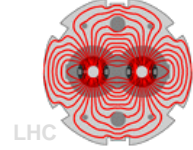




LHC Wire Scanner Application Manual



o Overview:

LHC WIRESANNER APPLICATION

File **Acquisition** Optics: MEASURED OpticName: R2015a_A11mC11mA10mL10m_INJ # Bunches Ring 1 = 0 # Bunches Ring 2 = 0 Particles Ring 1 = PROTON Particles Ring 2 = PROTON

RBA: no token

Scanner Status

Scanner	Status	Voltage [M]	Filter	#scans	mode
LHC.BWS.5R4.B1H1	Home	0	No filter	--	OFF
LHC.BWS.5R4.B1V1	Home	0	No filter	--	OFF
LHC.BWS.5L4.B2H1	Home	8	No filter	--	OFF
LHC.BWS.5L4.B2V1	Home	8	No filter	--	OFF

configure scanners

Load Settings: commissioning

	Gain [%%]	Voltage [V]	Filter
B1H1	1000	2200.0	No filter
B1V1	1000	2200.0	No filter
B2H1	1000	2200.0	No filter
B2V1	1000	2200.0	No filter

configure acquisition

LHC.BWS.5R4.B1H1 LHC.BWS.5R4.B1V1

LHC.BWS.5L4.B2H1 LHC.BWS.5L4.B2V1

Number of Scans / Acquisition: 1

Bunch Acq Turn Acq

configure bunch selection

Acquisition Fill B1H1 x Acquisition Fill B1V1 x Acquisition Fill B2H1 x Acquisition Fill B2V1 x

LHC.BWS.5R4.B1H1

emittance [um]

energy [GeV]

Time

LHC.BWS.5R4.B1H1

a.u.

um

energy [GeV]:

LHC.BWS.5R4.B1H1

norm. emittance [um]

bunch #

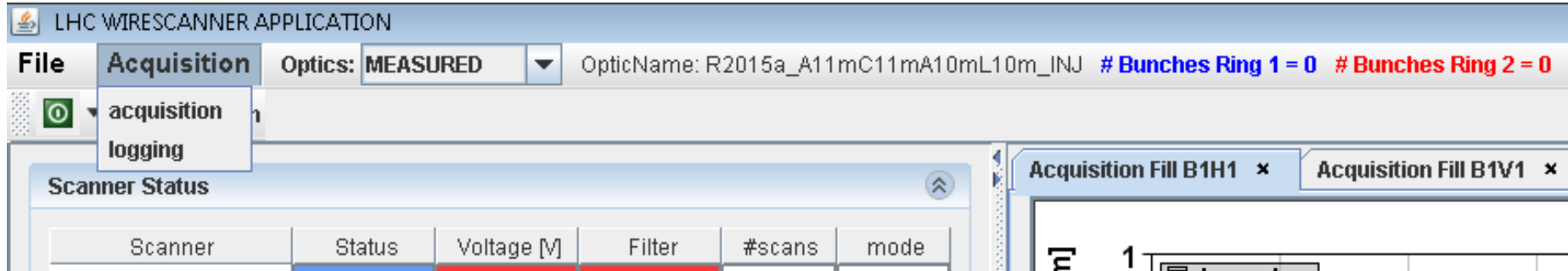
opticsID:

Acquire set all modes off Analyse

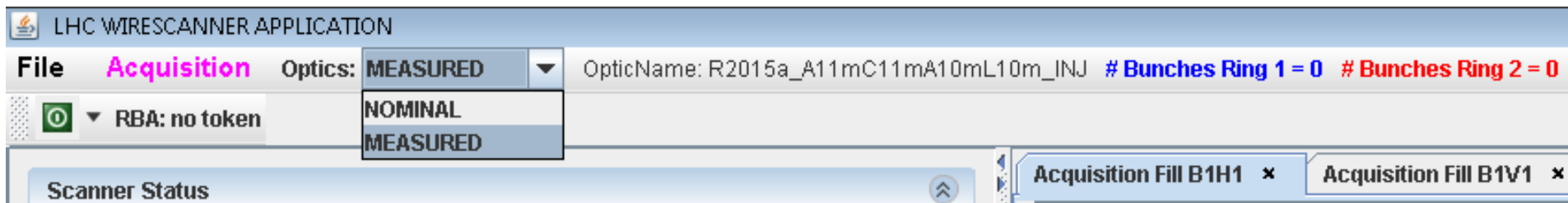
16:26:38 - cannot set values: RBAC Exception: Authorization access denied because token was not provided. Transaction: [SET on LHC.BWS.5L4.B2V1#SettingHV]Token [no token]RDA Info [clientHost=CWE-513-VMW321; remoteUser=m...



- o You can open more acquisition tabs or tabs where logging data is displayed



- o Nominal or measured optics for emittance calculation can be chosen (if no measured optics are available, nominal optics are automatically taken)



- o Also displayed: optics name, number of bunches and particle type
- o **Applicaton also works for ions!**

- o **# bunches automatically updated** at each injection and send to all wire scanners (information in menu bar)
- o Bunches can also be (de-)selected manually:

The screenshot shows the 'LHC WIRESCANNER APPLICATION' interface. The top menu bar includes 'File', 'Acquisition', and 'Optics: MEASURED'. The status bar shows 'OpticName: R2015a_A11mC11mA10mL10m_INJ', '# Bunches Ring 1 = 0', '# Bunches Ring 2 = 0', 'Particles Ring 1 = PROTON', and 'Particles Ring 2 = PROTON'. A 'Scanner Status' table is visible, and a 'Bunch Selection' dialog is open in the foreground.

Scanner	Status	Voltage [V]	Filter	#scans	mode
LHC.BWS.5R4.B1H1	Home	0	No filter	--	OFF
LHC.BWS.5R4.B1V1	Home	0	No filter	--	OFF
LHC.BWS.5L4.B2H1	Home	8	No filter	--	OFF
LHC.BWS.5L4.B2V1	Home	8	No filter	--	OFF

The 'Bunch Selection' dialog has tabs for 'B1' and 'B2'. It contains a 'Bunch pattern' input field, buttons for 'set all', 'select all beam slots', and 'clear', and a 'Help: Bunch input form' link. Below this is a grid for selecting bunches, with columns labeled 1-30 and rows labeled 1-24. A text box explains the selection format: '* startLHCbunch - finishLHCbunch : step @ startPSBatch - finishPSBatch : stepPSBatch where LHCbunch in [1,72] and PSBatch in [1,39]'. At the bottom of the dialog are 'Acquire', 'set all modes off', and 'Analyse' buttons.

16:34:12 - LHC beam mode has changed to 'BEAM SETUP'

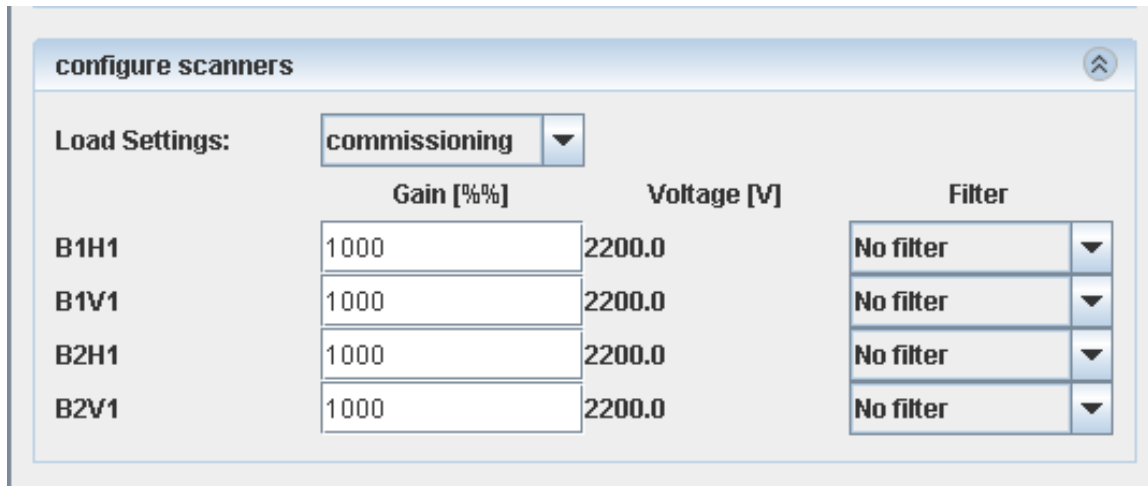
- o Scanner position, photomultiplier (PM) voltage and filter, # scans and mode are displayed
- o Once PM saturation is available, voltage and filter will be color coded (red = saturated, green = ok)

The screenshot shows the 'LHC WIRESCANNER APPLICATION' window. The 'Acquisition' menu is active, and the 'Optics' dropdown is set to 'MEASURED'. The 'RBA: no token' status is visible. The 'Scanner Status' window is open, displaying a table with the following data:

Scanner	Status	Voltage [V]	Filter	#scans	mode
LHC.BWS.5R4.B1H1	Home	0	No filter	--	OFF
LHC.BWS.5R4.B1V1	Home	0	No filter	--	OFF
LHC.BWS.5L4.B2H1	Home	8	No filter	--	OFF
LHC.BWS.5L4.B2V1	Home	8	No filter	--	OFF

- o Mode is ON once the scanner is armed
- o Total # scans should not exceed ~10000

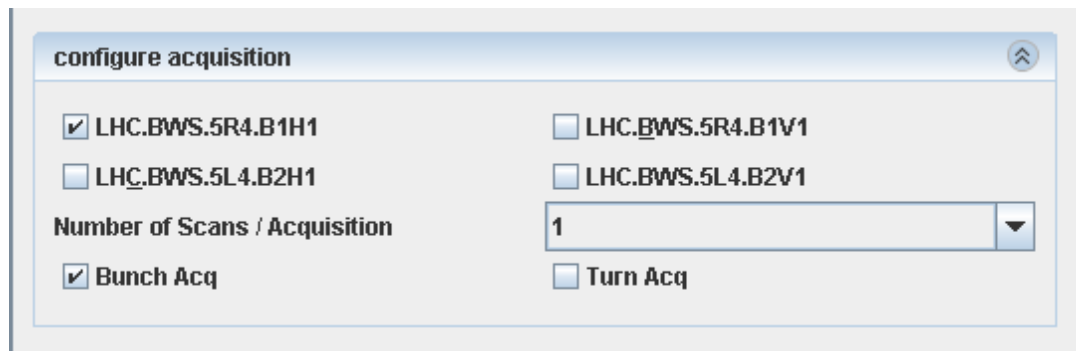
- o Different settings (commissioning, physics injection MD, ...) can be loaded
- o Gain is entered in per mille (1 – 1000), corresponding voltage is displayed
- o Available filters: No filter, 20 %, 10 %, 2 %, 1 %, 0.2 %, 0.1 %, No transmission



Scanner	Gain [%%]	Voltage [V]	Filter
B1H1	1000	2200.0	No filter
B1V1	1000	2200.0	No filter
B2H1	1000	2200.0	No filter
B2V1	1000	2200.0	No filter

- o **There is only one PM per beam! Settings will be send to the scanner only when acquire button is pressed**

- o Only one scanner per acquisition can be chosen at the moment
 - Each scanner has a different tab by default, no need to change ticks
- o Only one scan per acquisition possible at the moment
- o Bunch-by-bunch or turn acquisition possible
 - Window for turn acquisition not large enough to scan entire machine



configure acquisition

LHC.BWS.5R4.B1H1 LHC.BWS.5R4.B1V1

LHC.BWS.5L4.B2H1 LHC.BWS.5L4.B2V1

Number of Scans / Acquisition: 1

Bunch Acq Turn Acq

- o Press acquire to move the chosen scanner
 - Settings from configuration panel are applied

Scanner Status

Scanner	Status	Voltage [V]	Filter	#scans	mode
LHC.BWS.5R4.B1H1	Home	0	2%	--	OFF
LHC.BWS.5R4.B1V1	Home	0	2%	--	OFF
LHC.BWS.5L4.B2H1	Home	2194	No filter	35	OFF
LHC.BWS.5L4.B2V1	Home	2194	No filter	41	OFF

configure scanners

Load Settings:

	Gain [%%]	Voltage [V]	Filter
B1H1	100	1237.0	2%
B1V1	100	1237.0	2%
B2H1	1000	2200.0	No filter
B2V1	1000	2200.0	No filter

configure acquisition

LHC.BWS.5R4.B1H1 LHC.BWS.5R4.B1V1
 LHC.BWS.5L4.B2H1 LHC.BWS.5L4.B2V1

Number of Scans / Acquisition:

Bunch Acq Turn Acq

configure bunch selection

By default all circulating bunches are automatically selected.

configure logging access

Acq Fill 3607 B2H1 x Acq Fill 3607 B2V1 x

LHC.BWS.5L4.B2H1

emittance [um]

Time

LHC.BWS.5L4.B2H1

a.u.

um

energy [GeV]: 450.0

LHC.BWS.5L4.B2H1

norm. emittance [um]

bunch #

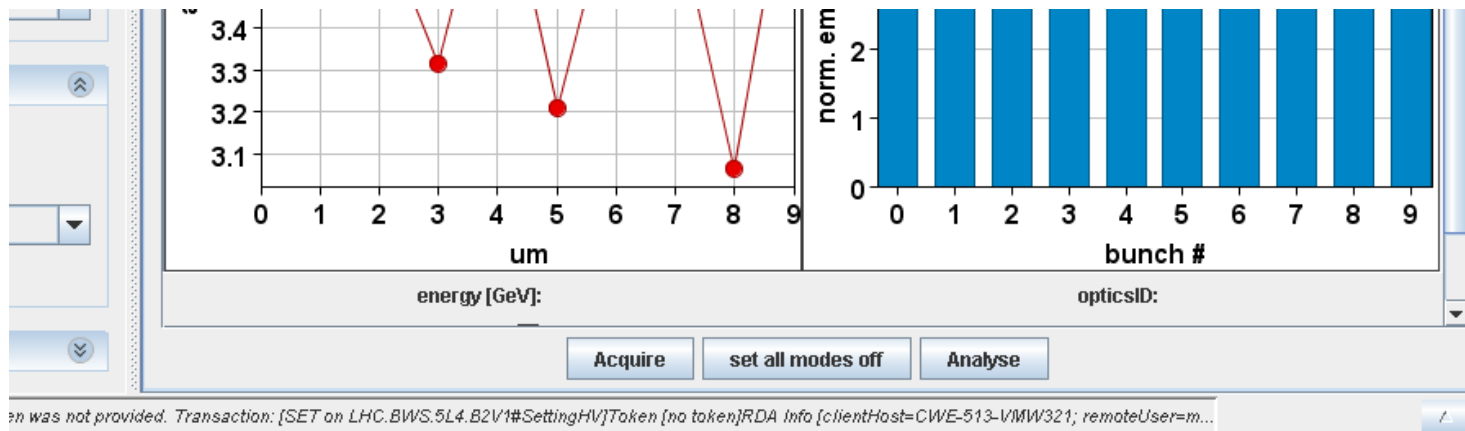
opticsID: 0 beta [m] = 188.67 opticsType: NOM

Bunch 1 of 240

2015-04-06 14:09:28.55

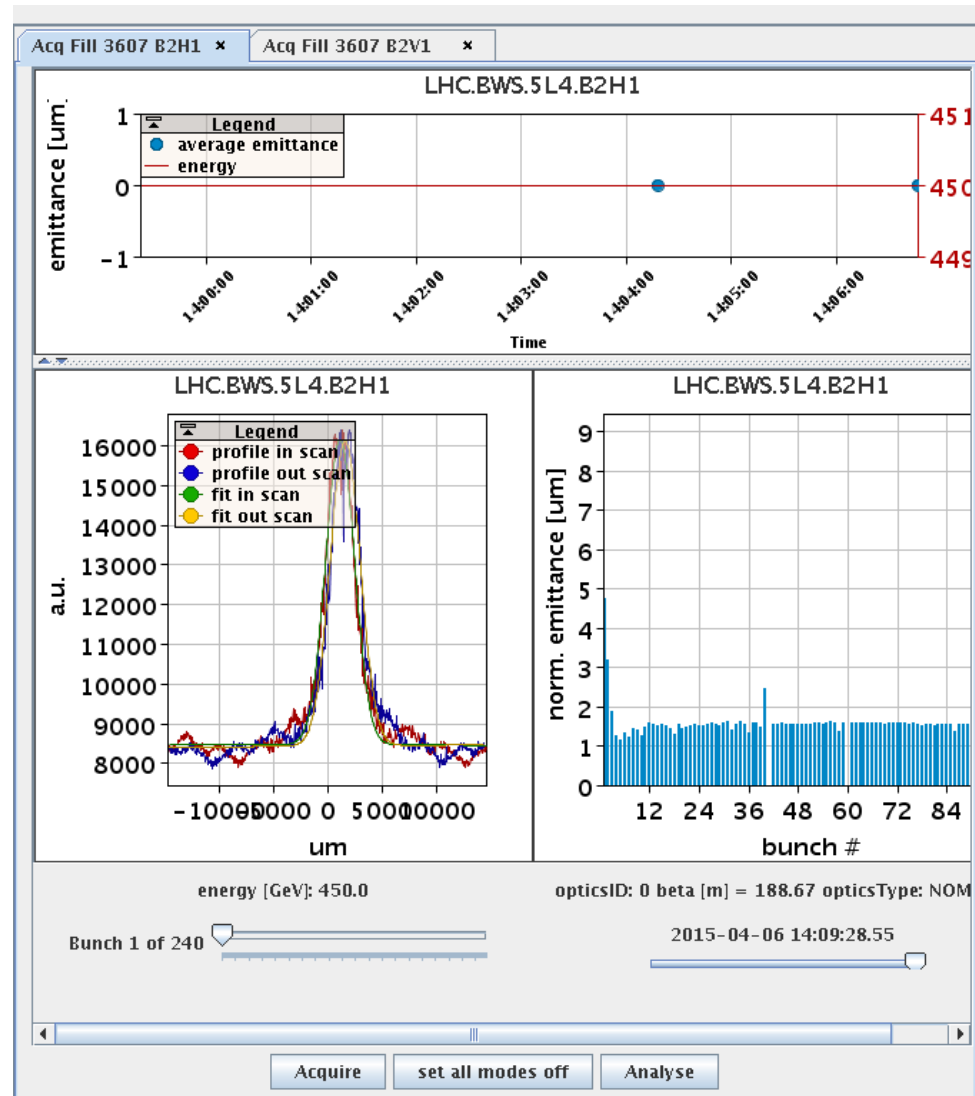
If anything goes wrong...

- o If wire is HOME but mode is still ON:
 - Press „set all modes off“
 - Try several times if necessary



- o **If wire is stuck IN or READY but doesn't fire please contact an expert!** No wire scans are possible until problem is fixed.

- o To fit the profiles, press „Analyse“
- o Fit results will be send to logging DB automatically
- o Overview of bunch emittances is displayed in bar chart (already averaged over in and out scan)
- o Timeline of scans during one fill is displayed above (either bunch-by-bunch or averaged over all bunches if > 50 bunches)
- o Scroll through bunches and scans



- o Data can be retrieved from logging
 - Choose scanners, fillnumber, beammodes and loggingDB or measDB
- o Profiles can be refit with analyse button

Scanner Status

Scanner	Status	Voltage [V]	Filter	#scans	mode
LHC.BWS.5R4.B1H1	Home	0	No filter	--	OFF
LHC.BWS.5R4.B1V1	Home	0	No filter	--	OFF
LHC.BWS.5L4.B2H1	Home	8	No filter	--	OFF
LHC.BWS.5L4.B2V1	Home	8	No filter	--	OFF

configure scanners

configure acquisition

configure bunch selection

configure logging access

B1H1 B1H2 B1V1 B1V2
 B2H1 B2H2 B2V1 B2V2

Fillnumber: Beammode 1:
 loggingDB measDB Beammode 2:

Acquisition Fill B1H1 x Acquisition Fill B1V1 x Acquisition Fill B2H1 x Acquisition Fill B2V1 x Log Fill 2778 x

LHC.BWS.5R4.B1H2

LHC.BWS.5R4.B1H2

LHC.BWS.5R4.B1H2

energy [GeV]: 450.0 opticsID: 1829 beta [m] = 165.48 opticsType: NOMINAL

Bunch 1 of 2 2012-06-24 17:47:56.903