

Settings Manager User Guide

Settings Manager → Help → User Guide

Tong Zhang

2022-04-28

Revised: 2023-02-16

Contents

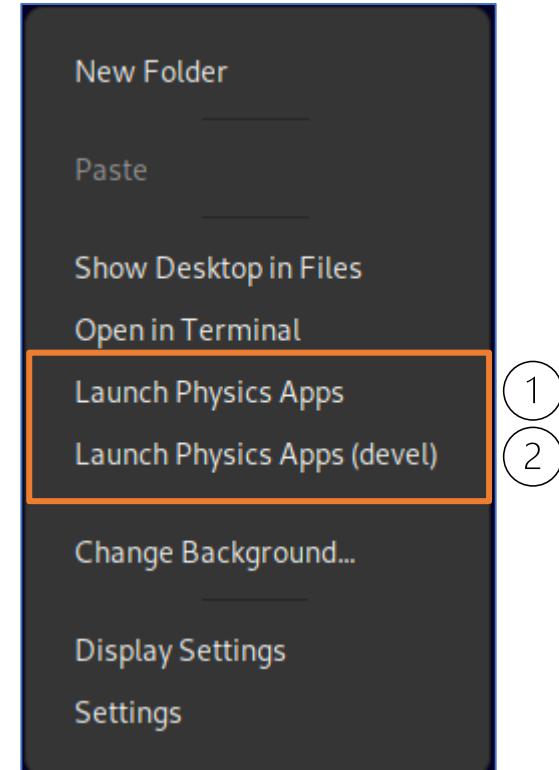
- [What is Settings Manager](#)
- [How to start Settings Manager](#)
- [How the GUI components are organized](#)
- [How the snapshot data is managed](#)
- [How the device settings data is organized](#)
- [How to investigate the machine settings before restore](#)
- [How to change machine settings with snapshots](#)
- [How to revert the changed device settings](#)
- [How to take a new snapshot](#)
- [How is Settings Manager integrated into CS-Studio](#)
- [How to monitor the machine settings](#)

What is it?

- It is a software application for the data management of physics settings.
- It is one of the applications that is built upon PHANTASY framework.
- Take snapshots of the device settings of an accelerator.
- Load snapshots from database systems.
- Change device settings with loaded snapshots.
- It supports device settings scaling based on different ion species.
- It supports rich features of data sorting, filtering, device state monitoring, and more.
- Accompanied by a collection of Operator Interface (OPI) screens for CS-Studio integration.

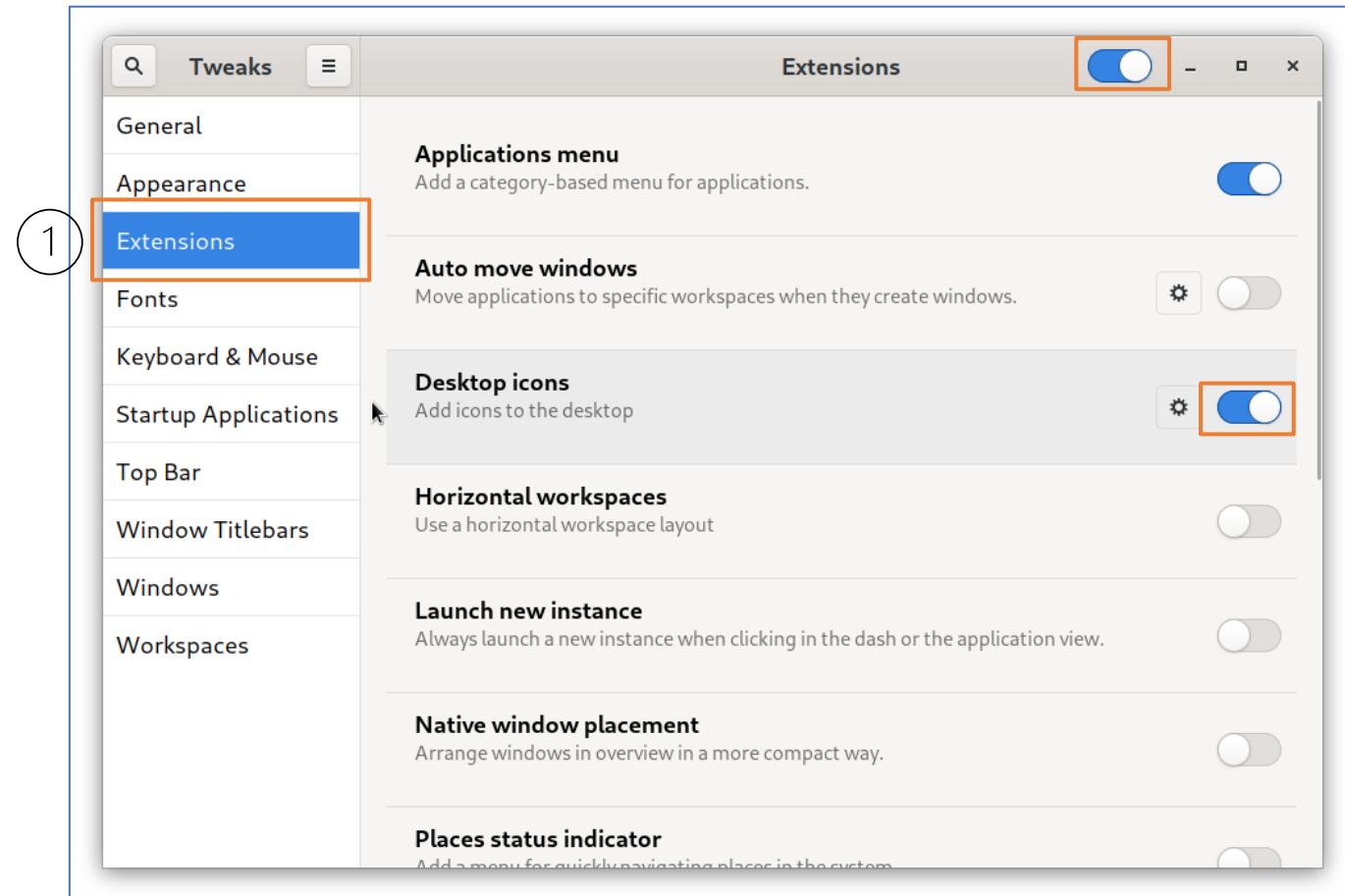
How to start it?

- All physics applications are managed in an app called “App Launcher”
- Each app is presented as one clickable ‘card’ in “App Launcher”
- To have “App Launcher” show up:
 - Right-clicking on the Desktop
 - Select “*Launch Physics Apps*” menu ①
 - *Launch Physics Apps (devel)* is for AP group only ②
 - If cannot see this menu, see next page

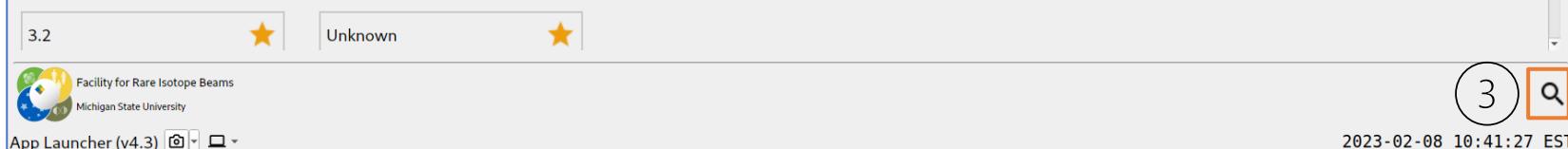
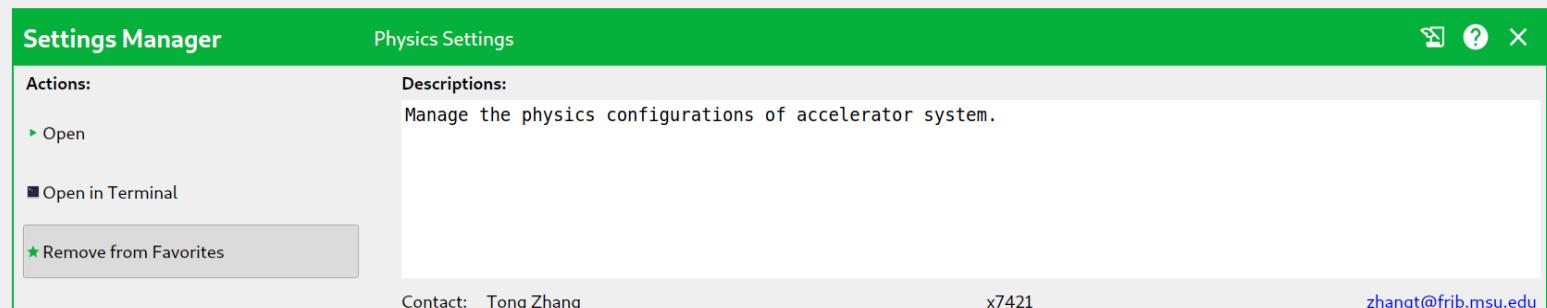
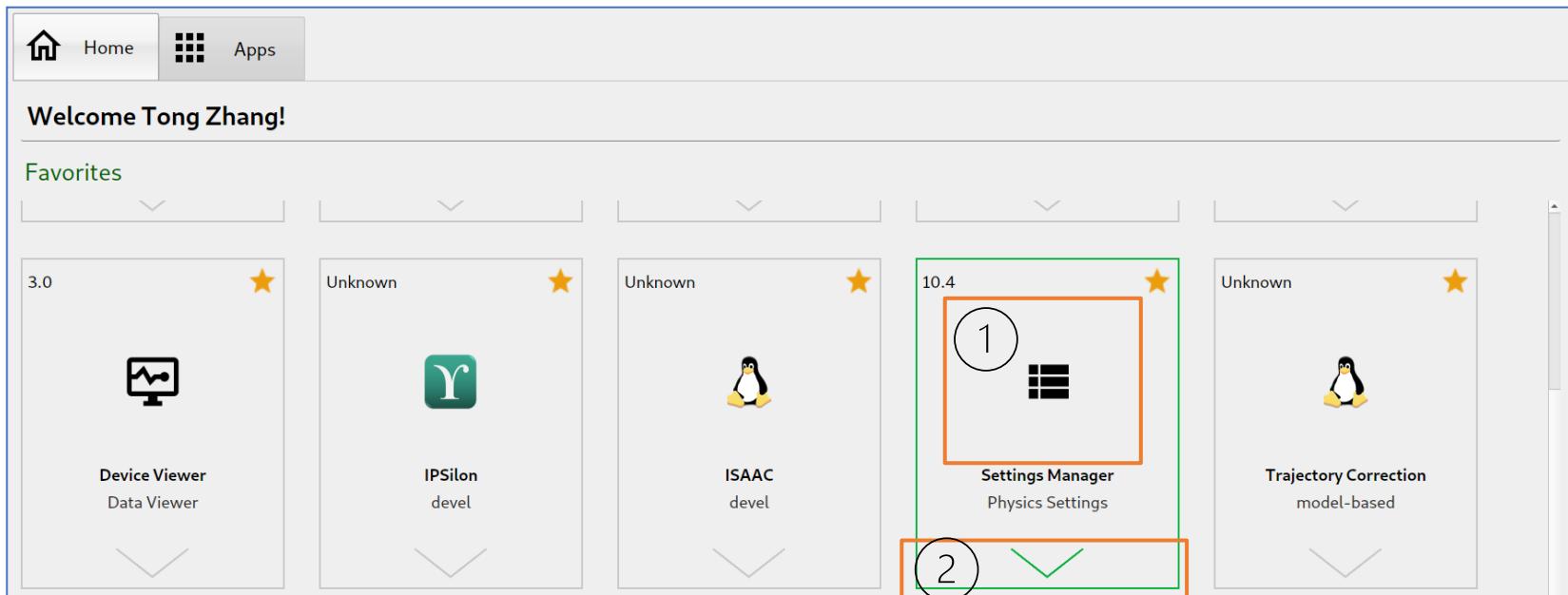


How to enable “Desktop Icons” extension?

- Enable “Desktop Icons” extension to have right-clicking context menu work on GNOME desktop
- Start “Tweak” app, either by searching “tweak” or start from the system menu
- Enable *Desktop icons* in the Extensions tab.



App Launcher: A Global App Manager



- Start by **single-clicking** the app card (1)
- Click the to expand the detailed info:
 - Description
 - Contact
 - Help documents if available
 - Start up options
 - Others...
- Search apps by CTRL + F, or click (3)

Settings Manager: Main User Interface (1)

The screenshot shows the main window of the Settings Manager. At the top is a toolbar with icons for Load Lattice, Add Devices, Take Snapshot, Capture Machine State, Physics Fields, Engineering Fields, Preferences, and Exit. A status bar at the bottom indicates "Loaded lattice FRIB LINAC" and "Last refreshed at 2023-02-08 11:00:55".

The central area contains a table of snapshots:

Timestamp	Ion	Z	A	Q	User	Tags	Note
2023-02-06T18:01:23	Pt	78	198	29	maruta	SCS1,LINAC	Setting at the end of today's study
2023-02-06T16:27:51	Pt	78	198	29	maruta	SCS1,LINAC	198Pt to FS1b target with Lq. Li stripper. Magnets after the foil is scaled fo...
2023-02-06T15:46:23	Pt	78	198	29	maruta	SCS1,LINAC	Snapshot at this moment
2023-02-06T12:37:17	Pt	78	198	29	zhaoy	LINAC	CH, LS2, LS3, MGBs adjusted
2023-02-06T11:54:08	Pt	78	198	29	zhaoy	LINAC	CH phase adjusted to obtain 20keV/u lower energy to stripper
2023-02-06T10:58:47	Pt	78	198	29	zhaoy	LINAC	MGB1=980,MGB2=750
2023-02-06T08:16:24	Pt	78	198	29	zhaoy	LINAC	as is at user experiment completion

Below the snapshots is a table of device settings:

Device	Field	Type	Setpoint(x_0)	Live Readback(x_1)	Live Setpoint(x_2)	$\Delta(x_2, x_0)$	$\Delta(x_1, x_2)$	x_2/x_0	Live State	State
FE_ISRC2:BEAM	A	ION	124.000	124.000	124.000	0.000	0.000	1.000	Green	Red
FE_ISRC2:BEAM	Q	ION	26.000	26.000	26.000	0.000	0.000	1.000	Green	Red
FE_ISRC2:BEAM	Z	ION	54.000	54.000	54.000	0.000	0.000	1.000	Green	Red
FE_LBET:BEAM	ATT_TOTAL	ATT	1.000	20.000	20.000	▲ 19.000	0.000	20.000	Red	Green
FE_SRC2:PSEL_D0651	V	SEL	0.000	-1.303	0.000	0.000	▲ -1.303	inf	Red	Red
FE_SRC2:HVP_D0652	V	HVP	15000.000	15003.700	15000.000	0.000	▲ 3.700	1.000	Green	Red
FE_SRC2:PSB_D0659	V	SB	-35.000	-35.003	-35.000	0.000	-0.003	1.000	Green	Red
FE_SRC2:SOLs_D0659	I	SOL	138.000	138.013	138.000	0.000	0.013	1.000	Green	Green
FE_SRC2:S_D0661	I	SEXT	288.000	288.052	288.000	0.000	0.052	1.000	Green	Green
FE_SRC2:SOLs_D0662	I	SOL	110.000	110.000	110.000	0.000	-0.000	1.000	Green	Green
FE_SRC2:SOLs_D0664	I	SOL	100.000	99.989	100.000	0.000	-0.011	1.000	Green	Green
FE_SRC2:PSE_D0665	V	SE	0.000	0.000	0.000	0.000	0.000	inf	Red	Red

At the bottom is a footer with links for "Loaded lattice FRIB LINAC", "Reference Set", "Alarm Config", and "Settings Manager (v10.4)".

Toolbar Area:

- **Take Snapshot:** Capture device settings and machine state data (if *Take Snapshot with Machine State* is checked) 1
- **Beam info:** Current running beam info, with charge state post stripper
 - Double-clicking to launch the physics calculator
 - Hover on to see the meaning and PVs
 - Auto-switching between 1(Artemis) and 2(HP-ECR) to indicate the ECR source in operation

Less used tools:

- **Load Lattice, Add Devices:** for creating the snapshot template
- **Capture Machine State:** take machine state data (defined in *Preferences*→*Machine State*) and/or save it as a file, this is only useful when the machine state data is wanted, otherwise Take Snapshot will always capture the machine state data and keep together with the snapshot record.
- **Physics Fields:** Show also the physics interpretation of the device settings, e.g. B field of a solenoid from the I reading, you may see doubled amount the items in the Settings View area.
- **Engineering fields:** Show the engineering value of the device settings.
- Note both physics and engineering data is recorded in a snapshot.

Settings Manager: Main User Interface (2)

The screenshot shows the main user interface of the Settings Manager. At the top, there is a menu bar with File, Tools, View, Help, and various icons for loading lattices, adding devices, capturing machine state, and engineering fields. Below the menu is a toolbar with buttons for Load Lattice, Add Devices, Take Snapshot, Capture Machine State, Physics Fields, Engineering Fields, Preferences, and Exit. A status bar at the bottom indicates the loaded lattice is FRIB LINAC, the last refresh was at 2023-02-08 11:00:55, and the current time is 2023-02-08 11:01:06 EST.

Snapshots Data Area:

Timestamp	Ion	Z	A	Q	User	Tags	Note
2023-02-06T18:01:23	Pt	78	198	29	maruta	SCS1,LINAC	Setting at the end of today's study
2023-02-06T16:27:51	Pt	78	198	29	maruta	SCS1,LINAC	198Pt to FS1b target with Lq. Li stripper. Magnets after the foil is scaled fo...
2023-02-06T15:46:23	Pt	78	198	29	maruta	SCS1,LINAC	Snapshot at this moment
2023-02-06T12:37:17	Pt	78	198	29	zhaoy	LINAC	CH, LS2, LS3, MGBs adjusted
2023-02-06T11:54:08	Pt	78	198	29	zhaoy	LINAC	CH phase adjusted to obtain 20keV/u lower energy to stripper
2023-02-06T10:58:47	Pt	78	198	29	zhaoy	LINAC	MGB1=980,MGB2=750
2023-02-06T08:16:24	Pt	78	198	29	zhaoy	LINAC	as is at user experiment completion

Device Table:

Device	Field	Type	Setpoint(x ₀)	Live Readback(x ₁)	Live Setpoint(x ₂)	Δ(x ₂ ,x ₀)	Δ(x ₁ ,x ₂)	x ₂ /x ₀	Live State	State
FE_ISRC2:BEAM	A	ION	124.000	124.000	124.000	0.000	0.000	1.000	Green	Red
FE_ISRC2:BEAM	Q	ION	26.000	26.000	26.000	0.000	0.000	1.000	Green	Red
FE_ISRC2:BEAM	Z	ION	54.000	54.000	54.000	0.000	0.000	1.000	Green	Red
FE_LEBT:BEAM	ATT_TOTAL	ATT	1.000	20.000	20.000	▲ 19.000	0.000	20.000	Red	Green
FE_SRC2:PSEL_D0651	V	SEL	0.000	-1.303	0.000	0.000	▲ -1.303	inf	Red	Red
FE_SRC2:HVP_D0652	V	HVP	15000.000	15003.700	15000.000	0.000	▲ 3.700	1.000	Green	Red
FE_SRC2:PSB_D0659	V	SB	-35.000	-35.003	-35.000	0.000	-0.003	1.000	Green	Red
FE_SRC2:SOLs_D0659	I	SOL	138.000	138.013	138.000	0.000	0.013	1.000	Green	Green
FE_SRC2:S_D0661	I	SEXT	288.000	288.052	288.000	0.000	0.052	1.000	Green	Green
FE_SRC2:SOLs_D0662	I	SOL	110.000	110.000	110.000	0.000	-0.000	1.000	Green	Green
FE_SRC2:SOLs_D0664	I	SOL	100.000	99.989	100.000	0.000	-0.011	1.000	Green	Green
FE_SRC2:PSE_D0665	V	SE	0.000	0.000	0.000	0.000	0.000	inf	Red	Red

Snapshots data area:

- List the entries of snapshots, each row is one snapshot taken at the shown timestamp, with beam species info, tags, user (who created), and note.
- Columns are clickable for sorting
- The loaded one will be indicated with
- Each snapshot could be tagged with multiple tags: words separated by the comma (,)
- Additional information could be put into the Note area
- Only Tags and Note are editable, by double-clicking the cell

Settings Manager: Main User Interface (3)

The screenshot shows the main user interface of the Settings Manager. At the top, there is a menu bar with File, Tools, View, Help, and several icons. Below the menu is a toolbar with buttons for Load Lattice, Add Devices, Take Snapshot, Capture Machine State, Physics Fields, Engineering Fields, Preferences, and Exit. A status bar at the bottom displays "Loaded Lattice FRIB LINAC", "Settings Data Last refreshed at 2023-02-08 11:00:55", "Refresh Once", "Apply", "0.69852", "Take Snapshot with Machine State", "WYSIWYC", "Auto Precision number 3", and the date "2023-02-08 11:01:06 EST".

Snapshots tab is selected. The main area displays a table of snapshots with columns for Timestamp, Ion, Z, A, Q, User, Tags, and Note. The table shows several entries from February 6, 2023, with details about the experiment setup and notes.

Settings Data tab is also visible, showing a table of device settings with columns for Device, Field, Type, Setpoint(x_0), Live Readback(x_1), Live Setpoint(x_2), $\Delta(x_2, x_0)$, $\Delta(x_1, x_2)$, x_2/x_0 , Live State, and State. The table lists various components like FE_ISRC2:BEAM, FE_LBET:BEAM, etc., with their respective parameters and live values.

Settings view area:

- Table view of the device settings
- Each row is displaying the values for each field (a field is a controllable signal, either in engineering unit or physics (if Physics Fields tool is checked)) 1
- Rich filter buttons for machine state investigation
- The values are auto-updated at a fixed rate, the updated status could be reading from the vertical bar left next to “Settings Data” 2
- The loaded snapshot info is posted at 3

Settings Manager: Snapshot Actions

The screenshot shows the 'Settings Manager' application interface. The main window title is 'Settings Manager'. The menu bar includes 'File', 'Tools', 'View', and 'Help'. The toolbar contains icons for 'Load Lattice', 'Add Devices', 'Take Snapshot', 'Capture Machine State', 'Physics Fields', and 'Engine'. A status bar at the bottom shows 'Working Directory /files/shared/ap/settings_manager/sm.db'. The main area is titled 'NOTAG (20)'. It features a 'Select Tags' dropdown with 'None' and 'All' options, and a 'Filter between' date range from '2022-04-28' to '2022-04-28'. Below this is a table with columns: 'Timestamp', 'Ion Z', 'A', 'Q', 'User', 'Tags', and 'Note'. The table lists two entries: one for '2022-04-27 Wednesday' and another for '2022-04-27'. The entry for '2022-04-27' is selected and has a context menu open. The menu items are: Load (highlighted), Set As Reference, Copy Text, Copy Data, Read, Machine State, Export, and Delete. The 'Load' item is highlighted with a blue background. At the bottom of the table area, there are buttons for 'Check All' and 'Checkstate', and a status message '0 Checked Items'.

Right-clicking menu on snapshot entry:

- **Load:** Load the snapshot and present the data into the Settings view area
- **Copy Data:** Copy the table of settings data and could be paste into other apps, e.g., LibreOffice Calc
- **Copy Text:** Copy the text string, e.g., the timestamp string in this screenshot when the mouse is pointing
- **Read:** Open the snapshot in LibreOffice Calc
- **Machine State:** Visualize the machine state if data is stored in the snapshot
- **Export:** Export the table of settings into other file formats, e.g., xlsx, csv, etc.
- **Delete:** Archive the selected snapshot (tagged as 'archive')
- **Set As Reference:** Publish the snapshot as the reference to the control network (See Settings Manager OPI)

1. Double-clicking on the snapshot will load it into Settings View
2. Double-clicking on Tags, Note area will enable editing

- 'Tags' support a string with multiple words that separated with comma (,), do not put spaces. e.g., put the string 'test1,test2' into Tags will tag the snapshot with two tags: 'test1' and 'test2'.

Settings Manager: Snapshot Filters

The screenshot shows the 'Snapshots' section of the Settings Manager. At the top, there's a toolbar with buttons for 'Working Database' (set to /files/shared/ap/settings_manager/sm.db), 'Merge', 'All', and 'Total 1181'. Below the toolbar is a grid of ion species names (Ar, Bi, Ca, He, Kr, O, Pb, Pt, Se, Tm, U, Xe, Zn, NAN) with checkboxes. A dropdown menu is open over the 'Xe' button. To the right of the species grid are three filter buttons: 'DateRange', 'Note', and 'User'. The main area is a table titled 'Snapshots' with columns: Timestamp, Ion, Z, A, Q, User, Tags, and Note. The table lists 20 snapshots from January 2023, such as '2023-01-25T13:11:21 Xe 54 124 26 hwang LINAC,SCS2' and '2023-01-24T13:47:58 Xe 54 124 26 maruta SCS2,LINAC'. The 'Tags' column contains icons representing the tags assigned to each snapshot.

Snapshots	Timestamp	Ion	Z	A	Q	User	Tags	Note
2023-01-25 Wednesday	2023-01-25T13:11:21	Xe	54	124	26	hwang		CC11Cav3 amplitude reduced due to X-ray. Following cavit...
2023-01-24 Tuesday	2023-01-24T13:47:58	Xe	54	124	26	maruta		3CS of 224 MeV/u, 1 kW
	2023-01-24T09:52:23	Xe	54	124	26	maruta		3CS of 218.7 MeV/u, 1.5 kW before switching to another b...
2023-01-23 Monday	2023-01-23T10:14:17	Xe	54	124	26	zhangt		Added NMR/HALLProbe fields for FS2 dipoles.
2023-01-22 Sunday	2023-01-22T13:01:25	Xe	54	124	26	zhao		181.3 MeV/u temp
2023-01-21 Saturday	2023-01-21T01:55:33	Xe	54	124	26	maruta		181.3 MeV/u 50+ to target
	2023-01-21T00:33:19	Xe	54	124	26	maruta		218.7 MeV/u 3CS to target
2023-01-20 Friday	2023-01-20T22:59:46	Xe	54	124	26	maruta		224 MeV/u (50+), 223.8 MeV/u (3CS) to target
	2023-01-20T21:46:53	Xe	54	124	26	maruta		227 MeV/u 3CS to target
	2023-01-20T18:57:56	Xe	54	124	26	maruta		124Xe26(49,50,51) to target, 400 W, MGB amplitudes are t...
	2023-01-20T16:16:07	Xe	54	124	26	maruta		227 MeV/u 124Xe26(50) to BDS BD, FS2 magnets tuning fini...

By default, only 20 most recent snapshots are listed, to show more, proceed:

1. Click the button labeled with number, each click will change the displayed number, e.g., from 20 to 50, 100, and All
2. Click to update the snapshot list

Filter buttons: on tags, and ion species names

- Check the filter buttons right after “Select Tags” or “Select Icons” labels to enable the filters.
- By default, all snapshots are listed
- The example of the screenshot shows:
 - Only show “Xe” with “SCS2” tagged snapshots
- Column could also be sorted by clicking
- Support data filtering by date range, note content and username, by checking/unchecking the filter button to enable/disable searching

Select None
 Invert Selection
 Select All

Settings Manager: Settings View

Settings Manager: Manage Physics Configurations of Accelerator System

File Tools View Help

Load Lattice Add Devices Take Snapshot Capture Machine State Physics Fields Engineering Fields Preferences Exit

Working Database /files/shared/ap/settings_manager/sm.db

COPY (1) GENERATED (1) LINAC (19) SCS1 (9)

Snapshots

+ Expand - Collapse

Timestamp	Ion	Z	A	Q	User	Tags	Note
2023-02-06 Monday							
2023-02-06T18:01:23	Pt	78	198	29	maruta	SCS1,LINAC	Setting at the end of today's study
2023-02-06T16:27:51	Pt	78	198	29	maruta	SCS1,LINAC	198Pt to FS1b target with Lq. Li stripper. Magnets after the foil is scaled for 66+ to ...

A⁺ A⁻ ← → Snapshot: 2023-02-06T18:01:23, 198Pt78(29)
Setting at the end of today's study [Loaded at 2023-02-06 13:34:39]

Check All Uncheck All Invert Checkstate 0 Checked Items

To Scale 🔍 1926 Items

Device	Field	Type	Setpoint(x ₀)	Live Readback(x ₁)	Live Setpoint(x ₂)	$\Delta(x_2, x_0)$	$\Delta(x_1, x_2)$	x ₂ /x ₀	Live State	State
FE_SCS2:SORL_D0683	I	SOL	0.000	0.000	0.000	0.000	-0.000 inf	1.000	green	green
FE_SCS2:DCH_D0688	I	HCOR	0.000	0.000	-0.000	-0.000	0.000 inf	1.000	green	green
FE_SCS2:DCV_D0688	I	VCOR	0.000	0.000	0.000	0.000	-0.000 inf	1.000	green	green
FE_SCS2:DH_D0696	I	BEND	78.300	78.359	78.300	0.000	0.059 1.000	1.000	green	red
FE_SCS2:DCH_D0702	I	HCOR	0.000	0.000	-0.000	-0.000	0.000 inf	1.000	green	green
FE_SCS2:DCV_D0702	I	VCOR	0.000	0.000	-0.000	-0.000	0.000 inf	1.000	green	green
FE_SCS2:QHE_D0705	V	EQUAD	3646.200	3646.235	3646.200	0.000	0.035 1.000	1.000	green	red
FE_SCS2:QVE_D0709	V	EQUAD	-7015.000	-7015.018	-7015.000	0.000	-0.018 1.000	1.000	green	red
FE_SCS2:QHE_D0712	V	EQUAD	2737.200	2737.171	2737.200	0.000	-0.029 1.000	1.000	green	red
FE_SCS2:QHE_D0722	V	EQUAD	2737.200	2737.092	2737.200	0.000	-0.108 1.000	1.000	green	red
FE_SCS2:QVE_D0725	V	EQUAD	-7015.000	-7014.992	-7015.000	0.000	0.008 1.000	1.000	green	red
FE_SCS2:QHE_D0728	V	EQUAD	3646.200	3646.109	3646.200	0.000	-0.091 1.000	1.000	green	red
FE_SCS2:DCH_D0731	I	HCOR	0.000	0.000	0.000	0.000	0.000 inf	1.000	green	green
FE_SCS2:DCV_D0731	I	VCOR	0.000	0.000	0.000	0.000	0.000 inf	1.000	green	green
FE_SCS2:DH_D0738	I	BEND	78.350	78.328	78.350	0.000	-0.022 1.000	1.000	green	green
FE_SCS2:QVE_D0746	V	EQUAD	-1284.500	-7.790	-1284.500	0.000	1276.710 1.000	1.000	red	red
FE_SCS2:QHE_D0749	V	EQUAD	1000.000	7.726	1000.000	0.000	-992.274 1.000	1.000	red	red
FE_LEBT:DH_D0759	I	BEND	111.351	-0.014	0.000	0.000	-111.351 0.000	0.000	red	green
FE_SCS2:DCH_D0755	I	HCOR	0.000	0.000	0.000	0.000	0.000 inf	1.000	green	green

Loaded Lattice FRIB LINAC >

Reference Set Alarm Config

Settings Data Last refreshed at 2023-02-08 13:34:48 Refresh Once Apply X 0.69852

Take Snapshot with Machine State WYSIWYC Auto Precision number 3

Settings Manager (v10.4) 2023-02-08 13:35:03 EST

- **Device:** name of the device, by default sorted by the device global s-position ascendingly
- **Field:** name of the controllable attribute, e.g., I of FE_SCS2:DCH_D0688 means the current of this horizontal corrector, all the values in right columns are for this field
- **Type:** device type, e.g., SOL is solenoid, HCOR is horizontal corrector, QUAD is magnetic quadrupole, etc.
- **Setpoint(x₀):** saved setpoint values, i.e., the live setpoints when the snapshot was captured
- **Live Readback(x₁):** live readback values
- **Live Setpoint(x₂):** live setpoint values
- **$\Delta(x_2, x_0)$:** x₂-x₀, how diff of current set and last saved one
- **$\Delta(x_1, x_2)$:** x₁-x₂, how diff of current read and set
- **x₂/x₀:** the ratio of current set and saved one
- **Live State:** current device state indicator
- **State:** last saved device state indicator

Settings Manager: Investigate Settings (1)

Settings Manager: Manage Physics Configurations of Accelerator System

File Tools View Help

Load Lattice Add Devices Take Snapshot Capture Machine State Physics Fields Engineering Fields Preferences Exit

Working Database /files/shared/ap/settings_manager/sm.db

COPY (1) GENERATED (1) LINAC (19) SCS1 (9)

Snapshots

+ Expand - Collapse

Timestamp Ion Z A Q User Tags Note

- 2023-02-06 Monday

2023-02-06T18:01:23 Pt 78 198 29 maruta SCS1,LINAC Setting at the end of today's study

2023-02-06T16:27:51 Pt 78 198 29 maruta SCS1,LINAC 198Pt to FS1b target with Lq. Li stripper. Magnets after the foil is scaled for 66+ to ...

A A ← Snapshot: 2023-02-06T18:01:23, 198Pt78(29)
Setting at the end of today's study [Loaded at 2023-02-08 13:34:39]

Check All Uncheck All Invert Checkstate 0 Checked Items

Stripper 224.90 m Disconnected (x₀,x₂) (x₁,x₂) State Diff

To Scale 🔍 ? 32 Items

Device	Field	Type	Setpoint(x ₀)	Live Readback(x ₁)	Live Setpoint(x ₂)	Δ(x ₂ ,x ₀)	Δ(x ₁ ,x ₂)	x ₂ /x ₀	Live State	State
FE_SCS2:QVE_D0725	V	EQUAD	-7015.000	-7014.998	-7015.000	0.000	0.002	1.000	Green	Red
FE_SCS2:QHE_D0728	V	EQUAD	3646.200	3646.114	3646.200	0.000	-0.086	1.000	Green	Red
FE_LBET:DH_D0759	I	BEND	111.351	-0.015	0.000	▲ -111.351	-0.015	0.000	Red	Green
FE_LBET:CHP_D0792	STATE	CHP	2.000	3.000	3.000	▲ 1.000	0.000	1.500	Green	Red
FE_LBET:CHP_D0792	DUTY_FACTOR	CHP	0.000	99.500	99.500	▲ 99.500	0.000	inf	Green	Red
FE_LBET:CHP_D0792	REP_RATE	CHP	5.000	100.000	100.000	▲ 95.000	0.000	20.000	Green	Red
FE_LBET:CHP_D0792	PULSE_WIDTH	CHP	8800.000	9950.000	9950.000	▲ 1150.000	0.000	1.131	Green	Red
FS1_BBS:DH_D2394	I_TC	BEND	0.000	0.000	0.000	0.000	0.000	inf	Red	Green
FS1_BBS:DH_D2435	I_TC	BEND	1.180	0.000	0.902	▲ -0.278	▲ -0.902	0.764	Red	Green
FS1_BBS:DH_D2453	I_TC	BEND	1.683	0.000	1.406	▲ -0.277	▲ -1.406	0.835	Red	Green
FS1_BBS:DH_D2494	I_TC	BEND	4.000	0.000	3.012	▲ -0.988	▲ -3.012	0.753	Red	Green
LS3_CD06:CAV8_D4693	PHA	CAV	48.446	97.008	34.517	▲ -13.929	▲ 62.491	0.712	Red	Green
LS3_CD06:CAV8_D4693	PHA_CREST	CAV	-123.350	-123.350	-123.350	0.000	0.000	1.000	Red	Green
LS3_CD06:CAV8_D4693	AMP	CAV	6.820	0.000	0.000	▲ -6.820	0.000	0.000	Red	Green
LS3_CD06:CAV8_D4693	AMP_COEF	CAV	1.005	1.005	1.005	-0.000	0.000	1.000	Red	Green
BDS_BBS:DH_D5578	I	BEND	69.904	-0.084	64.750	▲ -5.154	▲ -64.834	0.926	Red	Green
BDS_BBS:DH_D5641	I	BEND	69.904	-0.084	64.750	▲ -5.154	▲ -64.834	0.926	Red	Green
BDS_BBS:DH_D5668	I	BEND	69.904	-0.085	64.750	▲ -5.154	▲ -64.835	0.926	Red	Green
BDS_BBS:DH_D5731	I	BEND	69.904	-0.085	64.750	▲ -5.154	▲ -64.835	0.926	Red	Green

Loaded Lattice FRIB LINAC Reference Set Alarm Config

Last refreshed at 2023-02-08 13:35:48 Refresh Once Apply X 0.69852

Take Snapshot with Machine State WYSIWYC Auto Precision number 3

Settings Manager (v10.4) 2023-02-08 13:35:50 EST

State Diff Filter out the items that meet:

Current device state is not the same as last saved one.

Normally, Red means the device is powered off, Green is for powered on; for SRF cavities, Red is phase unlocked, green is phase locked.

Extended device state indicator:

- Red state indicates the device is either intercepting or blocking the beam, e.g., chopper, aperture, attenuator, etc.
- Green state indicates the reverse state of red state
- Blue state: only for chopper 'off' state
- Brown state: only for chopper 'invalid input' state

Settings Manager: Investigate Settings (2)

File Tools View Help

Load Lattice Add Devices Take Snapshot Capture Machine State Physics Fields Engineering Fields Preferences Exit

Working Database /files/shared/ap/settings_manager/sm.db

COPY (1) GENERATED (1) LINAC (19) SCS1 (9)

Snapshots

Timestamp Ion Z A Q User Tags Note

2023-02-06 Monday

2023-02-06T18:01:23 Pt 78 198 29 maruta SCS1,LINAC Setting at the end of today's study
198Pt to FS1b target with Lq. Li stripper. Magnets after the foil is scaled for 66+ to ...
2023-02-06T16:27:51 Pt 78 198 29 maruta SCS1,LINAC

A⁺ A⁻ Snapshot: 2023-02-06T18:01:23, 198Pt78(29)
Setting at the end of today's study [Loaded at 2023-02-08 13:34:39]

Check All Uncheck All Invert Checkstate 0 Checked Items

Stripper 224.90 m Disconnected $\Delta(x_0, x_2)$ $\Delta(x_1, x_2)$ State Diff Checked Field Type

Device	Field	Type	Setpoint(x_0)	Live Readback(x_1)	Live Setpoint(x_2)	$\Delta(x_2, x_0)$	$\Delta(x_1, x_2)$	x_2/x_0	Live State	State
FE_LEBT:DH_D0759	I	BEND	111.351	-0.014	0.000	Δ -111.351	-0.014	0.000	Red	Green
FE_LEBT:DCH_D0773	I	HCOR	-0.531	-0.910	-0.900	Δ -0.369	-0.010	1.695	Green	Green
FE_LEBT:DCV_D0773	I	VCOR	-1.061	0.000	0.000	Δ 1.061	0.000	-0.000	Green	Green
FE_LEBT:SOLR_D0787	I	SOL	137.426	65.008	65.145	Δ -72.281	-0.137	0.474	Green	Green
FE_LEBT:DCH_D0790	I	HCOR	-3.715	0.499	0.500	Δ 4.215	-0.001	-0.135	Green	Green
FE_LEBT:DCV_D0790	I	VCOR	1.061	-0.804	-0.800	Δ -1.861	-0.004	-0.754	Green	Green
FE_LEBT:CHP_D0792	STATE	CHP	2.000	3.000	3.000	Δ 1.000	0.000	1.500	Green	Red
FE_LEBT:CHP_D0792	DUTY_FACTOR	CHP	0.000	99.500	99.500	Δ 99.500	0.000	inf	Green	Red
FE_LEBT:CHP_D0792	REP_RATE	CHP	5.000	100.000	100.000	Δ 95.000	0.000	20.000	Green	Red
FE_LEBT:CHP_D0792	PULSE_WIDTH	CHP	8800.000	9950.000	9950.000	Δ 1150.000	0.000	1.131	Green	Red
FE_LEBT:SOLR_D0802	I	SOL	149.081	73.976	74.064	Δ -75.017	-0.088	0.497	Green	Green
FE_LEBT:DCH_D0805	I	HCOR	-0.201	0.000	0.000	Δ 0.201	0.000	-0.000	Green	Green
FE_LEBT:SOLR_D0818	I	SOL	89.854	84.644	84.734	Δ -5.120	-0.090	0.943	Green	Green
FE_LEBT:DCH_D0821	I	HCOR	0.011	0.000	0.000	Δ -0.011	0.000	0.000	Green	Green
FE_LEBT:DCV_D0821	I	VCOR	0.819	0.000	0.000	Δ -0.819	0.000	0.000	Green	Green
FE_LEBT:DVE_D0833	V	EBEND	-10443.964	-7252.408	-7252.800	Δ 3191.164	0.392	0.694	Green	Green
FE_LEBT:DCH_D0840	I	HCOR	-1.400	-0.526	-0.527	Δ 0.873	0.001	0.376	Green	Green
FE_LEBT:DCV_D0840	I	VCOR	5.364	-0.773	-0.768	Δ -6.132	-0.005	-0.143	Green	Green
FE_LEBT:QHE_D0844	V	EQUAD	-3048.929	-1596.590	-1596.569	Δ 1452.360	-0.021	0.524	Green	Green

Loaded Lattice FRIB LINAC >

Settings Data Last refreshed at 2023-02-08 13:36:37 Refresh Once Apply X 0.69852

Take Snapshot with Machine State WYSIWYC Auto Precision number 3

Reference Set Alarm Config

Settings Manager (v10.4) 2023-02-08 13:36:40 EST

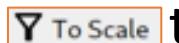
$\Delta(x_0, x_2)$ Filter out the items that meet:
Current live set values are different from the ones that last saved, i.e., only list items with different x_2 and x_0 or non-zero $\Delta(x_2, x_0)$.

The same applies to $\Delta(x_1, x_2)$, and other filter buttons in blue highlighted area.

Tips:

- Hover on the button for the hint (brief help).
- General search feature, see and
 - e.g., input 'FE' will only show the device name contains 'FE'.

Settings Manager: Change Machine Settings

- After loaded one snapshot, the user is ready to change the machine settings by ‘Apply’ operation (see the ‘Apply’ button at the right bottom area)
- **Only checked items** will be put into the ‘Apply’ list
 - The setting log could be seen in settings log, right-clicking empty toolbar area to enable it
- How to check items:
 - Click the button  **Check All** will check all items that allowed to control
 - Non-writable items are gray colored, which is largely based on channel access permission
 - Double-click on the device item will check/uncheck the item
 - Supports working with CTRL and SHIFT for multiple selections (not yet check)
 - To check selected items, right-click on the selection area, and follow the menu guide to check/uncheck all
 - To see all checked items, click  **Checked** filter button
- Click ‘Apply’ button to set the device with the data in x_0 column, if scaling factor rather than 1.0 is used, the real set values are scaling factor times x_0
 - Click the filter button  **To Scale** to list the items that good for scaling (contact AP if needed)

Apply Settings

Screenshots of the Settings Manager application interface:

- Top Bar:** File, Tools, View, Help, Load Lattice, Add Devices, Take Snapshot, Capture Machine State, Physics Fields, Engineering Fields, Preferences, Exit.
- Working Database:** /home/tong/Dropbox/phantasy-project/phantasy-apps/phantasy_apps/settings_manager/testdata/settings_manager/sm.db
- Checkboxes:** + ARCHIVE (4), ✓ ARIS (2), ✓ ARR07 (2), ✓ FRIB (1), ✓ FSEE (1), ✓ GENERATED (2), ✓ GOLDEN (3), ✓ LINAC (3), ✓ REA (4), ✓ TEMPLATE (1), ✓ TEST (5).
- Chemical Elements:** Ar (Argon), Ca (Calcium), Tm (Thulium).
- Snapshots Table:**

Timestamp	Ion Z	A	Q	User	Tags	Note
2022-11-10T16:47:39	Ar	18	40	9	tong	■ LINAC, ARCHIVE tst
2022-10-14 Friday						
2022-10-14T15:10:55	Ar	18	40	9	tong	■ LINAC, GOLDEN FRIB/LS1FS1 VA with LS1 trajectory corrected.
2022-09-26 Monday						
- Bottom Panel:** A* A- ↔ Snapshot: 2022-10-14T15:10:55, 40Ar18(9+). FRIB/LS1FS1 VA with LS1 tr... | Loaded at 2023-02-16 09:17:12. Check All, Uncheck All, Invert Checkstate, 445 Checked Items, Stripper, 224.90 m, Disconnected, State Diff, Checked, Field, Type.
- Device Table:**

Device	Field	Type	Setpoint(x ₀)	Live Readback(x ₁)	Live Setpoint(x ₂)	Δ(x ₂ ,x ₀)	Δ(x ₁ ,x ₂)	x ₂ /x ₀	Live State	State
✓ LS1_CB02:CAV5_D1325	PHA	CAV	-21.000000	-20.934160	-21.000000	0.000000	0.065840	1.000000	●	●
✓ LS1_CB02:CAV5_D1325	AMP	CAV	1.000000	1.001916	1.000000	0.000000	0.001916	1.000000	●	●
✓ LS1_CB02:CAV6_D1329	PHA	CAV	-21.000000	-20.946930	-21.000000	0.000000	0.053070	1.000000	●	●
✓ LS1_CB02:CAV6_D1329	AMP	CAV	1.000000	0.999823	1.000000	0.000000	-0.000177	1.000000	●	●
✓ LS1_CB02:CAV7_D1333	PHA	CAV	-21.000000	-21.033727	-21.000000	0.000000	-0.033727	1.000000	●	●
✓ LS1_CB02:CAV7_D1333	AMP	CAV	1.000000	1.0004173	1.000000	0.000000	0.004173	1.000000	●	●
✓ LS1_CB02:SOL3_D1339	I	SOL	5.510000	5.491006	5.510000	0.000000	-0.018994	1.000000	●	●
✓ LS1_CB02:DCV_D1339	I	VCOR	0.000484	0.000000	0.000000	▲ -0.000484	0.000000	0.000000	●	●
- Bottom Right Panel:** Settings Data, Last refreshed at 2023-02-16 09:52:19, Refresh, Apply, Abort, Revert, Take Snapshot with Machine State, WYSIWYC, Auto Precision number (6), Open in Text Editor, Clear All.
- Setting Logs:** Total log entries: 318. Log entries (partial): [2023-02-16T09:52:28.908638] [Set] LS1_CB02:DCH_D1319 [I] from 0.0 to 3.7e-05 (3.7e-05 x 1.0). [2023-02-16T09:52:28.958447] [Skip] LS1_CB02:CAV5_D1325 [PHA] from -21.0 to -21.0 (-21.0 x 1.0). [2023-02-16T09:52:29.008373] [Skip] LS1_CB02:CAV5_D1325 [AMP] from 1.0 to 1.0 (1.0 x 1.0). [2023-02-16T09:52:29.058759] [Skip] LS1_CB02:CAV6_D1329 [PHA] from -21.0 to -21.0 (-21.0 x 1.0). [2023-02-16T09:52:29.109049] [Skip] LS1_CB02:CAV6_D1329 [AMP] from 1.0 to 1.0 (1.0 x 1.0). [2023-02-16T09:52:29.159038] [Skip] LS1_CB02:CAV7_D1333 [PHA] from -21.0 to -21.0 (-21.0 x 1.0). [2023-02-16T09:52:29.209293] [Skip] LS1_CB02:CAV7_D1333 [AMP] from 1.0 to 1.0 (1.0 x 1.0).
- Bottom Status:** Settings Manager (v10.4) | 2023-02-16 09:52:28 EST

- The Apply button will be ready to click only when there are checked items in the current page
- The Abort button will be valid to terminate the apply procedure once it is ongoing

Revert Settings: Undo Last Apply

The screenshot shows the Settings Manager application interface. The top menu bar includes File, Tools, View, Help, Load Lattice, Add Devices, Take Snapshot, Capture Machine State, Physics Fields, Engineering Fields, Preferences, and Exit. The title bar displays the working database path: /home/tong/Dropbox/phantasy-project/phantasy-apps/phantasy_apps/settings_manager/testdata/settings_manager/sm.db. The status bar at the bottom right shows the date and time: 2023-02-16 09:52:32 EST.

The main area contains several panels:

- Snapshots:** A list of snapshots with details like timestamp, ion type, and notes. One entry is highlighted: "2022-10-14T15:10:55 Ar 18 40 9 tong LINAC, GOLDEN FRIB/LS1FS1 VA with LS1 trajectory corrected."
- Device Settings Table:** A grid showing device parameters like Setpoint(x₀), Live Readback(x₁), and State. A specific row for LS1_CB04:CAV2_D1432 is selected.
- Setting Logs Panel:** Shows a list of log entries with timestamps and actions like [Revert].

At the bottom right of the main window, there is a toolbar with buttons for Refresh, Apply, and Revert. The "Revert" button is highlighted with a red box.

- After each “Apply”, the “Revert” button will be available to revert the device settings that have been changed by the “Apply”, which includes the case that the last Apply procedure is aborted by “Abort”
- The Setting Logs panel could be turned on by right-clicking on the toolbar, and check “Setting Logs”
- From the Setting Logs, one can read every line of device change is either:
 - Skip: no real set
 - Set: set with saved
 - Revert: revert last Set
 - Revert only: points when the setting was last changed

Scale Device Settings

- Generally, *scale* is multiplying (\times) a factor to the Setpoint (x_0) with which set the device as the new setting; shifting (+) is also supported, meaning apply the device new settings as $x_0 + \text{shift amount}$ (the same place where scaling factor is input).
- For scaling operation, only devices with the field name falls into the following list are eligible:
 - I, V, AMP, AMP1, AMP2, AMP3, I_TC
 - Otherwise ignore the non-unity scaling factor
- For shifting operation, all devices are eligible
- After the Apply button is clicked, a warning message with scaling/shifting info is pop-up.

Settings Manager: Take a Snapshot

- Click the “Take Snapshot” button in Toolbar area will make a new snapshot, includes:
 - Capture machine state data
 - Capture live physics settings that listed on the Settings view area
 - By default, it will capture the full list of device settings
 - Unless ‘WYSIWYC’ option is enabled (see the checkbox at the bottom area of the main UI)
- **What is WYSIWYC: What You See Is What You Capture**
 - If enabled, “Take snapshot” will only capture the items that currently show on the page of Settings View, by whatever means to produce the list, e.g., by filtering.
 - This option can be used to make subset of the snapshot for other purposes, e.g., monitoring
 - **Do not forget to turn this option off**, if you want the default take full list of devices settings option back

Settings Manager: Capturing a Snapshot

When “Take Snapshot” is hit...

The image consists of two side-by-side screenshots of the "Settings Manager: Manage Physics Configurations of Accelerator System" software. Both screenshots show a main window with a toolbar at the top, a status bar at the bottom, and a central table view.

Screenshot 1: This screenshot shows the software in the process of capturing machine state. A modal dialog box titled "Capturing Machine State..." is displayed in the center of the screen, indicating a progress of 25%. The main table below shows various device parameters like Setpoint(x₀), Live Readback(x₁), and State differences (Δ(x₂,x₀)).

Device	Field	Type	Setpoint(x ₀)	Live Readback(x ₁)	Live Setpoint(x ₂)	Δ(x ₂ ,x ₀)	x ₂ /x ₀	State	Last State
FE_ISRC1:BEAM	A	ION	48.000	48.000	48.000	0.000	0.000	1.000	...
FE_ISRC1:BEAM	Q	ION	10.000	10.000	10.000	0.000	0.000	1.000	...
FE_ISRC1:BEAM	Z	ION	20.000	20.000	20.000	0.000	0.000	1.000	...
FE_LEBT:BEAM	ATT_TOTAL	ATT	20.000	20.000	20.000	0.000	0.000	1.000	...
FE_ISRC1:HVP_D0679	V	HVP	15000.000	14981.322	15000.000	0.000	-18.678	1.000	...
FE_ISRC1:PSEL_D0679	V	SEL	0.000	0.000	0.000	0.000	inf
FE_ISRC1:PSE_D0679	V	SX	0.000	0.000	0.000	0.000	inf
FE_ISRC1:PSB_D0679	V	SB	-185.000	-13.820	-185.000	0.000	171.180	1.000	...
FE_ISRC1:SOLR_D0682	I	SOL	455.000	454.776	455.000	0.000	-0.224	1.000	...
FE_ISRC1:SOLR_D0685	I	SOL	518.000	517.854	518.000	0.000	-0.146	1.000	...
FE_ISRC1:PSE_D0686	V	SE	-2000.000	-2001.289	-2000.000	0.000	-1.289	1.000	...
FE_ISRC1:DRV_D0686	POS	MOTOR	0.000	39.994	0.000	0.000	39.994	inf	...
FE_ISRC1:SOLR_D0690	I	SOL	100.304	100.254	100.304	-0.000	-0.050	1.000	...
FE_ISRC1:DCH_D0695	I	HCOR	-0.000	0.000	-0.000	0.000	inf
FE_ISRC1:DCV_D0695	I	VCOR	-0.000	0.000	-0.000	0.000	inf
FE_ISRC1:PSEL_D0698	V	SEL	-2000.000	-2000.081	-2000.000	0.000	-0.081	1.000	...
FE_ISRC1:HVP_D0698	V	HVP	42592.000	42599.300	42592.000	0.000	7.300	1.000	...
FE_SCS1:SOLR_D0704	I	SOL	0.000	0.000	0.000	0.000	0.000	inf	...
FE_SCS1:DCH_D0709	I	HCOR	0.262	0.262	0.262	0.000	-0.000	1.001	...

Screenshot 2: This screenshot shows the result of the "Take Snapshot" operation. The main table now displays the captured snapshot data, which is identical to the current state shown in Screenshot 1. The "Schemas" section at the top indicates that the snapshot was taken for the ARIS template.

Device	Field	Type	Setpoint(x ₀)	Live Readback(x ₁)	Live Setpoint(x ₂)	Δ(x ₂ ,x ₀)	x ₂ /x ₀	State	Last State
FE_ISRC1:BEAM	A	ION	48.000	48.000	48.000	0.000	0.000	1.000	...
FE_ISRC1:BEAM	Q	ION	10.000	10.000	10.000	0.000	0.000	1.000	...
FE_ISRC1:BEAM	Z	ION	20.000	20.000	20.000	0.000	0.000	1.000	...
FE_LEBT:BEAM	ATT_TOTAL	ATT	20.000	20.000	20.000	0.000	0.000	1.000	...
FE_ISRC1:HVP_D0679	V	HVP	15000.000	14981.322	15000.000	0.000	-18.678	1.000	...
FE_ISRC1:PSEL_D0679	V	SEL	0.000	0.000	0.000	0.000	inf
FE_ISRC1:PSE_D0679	V	SX	0.000	0.000	0.000	0.000	inf
FE_ISRC1:PSB_D0679	V	SB	-185.000	-13.820	-185.000	0.000	171.180	1.000	...
FE_ISRC1:SOLR_D0682	I	SOL	455.000	454.776	455.000	0.000	-0.224	1.000	...
FE_ISRC1:SOLR_D0685	I	SOL	518.000	517.854	518.000	0.000	-0.146	1.000	...
FE_ISRC1:PSE_D0686	V	SE	-2000.000	-2001.289	-2000.000	0.000	-1.289	1.000	...
FE_ISRC1:DRV_D0686	POS	MOTOR	0.000	39.994	0.000	0.000	39.994	inf	...
FE_ISRC1:SOLR_D0690	I	SOL	100.304	100.254	100.304	-0.000	-0.050	1.000	...
FE_ISRC1:DCH_D0695	I	HCOR	-0.000	0.000	-0.000	0.000	inf
FE_ISRC1:DCV_D0695	I	VCOR	-0.000	0.000	-0.000	0.000	inf
FE_ISRC1:PSEL_D0698	V	SEL	-2000.000	-2000.081	-2000.000	0.000	-0.081	1.000	...
FE_ISRC1:HVP_D0698	V	HVP	42592.000	42599.300	42592.000	0.000	7.300	1.000	...
FE_SCS1:SOLR_D0704	I	SOL	0.000	0.000	0.000	0.000	0.000	inf	...
FE_SCS1:DCH_D0709	I	HCOR	0.262	0.262	0.262	0.000	-0.000	1.001	...

Capturing machine state data, which will be saved together with the snapshot database entry

The current settings view will be replaced with the just captured snapshot, meaning, e.g., clicking filter button like state diff will list nothing, all $\Delta(x_2, x_0)$ should be zero.

OPI Screens for Settings Manager (1)

- The OPI screens are developed to integrate all the snapshot information into the CS-Studio, and Phoebus
- The OPI screens are developed for monitoring live values (at least at 1 Hz)
- These OPI screens could be reached both in FTC and Office Network (via ftcextlogin machine)
- Two ways to reach via the CS-Studio menus:
 - FRIB Main → AP → Settings Manager
 - FRIB Main → FE → Settings Manager (under Operator/Global group)

OPI Screens for Settings Manager (2)

LINAC Physics Settings

Contact: Tong Zhang (x7421)
2023-02-08 13:53:44 EST

Name 2023-02T15:08:20 Ion Source 198Pt78(29+) Created by zhao

Note 186 MeV/u 198Pt29+/(67+,68+,66+) RTECR2target up to 1.5kW, CH shifted -10deg to compensate the thinner foil, and MGBs shifted -8 deg accordingly, all HWRs shifted by -10deg (-16 deg based on MGBs, +6deg to minimize losses in LS2/LS3...)

Last Updated 2023-02-02 16:52:59 EST by lange

Device Settings Group by Type Group by Segment

Diagnostics BPM

Open Settings Manager

Primary Beam

124 Xe 26 +
54 Post Stripping

Energy 0.000 MeV/u
Power 0.000 Watt

-Device Alarm Configuration-

Description	Read ON	Read OFF	Tune ON	Tune OFF
All SRC1 Read/Tune alarms	ON Disconnect	OFF Disconnect	ON Disconnect	OFF Disconnect
All SRC2 Read/Tune alarms	ON Disconnect	OFF Disconnect	ON Disconnect	OFF Disconnect
All FE Read/Tune alarms	ON 124 OFF 1	ON 0 OFF 125	ON 0 OFF 341	ON 0 OFF 92
All LS1 Read/Tune alarms	ON 341 OFF 0	ON 0 OFF 341	ON 0 OFF 408	ON 0 OFF 56
All FS1 Read/Tune alarms	ON 91 OFF 1	ON 0 OFF 408	ON 0 OFF 170	ON 0 OFF 43
All LS2 Read/Tune alarms	ON 402 OFF 6	ON 0 OFF 56	ON 0 OFF 43	ON 0 OFF 17
All FS2 Read/Tune alarms	ON 56 OFF 0	ON 0 OFF 56	ON 0 OFF 43	ON 0 OFF 17
All LS3 Read/Tune alarms	ON 168 OFF 2	ON 0 OFF 170	ON 0 OFF 43	ON 0 OFF 17
All BDS Read/Tune alarms	ON 43 OFF 0	ON 0 OFF 43	ON 0 OFF 17	ON 0 OFF 17
All SEE Read/Tune alarms	ON 0 OFF 17	ON 0 OFF 17	ON 0 OFF 17	ON 0 OFF 17
All Read Alarms	ON	OFF		
All Tune Alarms			ON	OFF

- Overview page for snapshot in operation
- And device settings alarm control

1

LINAC Physics Settings - Group by device type

Contact: Tong Zhang (x7421)
2023-02-08 13:55:12 EST

Name 2023-02T15:08:20 Ion Source 198Pt78(29+) Created by zhao

Note 186 MeV/u 198Pt29+/(67+,68+,66+) RTECR2target up to 1.5kW, CH shifted -10deg to compensate the thinner foil, and MGBs shifted -8 deg accordingly, all HWRs shifted by -10deg (-16 deg based on MGBs, +6deg to minimize losses in LS2/LS3...)

Last Updated 2023-02-02 16:52:59 EST by lange

Device Settings Group by Type Group by Segment

Diagnostics BPM

Open Settings Manager

Primary Beam

124 Xe 26 +
54 Post Stripping

Energy 16.494 MeV/u
Power 195.179 Watt

1

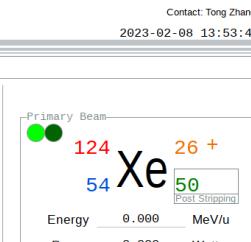
PHA	Device	Field	Live State	Unit	Live Read (x1)	Live Set (x2)	Reference (xref)	$\Delta(x2,xref)$	Tune Alarm	$\Delta(x1,x2)$	Tolerance	Read Alarm
AMP	FE_LEBT:CAV_D0987	PHA1	○	°	-171.487	-171.477	-171.477	0.000	ON	-0.010	0.150	ON
COR	FE_LEBT:CAV_D0987	PHA2	○	°	-162.266	-162.200	-162.200	0.000	ON	-0.006	0.150	ON
BEND	FE_LEBT:CAV_D0987	PHA3	○	°	22.995	23.000	23.000	0.000	ON	-0.005	0.150	ON
EBEND	FE_RFQ:CAV_D1005	PHA	○	°	0.013	0.000	0.000	0.000	ON	0.013	0.200	ON
QUAD	FE_MEBT:CAV_D1066	PHA	○	°	10.588	10.600	10.600	0.000	ON	-0.012	0.200	ON
EQUAD	FE_MEBT:CAV_D1107	PHA	○	°	24.157	24.200	24.200	-0.000	ON	-0.043	0.150	ON
SOL	LS1_CA01:CAV1_D1127	PHA	○	°	156.426	156.400	156.400	0.000	ON	0.026	0.200	ON
SEXT	LS1_CA01:CAV2_D1136	PHA	○	°	-28.243	-28.250	-28.250	0.000	ON	0.007	0.200	ON
OCT	LS1_CA01:CAV3_D1142	PHA	○	°	56.574	56.600	56.600	0.000	ON	-0.026	0.200	ON
AP	LS1_CA01:CAV4_D1150	PHA	○	°	-136.331	-136.300	-136.300	0.000	ON	-0.031	0.200	ON
ATT	LS1_CA02:CAV1_D1161	PHA	○	°	-7.955	-8.000	-8.000	0.000	ON	0.045	0.200	ON
SLT	LS1_CA02:CAV2_D1169	PHA	○	°	-124.001	-124.000	-124.000	0.000	ON	-0.001	0.200	ON
FOIL	LS1_CA02:CAV3_D1176	PHA	○	°	-133.315	-133.300	-133.300	0.000	ON	-0.015	0.200	ON
	LS1_CA02:CAV4_D1184	PHA	○	°	-155.460	-155.450	-155.450	0.000	ON	-0.010	0.200	ON
	LS1_CA03:CAV1_D1195	PHA	○	°	-44.490	-44.500	-44.500	0.000	ON	0.010	0.200	ON
	LS1_CA03:CAV2_D1203	PHA	○	°	55.630	55.600	55.600	0.000	ON	0.030	0.200	ON
	LS1_CA03:CAV3_D1209	PHA	○	°	-12.962	-12.900	-12.900	0.000	ON	-0.062	0.200	ON
	LS1_CA03:CAV4_D1218	PHA	○	°	-37.757	-37.700	-37.700	0.000	ON	-0.057	0.200	ON
	LS1_CB01:CAV1_D1229	PHA	○	°	166.001	166.000	166.000	0.000	ON	0.001	0.200	ON
	LS1_CB01:CAV2_D1241	PHA	○	°	148.996	149.000	149.000	0.000	ON	-0.004	0.200	ON

OPI Screens for Settings Manager (2)

LINAC Physics Settings

Contact: Tong Zhang (x7421)
2023-02-08 13:53:44 EST
Name 2023-02T15:08:20 Ion Source 198Pt78(29+) Created by zhao
Note 186 MeV/u 198Pt29+/(67+,68+,66+) RTECR2target up to 1.5kW, CH shifted -10deg to compensate the thinner foil, and MGBs shifted -8 deg accordingly, all HWRs shifted by -10deg (-16 deg based on MGBs, +6deg to minimize losses in LS2/LS3...) Last Updated 2023-02-02 16:52:59 EST by lange

Device Settings Group by Type Group by Segment
Diagnostics BPM



[Open Settings Manager](#)

-Device Alarm Configuration-

Description	Read ON	Read OFF	Tune ON	Tune OFF
All SRC1 Read/Tune alarms	ON Disconnect	OFF Disconnect	ON Disconnect	OFF Disconnect
All SRC2 Read/Tune alarms	ON Disconnect	OFF Disconnect	ON Disconnect	OFF Disconnect
All FE Read/Tune alarms	ON 124 OFF 1	ON 0 OFF 125	ON 0 OFF 125	ON 0 OFF 125
All LS1 Read/Tune alarms	ON 341 OFF 0	ON 0 OFF 341	ON 0 OFF 341	ON 0 OFF 341
All FS1 Read/Tune alarms	ON 91 OFF 1	ON 0 OFF 92	ON 0 OFF 92	ON 0 OFF 92
All LS2 Read/Tune alarms	ON 402 OFF 6	ON 0 OFF 408	ON 0 OFF 408	ON 0 OFF 408
All FS2 Read/Tune alarms	ON 56 OFF 0	ON 0 OFF 56	ON 0 OFF 56	ON 0 OFF 56
All LS3 Read/Tune alarms	ON 168 OFF 2	ON 0 OFF 170	ON 0 OFF 170	ON 0 OFF 170
All BDS Read/Tune alarms	ON 43 OFF 0	ON 0 OFF 43	ON 0 OFF 43	ON 0 OFF 43
All SEE Read/Tune alarms	ON 0 OFF 17	ON 0 OFF 17	ON 0 OFF 17	ON 0 OFF 17
All Read Alarms	ON OFF	ON OFF	ON OFF	ON OFF
All Tune Alarms	ON OFF	ON OFF	ON OFF	ON OFF

3

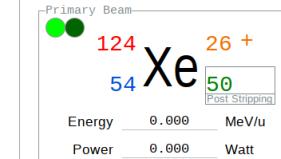
- Device settings alarms could be controlled by segment or
- Fine-grained per device in the device list pages

2

LINAC Physics Settings - Group by segment

Contact: Tong Zhang (x7421)
2023-02-08 13:56:07 EST
Name 2023-02T15:08:20 Ion Source 198Pt78(29+) Created by zhao
Note 186 MeV/u 198Pt29+/(67+,68+,66+) RTECR2target up to 1.5kW, CH shifted -10deg to compensate the thinner foil, and MGBs shifted -8 deg accordingly, all HWRs shifted by -10deg (-16 deg based on MGBs, +6deg to minimize losses in LS2/LS3...) Last Updated 2023-02-02 16:52:59 EST by lange

Device Settings Group by Type Group by Segment
Diagnostics BPM



[Open Settings Manager](#)

SRC1	Device	Type	Field	Live State	Unit	Live Read (x1)	Live Set (x2)	Reference (xref)	Δ(x2,xref)	Tune Alarm	Δ(x1,x2)	Tolerance	Read Alarm
FE	FE_LEBT:BEAM	ATT	ATT_TOTAL	Green	-	1.000	1.000	1.000	0.000	0.000	0.000	0.150	Green
LS1	FE_LEBT:DH_D0759	BEND	I	Red	A	-0.015	0.000	0.000	0.000	-0.015	0.000	0.120	Green
FS1	FE_LEBT:QVE_D0767	EQUAD	V	Green	V	-2651.910	-2651.857	-3903.600	1251.743	0.000	-0.053	0.150	Green
LS2	FE_LEBT:QHE_D0770	EQUAD	V	Green	V	6351.619	6351.620	4014.800	2336.820	0.000	-0.001	0.150	Green
FS2	FE_LEBT:DCV_D0773	VCOR	I	Green	A	0.000	0.000	0.000	0.000	0.000	0.000	0.100	Green
LS3	FE_LEBT:DCH_D0773	HCOR	I	Green	A	-0.910	-0.900	-0.900	0.000	0.000	-0.010	0.100	Green
BDS	FE_LEBT:QHE_D0776	EQUAD	V	Green	V	-6251.182	-6251.160	-2356.100	-3895.060	0.000	-0.022	0.150	Green
SEE	FE_LEBT:QVE_D0780	EQUAD	V	Green	V	3775.446	3775.450	2163.900	1611.550	0.000	-0.003	2.000	Green
	FE_LEBT:SOLR_D0787	SOL	I	Green	A	65.008	65.145	65.145	0.000	0.000	-0.137	0.200	Green
	FE_LEBT:DCV_D0790	VCOR	I	Green	A	-0.804	-0.800	-0.800	0.000	0.000	-0.004	0.100	Green
	FE_LEBT:DCH_D0790	HCOR	I	Green	A	0.499	0.500	0.500	0.000	0.000	-0.001	0.100	Green
	FE_LEBT:AP_D0796	AP	IN_STS	Green	-	0.000	0.000	0.000	0.000	0.000	0.000	0.150	Green
	FE_LEBT:SOLR_D0802	SOL	I	Green	A	73.976	74.064	74.064	0.000	0.000	-0.088	0.200	Green
	FE_LEBT:DCV_D0805	VCOR	I	Green	A	0.000	0.000	0.000	0.000	0.000	0.000	0.100	Green
	FE_LEBT:DCH_D0805	HCOR	I	Green	A	0.000	0.000	0.000	0.000	0.000	0.000	0.100	Green
	FE_LEBT:AP_D0807	AP	IN_STS	Green	-	0.000	0.000	0.000	0.000	0.000	0.000	0.150	Green
	FE_LEBT:SOLR_D0818	SOL	I	Green	A	84.644	84.734	84.734	0.000	0.000	-0.090	0.200	Green
	FE_LEBT:DCH_D0821	HCOR	I	Green	A	0.000	0.000	0.000	0.000	0.000	0.000	0.100	Green
	FE_LEBT:DCV_D0821	VCOR	I	Green	A	0.000	0.000	0.000	0.000	0.000	0.000	0.100	Green
	FE_LEBT:DVE_D0833	EBEND	V	Green	V	-7252.436	-7252.800	-7252.800	0.000	0.000	0.364	1.500	Green

Settings Guard: Alarm System for Settings Manager

LINAC Physics Settings - Group by segment

Contact: Tong Zhang (x742) 2023-02-08 13:56:07 EST

3 Note 186 MeV/u 198Pt78(29+/67+,68+,66+) RTECR2 target up to 1.5kW, CH shifted -10deg to compensate the thinner foil, and MGBs shifted -8 deg accordingly, all HWRs shifted by -10deg (-10 deg based on MGBs, +6deg to minimize losses in LS2/LS3;...)

Last Updated 2023-02-02 16:52:59 EST by lange

Device Settings Group by Type Group by Segment

Diagnostics BPM

Open Settings Manager

Device	Type	Field	Live State	Unit	Live Read (x1)	Live Set (x2)	Reference (xref)	$\Delta(x_2, xref)$	Tune Alarm	$\Delta(x_1, x_2)$	Read Alarm		
FE	LEBT	BEAM	ATT	ATT_TOTAL	1.000	1.000	1.000	0.000	OFF	0.000	ON		
LS1	FE	LEBT	QVE	D0759	A	-0.015	0.000	0.000	OFF	-0.015	ON		
FS1	FE	LEBT	QVE	D0770	V	-2651.910	-2651.857	-3903.600	1251.743	0.000	ON		
LS2	FE	LEBT	QHE	D0770	V	6351.619	6351.620	4014.800	2336.820	-0.001	ON		
FS2	FE	LEBT	DCV	D0773	I	A	0.000	0.000	0.000	0.000	0.100	ON	
LS3	FE	LEBT	DCH	D0773	I	A	-0.910	-0.900	-0.900	0.000	-0.010	ON	
BDS	FE	LEBT	QHE	D0776	V	-6251.182	-6251.160	-3956.100	-3895.660	-0.022	ON		
SEE	FE	LEBT	QVE	D0780	V	3775.446	3775.450	2163.900	1611.550	-0.003	ON		
	FE	LEBT	SOLR	D0787	I	A	65.000	65.145	65.145	0.000	-0.137	ON	
	FE	LEBT	DCV	D0790	V	A	-0.804	-0.800	-0.800	0.000	-0.004	ON	
	FE	LEBT	DCH	D0799	I	A	0.499	0.500	0.500	0.000	-0.001	ON	
	FE	LEBT	AP	D0796	AP	IN_STS	-	0.000	0.000	0.000	0.000	0.150	ON
	FE	LEBT	SOLR	D0802	I	A	73.976	74.064	74.064	0.000	-0.088	ON	
	FE	LEBT	DCV	D0805	V	A	0.000	0.000	0.000	0.000	0.000	ON	
	FE	LEBT	DCH	D0805	I	A	0.000	0.000	0.000	0.000	0.000	ON	
	FE	LEBT	AP	D0807	AP	IN_STS	-	0.000	0.000	0.000	0.000	0.150	ON
	FE	LEBT	SOLR	D0818	I	A	84.644	84.734	84.734	0.000	0.000	ON	
	FE	LEBT	DCH	D0821	I	A	0.000	0.000	0.000	0.000	0.000	ON	
	FE	LEBT	DCV	D0821	V	A	0.000	0.000	0.000	0.000	0.000	ON	
	FE	LEBT	DVE	D0833	EEND	V	-7252.436	-7252.800	-7252.800	0.000	0.000	ON	

Timestamp Ion Z A Q User Tags Note

2023-02-06 Monday

2023-02-06T18:01:23 Pt 78 198 29 maruta SCS1,LINAC Setting at the end of today's

2023-02-06T16:27:51 Pt 78 198 29 maruta SCS1,LINAC 198Pt to FS1b target with Lq.

2023-02-06T15:46:23 Pt 78 198 29 maruta SCS1,LINAC Snapshot at this moment

2023-02-06T12:37:17 Pt 78 198 29 zhao LINAC CH, LS2, LS3, MGBs adjusted

2023-02-06T11:54:08 Pt 78 198 29 zhao LINAC CH phase adjusted to obtain 20

2023-02-06T10:58:47 Pt 78 198 29 zhao LINAC MGB1=980,MGB2=750

2023-02-06T08:16:24 Pt 78 198 29 zhao LINAC as is at user experiment compl

2023-02-02 Thursday

2023-02-02T15:08:20 Pt 78 198 29 zhao LINAC 186 MeV/u 198PT29+/67+,68+,66

Load Set As Reference

2023-01-29 Sunday

Copy Text Copy Data Read

File Applications Window Help

ALARM_AP Alarm Tree X ALARM_AP 5

ALARM_AP Alarm Table X Active Alarms: 10 ALARM_AP

PV	Description	Alarm Severity	Alarm Status	Alarm Time	Alarm Value	PV Sever
PHY:BDS_BBS:DH_D5578:L_DRDST	BDS_BBS:DH_D5578 read alarm	MAJOR	LOLO_ALARM	2023-02-06 18:32:34.963	-0.6138007...	MAJOR
PHY:BDS_BBS:DH_D5641:I_DRDST	BDS_BBS:DH_D5641 read alarm	MAJOR	LOLO_ALARM	2023-02-06 18:32:34.967	-0.6138007...	MAJOR
PHY:BDS_BBS:DH_D5668:I_DRDST	BDS_BBS:DH_D5668 read alarm	MAJOR	LOLO_ALARM	2023-02-06 18:32:34.970	-0.6138007...	MAJOR
PHY:FE_ISRC1:ISOLR_D0690:L_DRDST	ISRC1 solenoid D0690 read alarm	MAJOR	LOLO_ALARM	2023-02-07 07:46:08.873	-20.942000...	MAJOR
PHY:SCS1_QVE:D0730:V_DRDST	SCS1_EQUAD D0730 read alarm	MINOR	HIGH_ALARM	2023-02-08 13:13:45.878	0.15046254...	MINOR
PHY:FS1_BBS:DH_D2435:I_TC_DRDST	FS1_BBS:DH_D2435 trim coil read alarm	MAJOR	LOLO_ALARM	2023-02-07 12:30:17.303	-1.18	MAJOR
PHY:FS1_BBS:DH_D2453:I_TC_DRDST	FS1_BBS:DH_D2453 trim coil read alarm	MAJOR	LOLO_ALARM	2023-02-07 12:30:17.305	-1.683	MAJOR
PHY:FS1_BBS:DH_D2494:I_TC_DRDST	FS1_BBS:DH_D2494 trim coil read alarm	MAJOR	LOLO_ALARM	2023-02-07 12:30:17.307	-4.0	MAJOR
PHY:LS3_CD06:CAV8_D4693:PHA_DRDST	LS3_CD06:CAV8_D4693 read alarm	MAJOR	HIGH_ALARM	2023-02-08 13:58:20.925	23.5466187...	MAJOR

Acknowledged Alarms: 3

PV	Description	Alarm Severity	Alarm Status	Alarm Time	Alarm Value	PV Sever
PHY:WATCH_DSTS:ALM_ALL	LINAC Device State Alarm	INVALID_ACK	LINK_ALARM	2023-01-28 01:09:42.764	0.0	INVALID
PHY:WATCH_DRSET:ALM_SEE	SEE read alarm	MAJOR_ACK	LOLO_ALARM	2023-01-28 01:09:43.764	0.0	MAJOR
PHY:WATCH_STREF:ALM_SEE	SEE tune alarm	MAJOR_ACK	HIGH_ALARM	2023-01-28 01:09:43.764	0.0	MAJOR

- From Settings Manager, push snapshot via “Set As Reference” 1
- The Setpoint (x_0) values will be published as “Reference (xref)” 2
- Together with the snapshot info 3

- Tune alarm: monitor x_0 (reference set) and x_2 (live set)
- Read alarm: monitor x_1 (live read) and x_2 (live set)
- Alarm could be configured device-wised or segment-wised
 - Switch the slide button, see 4
 - See 3 of last page
- The report page could be reached at Phoebus → Applications → Alarm → Alarm Tree: Select Alarm_AP in the dropdown menu, also could be opened in Alarm Panel or Alarm Table mode. 5

References

- Settings Manager: Manage LINAC Physics Settings
 - https://wikihost.nscl.msu.edu/AcceleratorPhysics/doku.php?id=apps:settings_manager
- Settings Guard: Alarm System for LINAC Physics Settings
 - https://wikihost.nscl.msu.edu/AcceleratorPhysics/doku.php?id=apps:settings_guard