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PC current surveillance for orbit interlocking

Kajetan Fuchsberger

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Thanks to:

M. Audrain, T. Baer, K. Fuchsberger, R. Schmidt,

J. Wenninger, M. Zerlauth



Content

- Motivation & Overview
- Some Statistics
- Status & Outlook



Present PC Interlocking

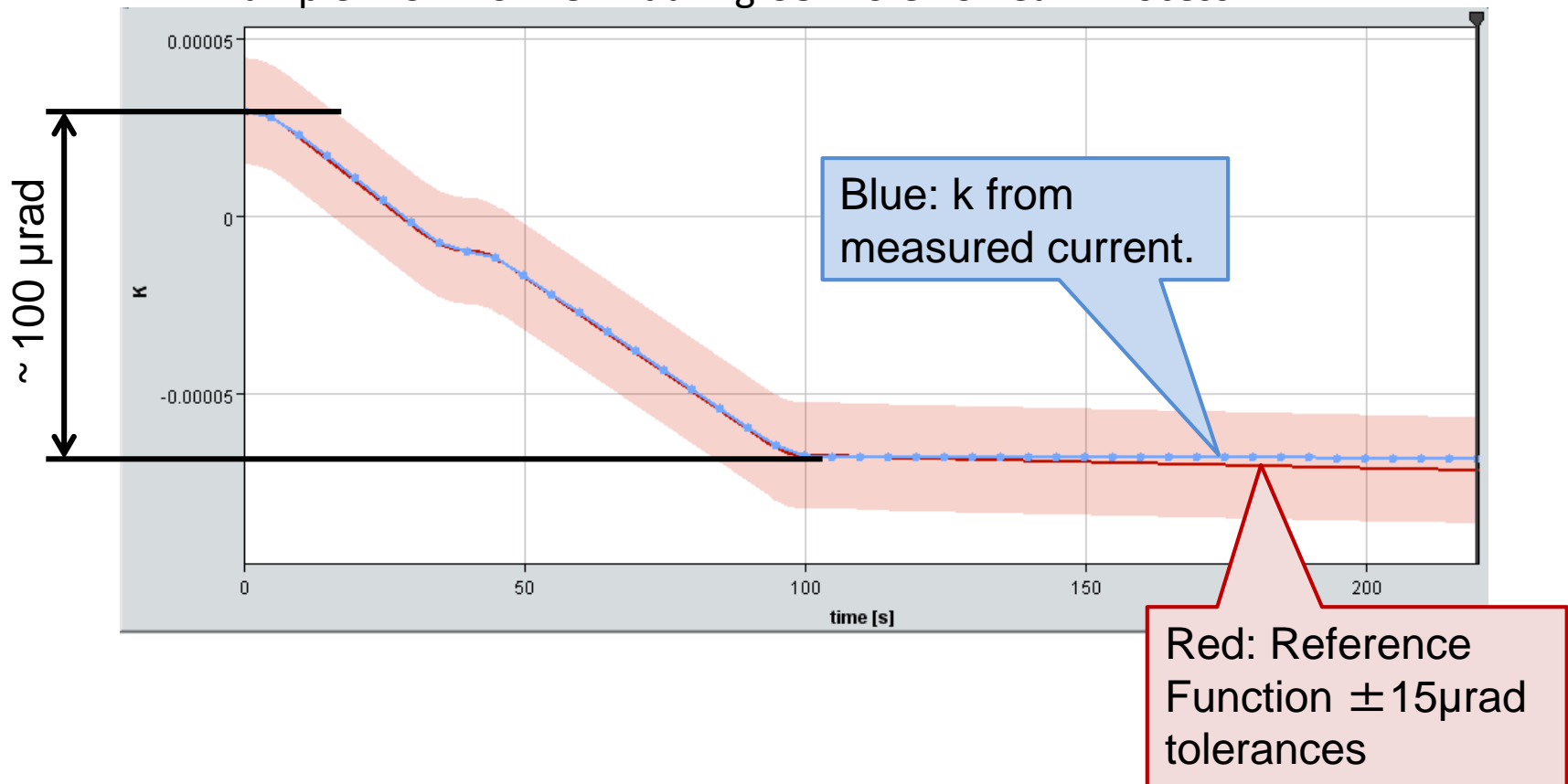
- SIS compares PC currents with reference values \pm tolerances.
- Shortcoming:
 - Only uses constant reference values per beam mode.
 - \rightarrow Limits have to be widely open e.g. during Collisions Beam Process.



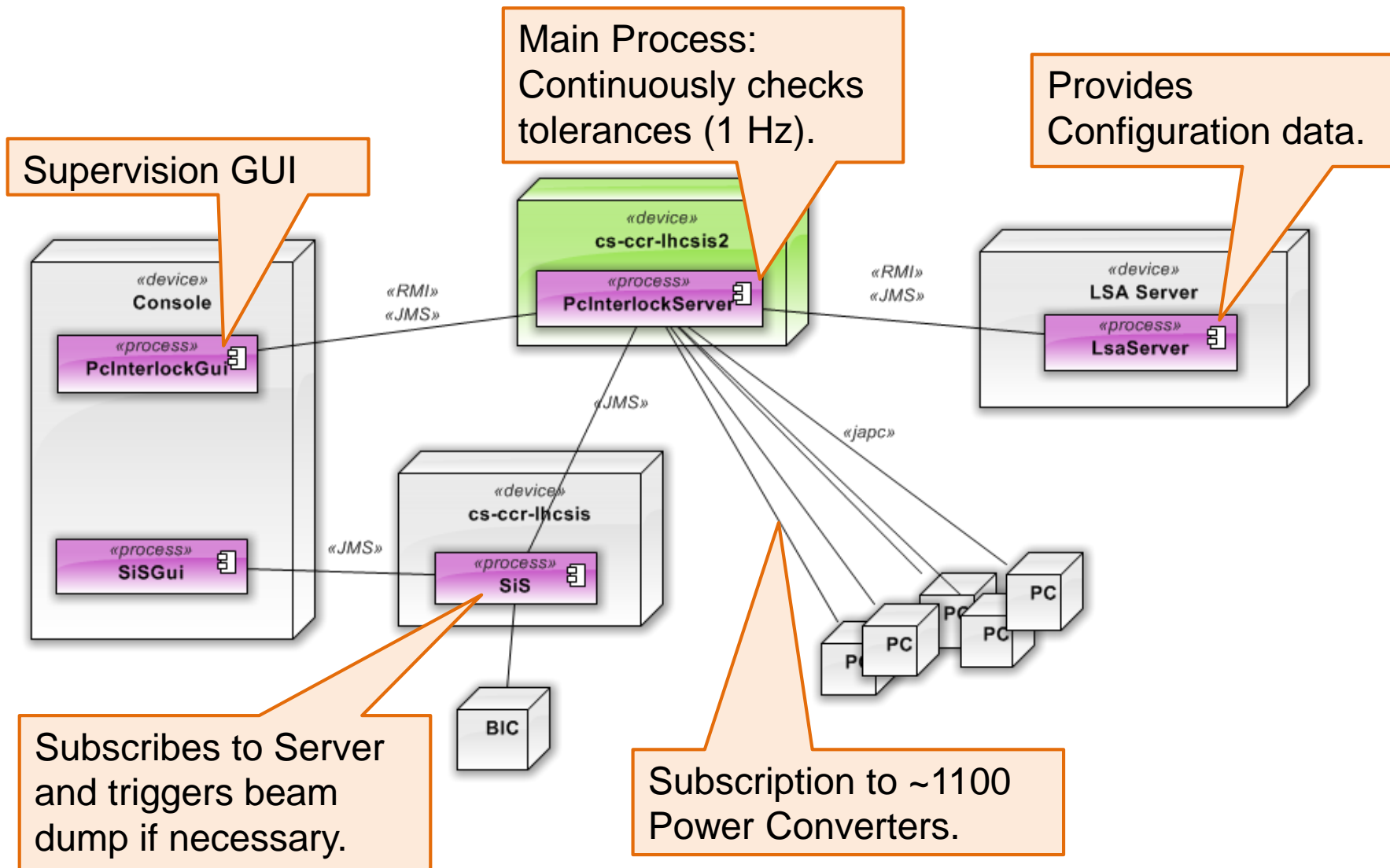
New Pc Interlock System

Principle: Subscribes to Power Converters and compares current to reference *functions* \pm tolerances (1 Hz).

Example: RCBYVS4.L8B2 during COLLISIONS Beam Process:



Overview





Supervision GUI

LHC Power Converter Interlock

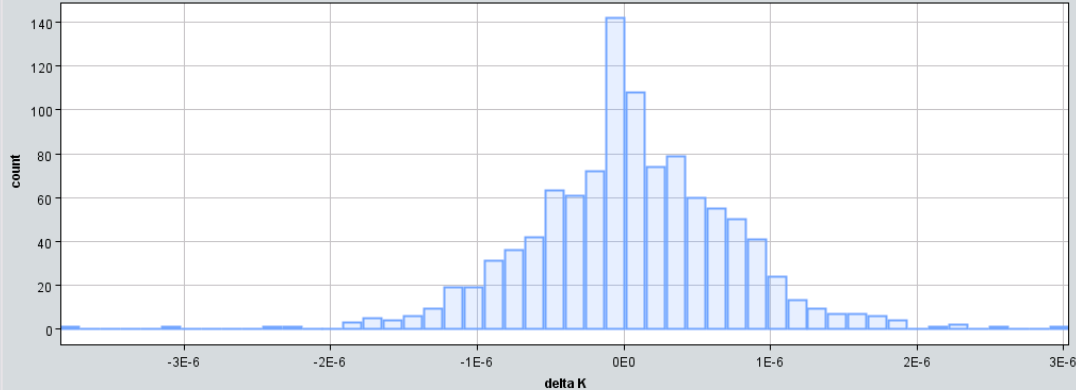
DC Interlock status @ 2012-05-10 19:57:42 : Everything OK , No Interlock

PC Interlock status @ 2012-05-10 20:00:15 : Everything OK , No Interlock

Remote
Logging
DataSet start time
2012-04-13 01:13:59 COLLISIONS
2012-05-10 19:34:15 INJECTION

Power Converters
Status Evolution
Statistics
LHC State

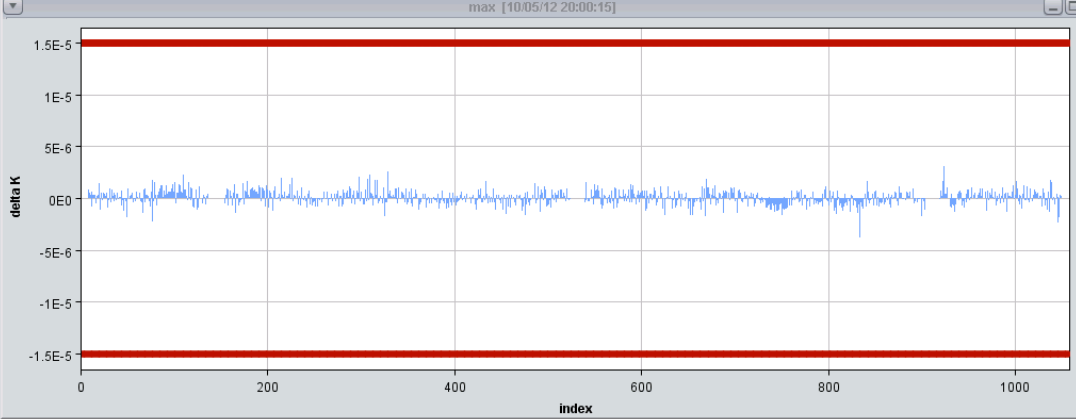
Views
meas [10/05/12 20:00:15]



count

delta K

max [10/05/12 20:00:15]



delta K

index

Pc Groups

- ORBIT_CORRECTOR...
- ORBIT_CORRECTOR...

Values

- I
- K

Delta mode

- NO_DELTA
- DELTA
- RELATIVE_DELTA

Abs?

- NORMAL
- ABSOLUTE

Options

- Ignore inactive States

Aggregate

- SINGLE_STATUS
- SINGLE_DATA_SET
- MULTIPLE_DATA_SE...

Statistics

- MEAN
- STDDEV
- RMS
- MIN
- MAX
- COUNT

Multi DataSets

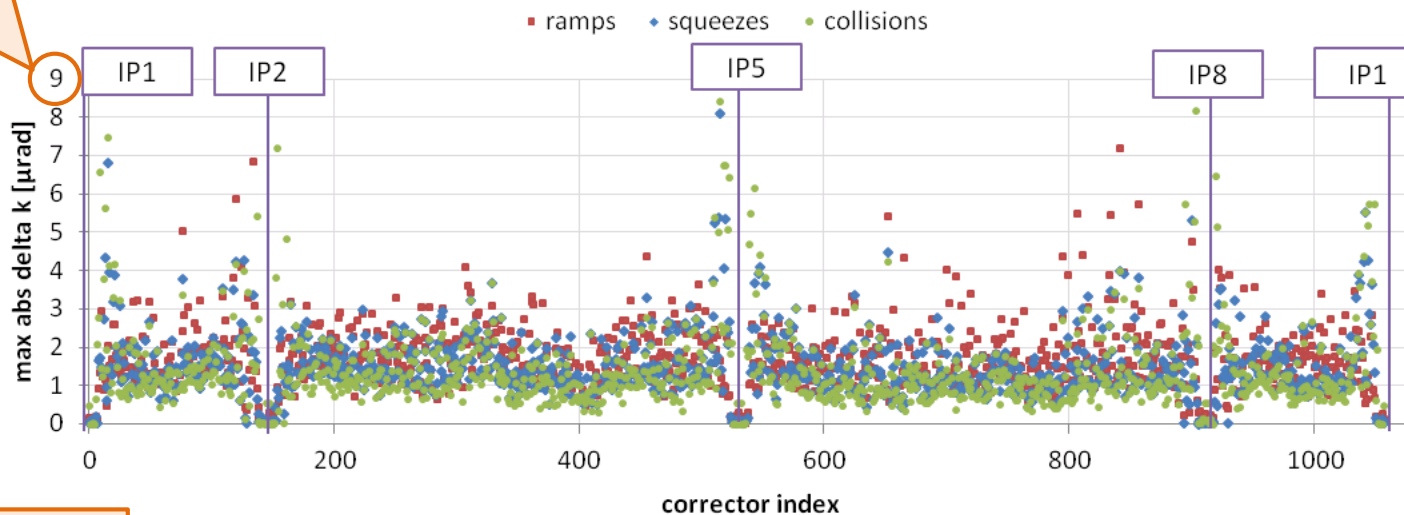
- AS_ONE

Auto save

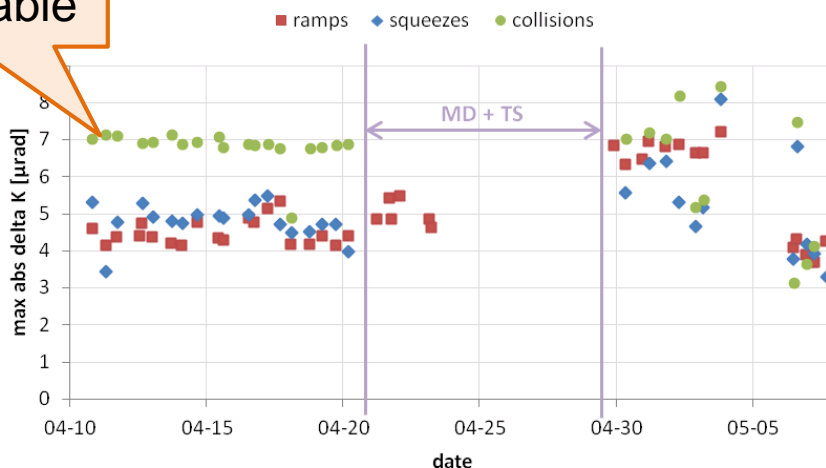


Would we have dumped?

All well below 15 μ rad



Nicely stable



No dump in that period!

Limits: Functions as of 07 May 2012. $\pm 15\mu$ rad

Data: 10 April 2012 to 07 May 2012:
41 ramps, 31 squeezes, 30 collisions.
Extraction from Logging every 30 seconds
(ramp, squeeze) or 20 seconds (collisions).



Status & Outlook

Status:

- Connected to SIS, but masked.
- Server runs stable already for several days.
- Ready to be switched on.
- Only orbit correctors at the moment.

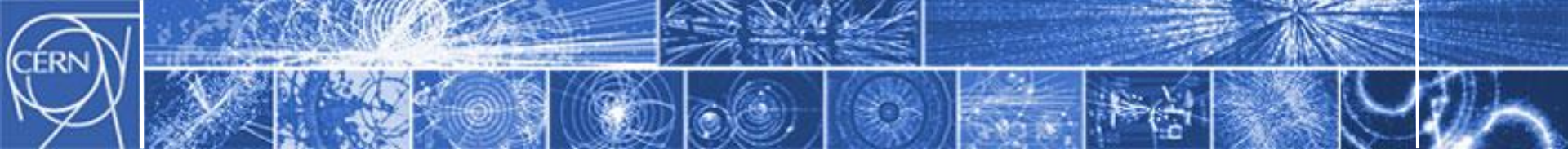
Next Steps:

- Add convenient way to edit tolerances in GUI.
- Protect reference functions and tolerances?
- Include more power converters.

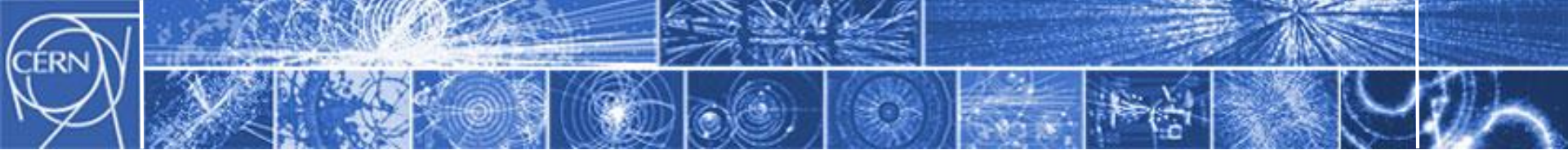


Summary

- No (false) dump would have happened during the last month.
- System is running and ready to be unmasked.



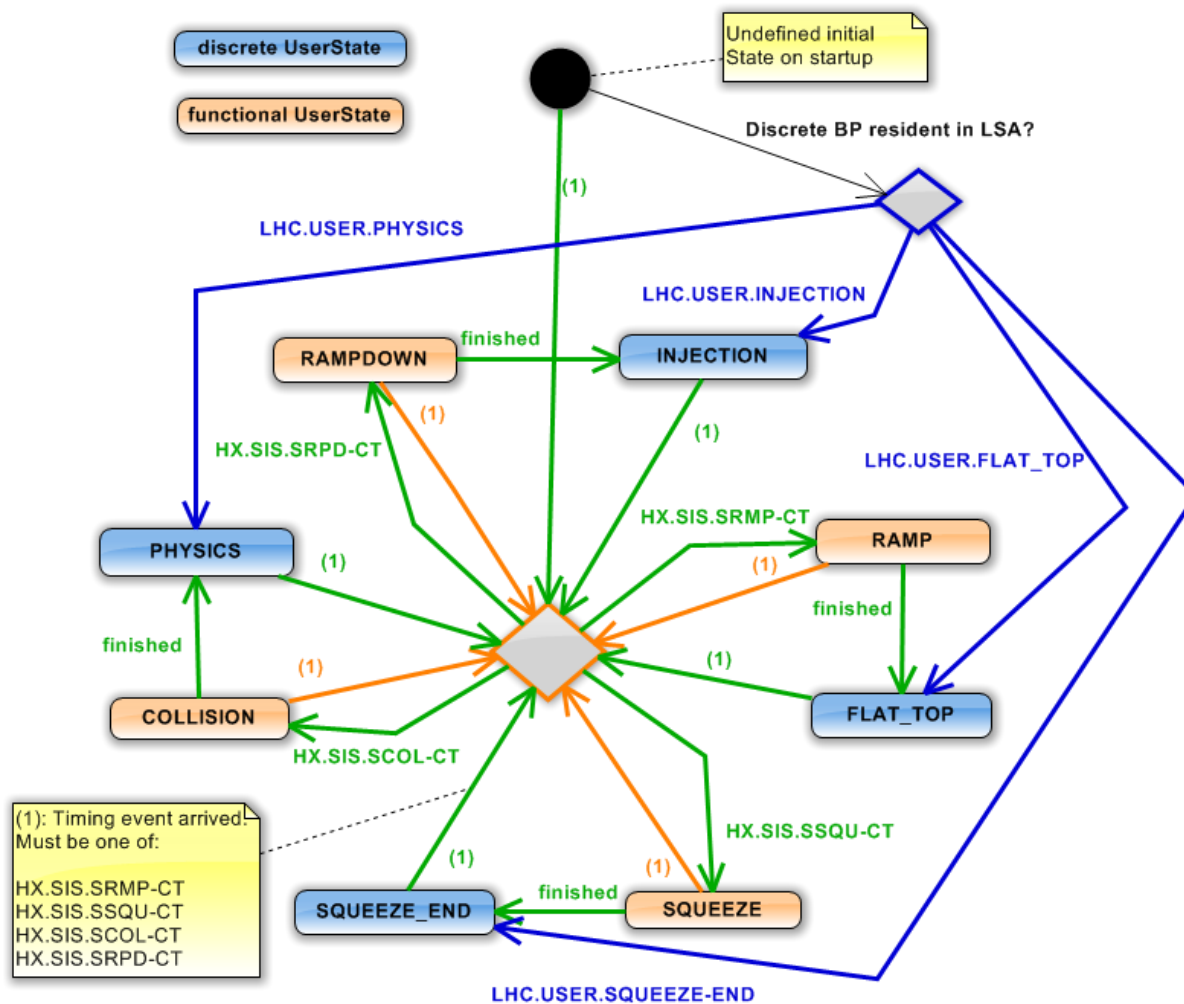
Thank you for your Attention! – Questions?

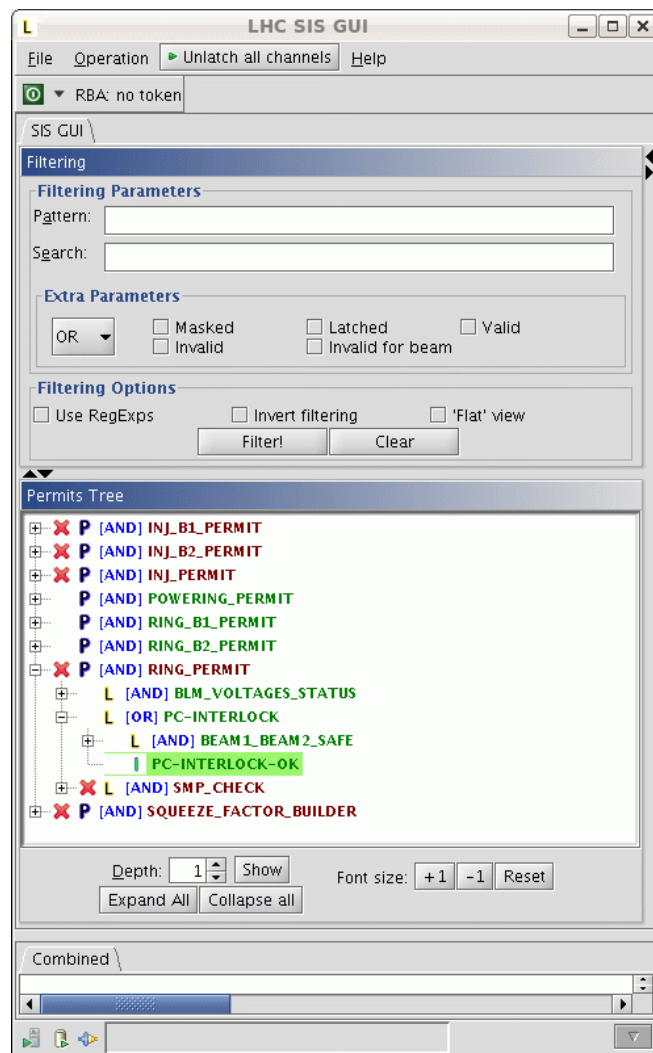


Spare Slides



LHC State determination







Configuration I

Generation Application

RBA: kfuchsbe LHC OP BP

Generate Contexts Generate Settings View Settings Edit types Actual Settings Incorporation **HyperCycle Management** Resident Context Manager

Hyper Cycles	Categories	User	BeamProcess
3.5TeV_10Aps_1m	ADT	LHC.USER.PCINT_RAMP	PC_INTERLOCK_REF_RAMP_4TeV_2012_V1
3.5TeV_10Aps_1m_25NS	BI	LHC.USER.PCINT_SQUEEZE	PC_INTERLOCK_REF_SQUEEZE_4TeV_LONG_2012_V1
3.5TeV_10Aps_1m_MD4	COLLIMATORS	LHC.USER.PCINT_COLLISIONS	PC_INTERLOCK_REF_PHYSICS-TILTED-SQUEEZE-2012_V1
3.5TeV_10Aps_1m_MD4_NOM	KICKERS	LHC.USER.PCINT_RAMPDOWN	PC_INTERLOCK_REF_RAMPDOWN
3.5TeV_10Aps_IONS_1m	PCINTERLOCK		
3.5TeV_10Aps_MD1	POWERCONVERTERS		
3.5TeV_10Aps_MD1_NOM	SPOOLS		
3.5TeV_10Aps_MD2			
3.5TeV_10Aps_MD2_NOM			
3.5TeV_10Aps_MD3			
3.5TeV_10Aps_MD3_NOM			
3.5TeV_10Aps_PPb_1m			
3.5TeV_2Aps			
3.5TeV_BTRAINS			
3.5TeV_Ramp&Squeeze			
3.5TeV_Ramp&Squeeze_IONS			
4TeV_10Aps_0.6m			
4TeV_10Aps_0.6m_MD1			
4TeV_10Aps_0.6m_backup2			
ATS_3.5TeV_2011			
ATS_4TeV_2012			
EARLY-IONS_3.5TeV			
FIDEL_CHECK			
FLAT_INJ			
FULL-RING-TEST			
HighBeta_3.5TeV_2011			
HighBeta_4TeV_2012			
INCORPORATION_TEST			

Make inactive Add Remove Clone

Global edition controls Edit Save Cancel

Add Remove Move up Move down

