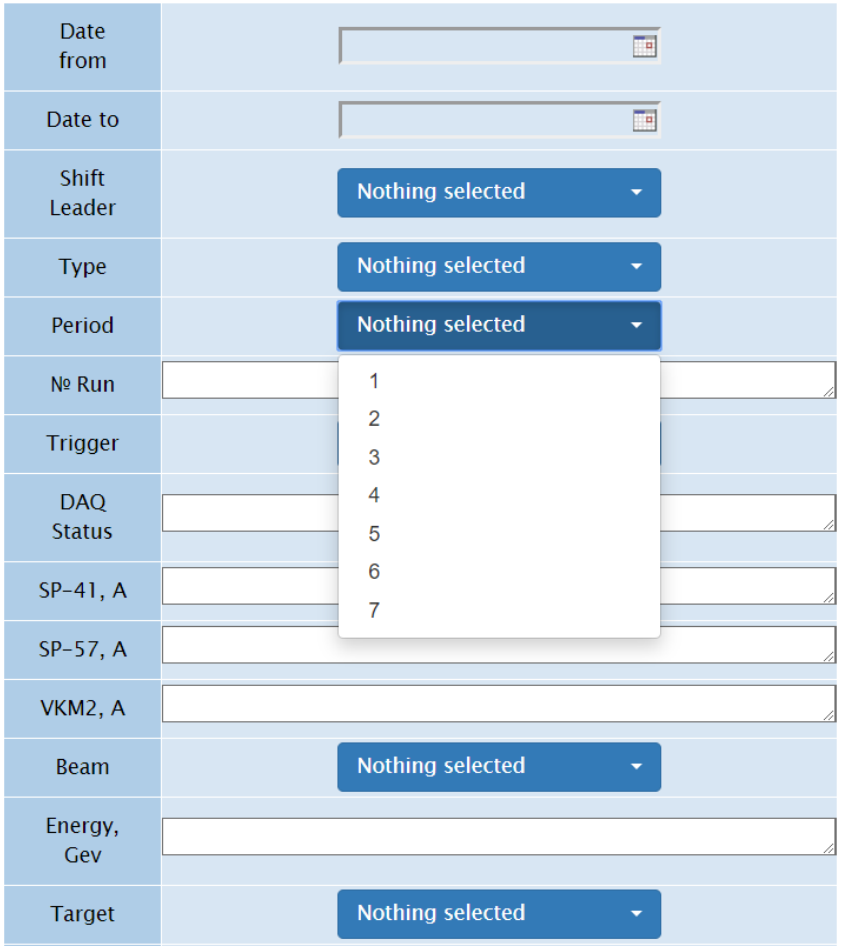
Event	Subscription
New record of the 'Configuration' type.	☐
New record of the 'Inform All' type.	☐
New record of the 'New Run' type.	☐
New record of the 'Other' type.	☐
New record of the 'Problem Fixed' type.	☐
New record of the 'Problem report' type.	☐
New record of the 'Routine' type.	☐
New record of the 'Shift started' type.	☐
New record of the 'Shift summary' type.	☐
New record of the 'Software Installation' type.	☐

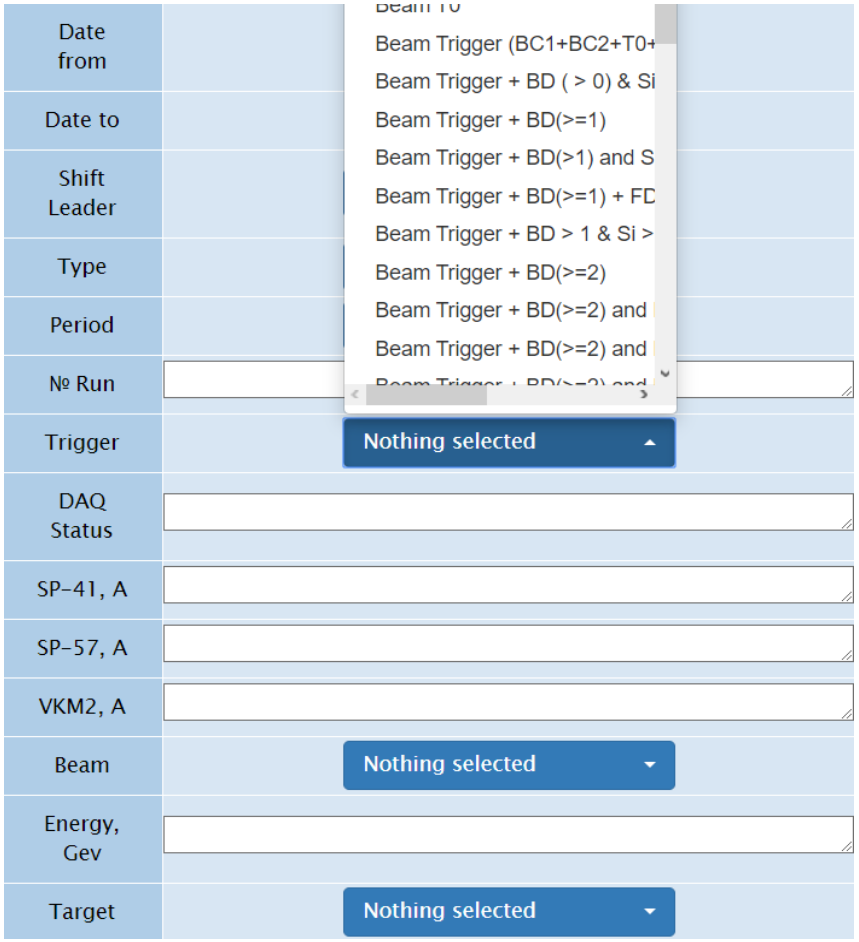
Save

In your account you can subscribe to the newsletter for selected types of events

e-Log: Functions

Advanced filter





e-Log: Functions

Shift Leader	Rumyantsev
Type	Inform All — Add New >>
Period	7
№ Run	5185
Trigger	Special Trigger — Add New >>
DAQ Status	All
SP-41, A	0
SP-57, A	0
VKM2, A	0
Beam	Kr — Add New >>
Energy, GeV	2.94
Target	Cu — Add New >>
Target Width, mm	2
	End of the RUN7

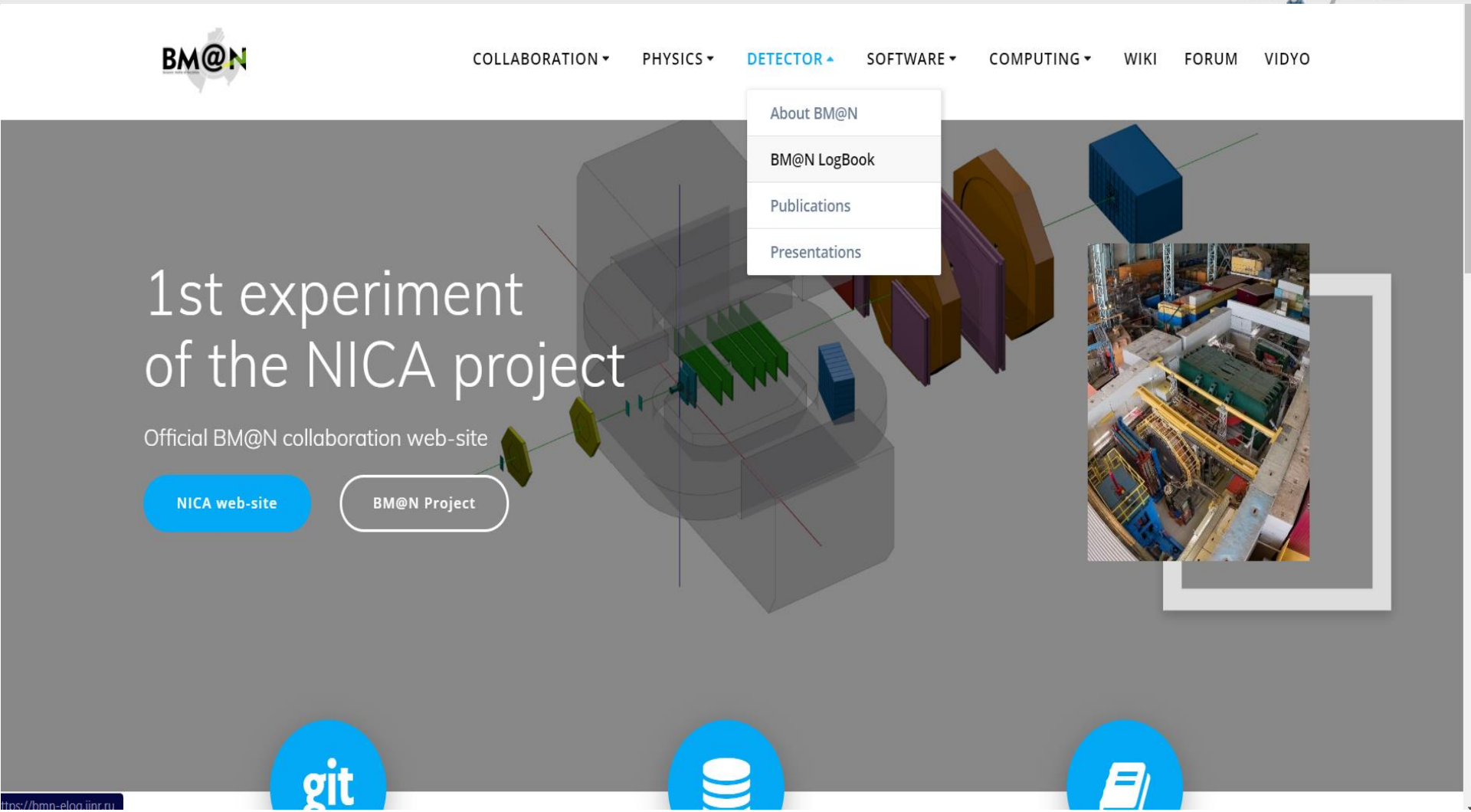
Attachments:

№	File

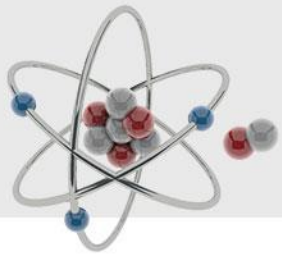
Choose file(s) to upload Выбрать файль

Only users belonging to the administrator or shift operators role can create or change records.

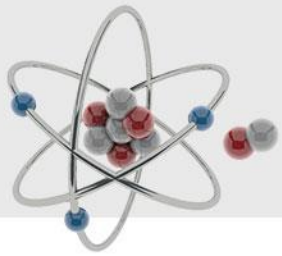
e-Log on the BM@N official Web site



Summary



- e-Log platform is an information system for viewing, modifying and visualizing the information on BM@N experiment for shift crews. Platform stored information of events or problems occurring in the experiment during its operation.
- The e-Log system uses the developed Logbook Database based on PostgreSQL which ensures data consistency, integrity and automatic backup of the stored data.
- The platform integrates access control functions for service administrators using the FreeIPA system.
- RFBR support with the NICA three-year grant (№18-02-40125) enables to develop and improve the Information Systems for online and offline data processing including the online Electronic Logbook system.



Thank you for your attention!

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