Project: Data Analysis of CERN accelerators' instruments

Team:

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Who are we?

CERN's Prevessin site

CERN

Systems

Beam Instrumentation

Software

What do we mean by beam instrumentation?

We are the "eyes" for the machine operators
- i.e. the instruments that observe the beam's behaviour

An accelerator can never be better than the instruments measuring its performance!
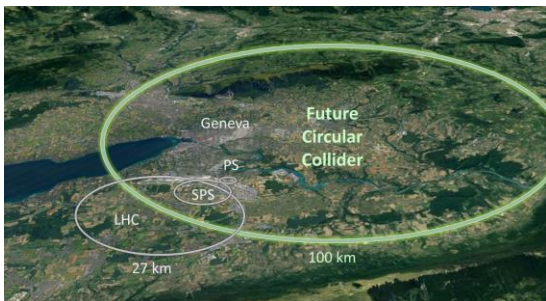
Procedure

| CERN | Instruments | Database | OAF (Offline Analysis Framework) | Operators |

- Beam Position
- Beam Intensity
- Beam Size from Profile
- Beam Loss
- Machine Tune and Chromaticity
- Other Monitors

The Beam Instrumentation Group developed the Offline Analysis Framework some years ago to regularly and systematically analyze data. A new web based Viewer is being developed to facilitate the users' access to results. It mainly produces graphs and tables for the different Instrument Analysis.
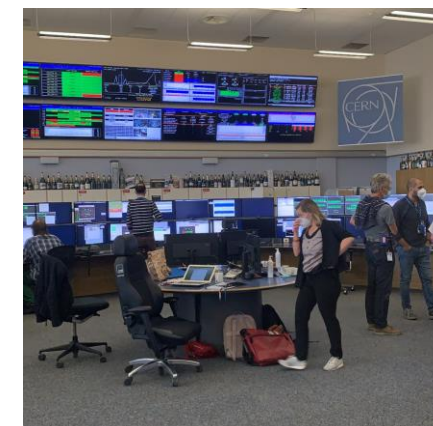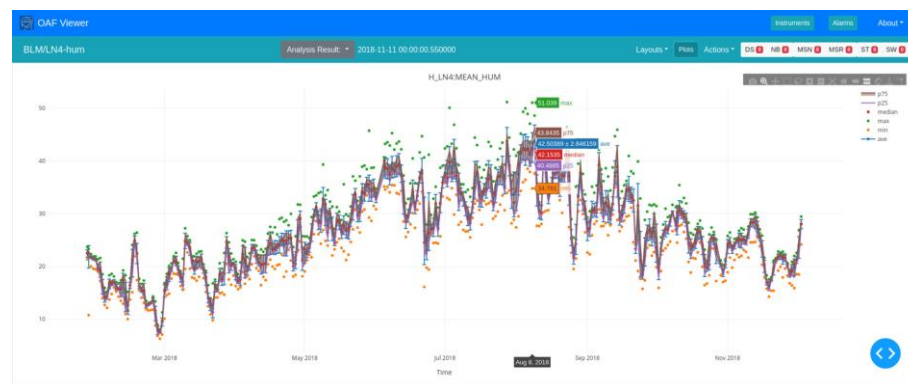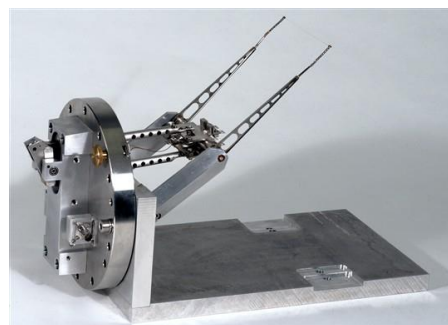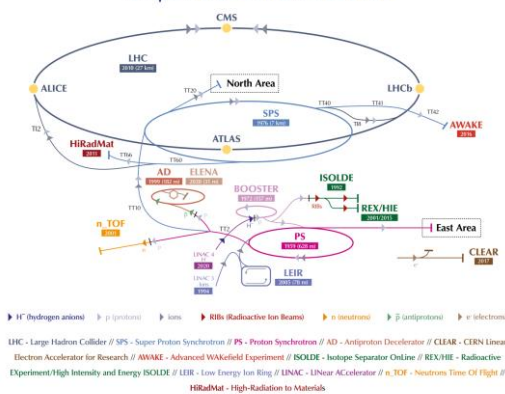
Data Analysis and why is it important?

❏ **What is Data Analysis?**

CERN analyses data from its large industrial infrastructure, for monitoring, control and predictive maintenance purposes. This includes data from accelerators, detectors, cryogenic systems, data centers and log files from the Worldwide LHC Computing Grid and others.
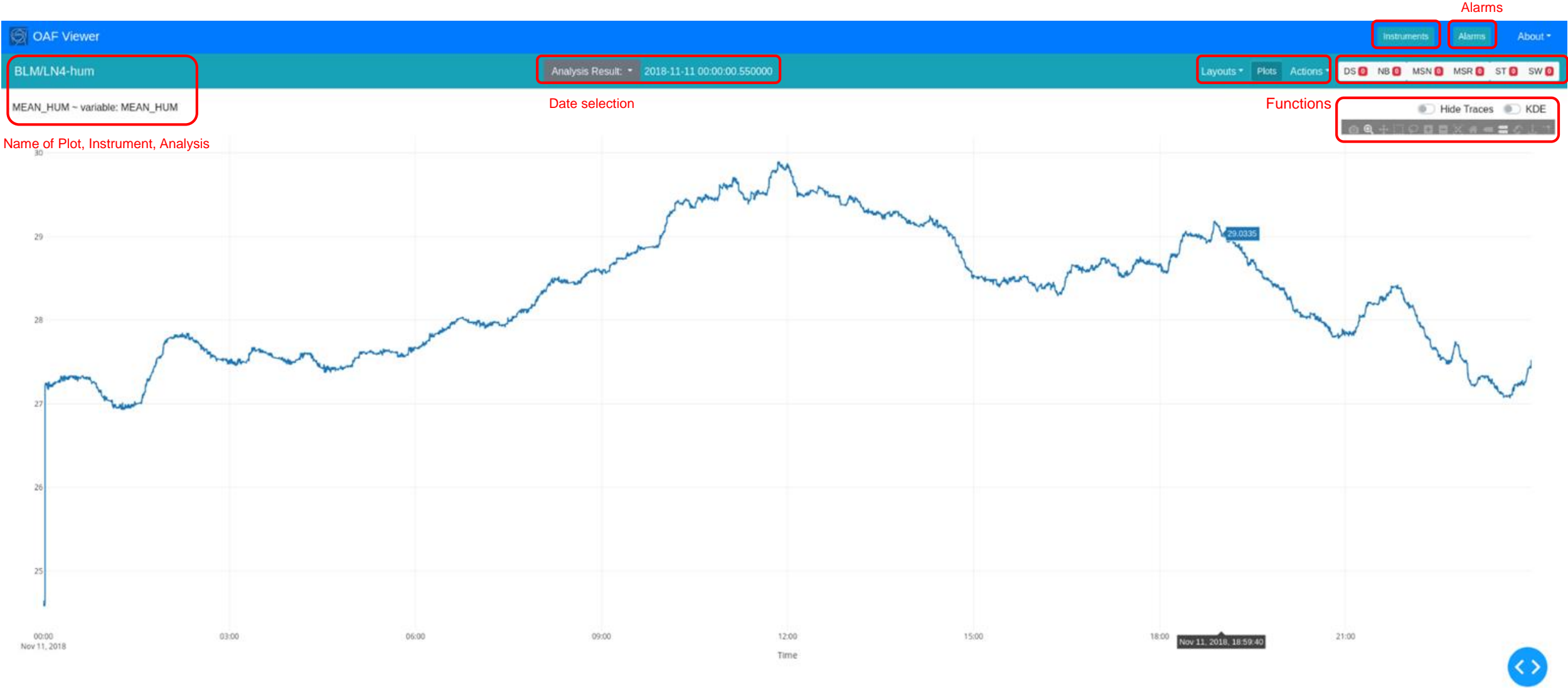
There are three fields connected with the data analysis: modeling of the detector response, modeling of the physics and extracting physics from data, and software tools for modeling and analyzing.

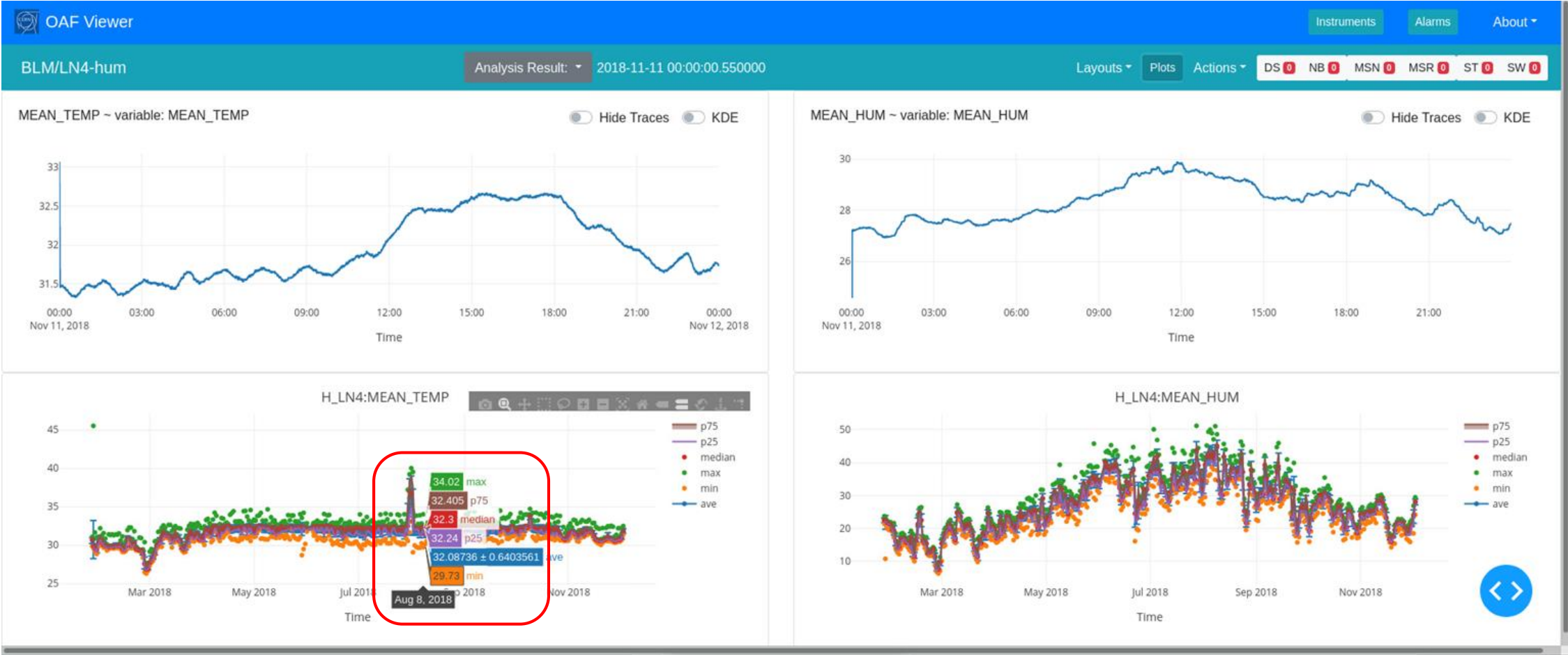*Higgs Boson Discovery- Importance of Data Analysis*

In the accelerators we are colliding particles and looking at what has produced in the collision. As we were taking data from LHC (ATLAS, CMS), accumulating and analysing them throughout the years 2011 and 2012, we saw a peak at around 125 GeV, telling us there is a particle there. (Bingo!)
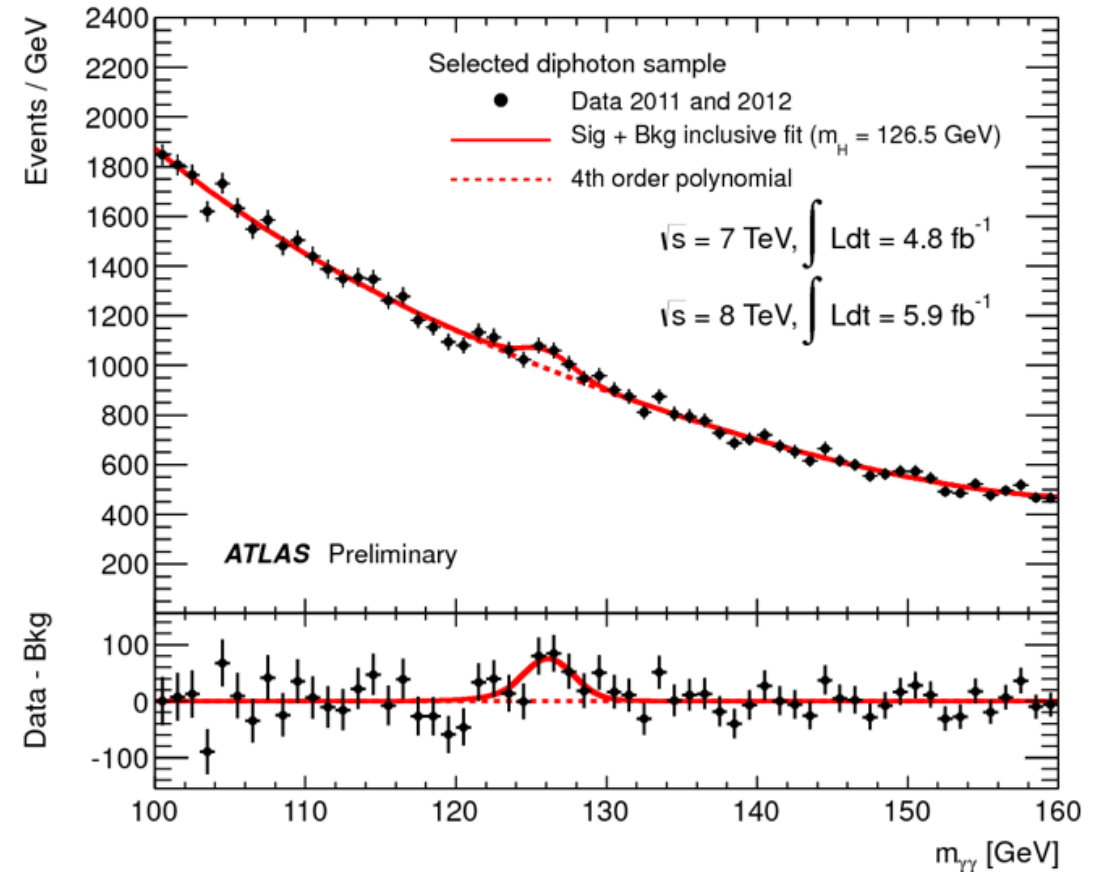
Offline Analysis Framework (OAF) - 1/4

Offline Analysis Framework (OAF) - 2/4

Offline Analysis Framework (OAF) - 3/4

Offline Analysis Framework (OAF) - 4/4

Export

Instrument	Analysis	Total Alarms	Newest Result	Comment
		filter data...		
BCT	L2-trans	0	2018-11-11 23:00:00.065000	
BCT	L3-trans	0	2021-09-01 00:00:01.655000	
BCT	L4-fulltrans	0	2021-08-05 23:00:00.065000	
BCT	L4-trans	0	2021-08-25 00:00:00.065000	
BCT	LAB-survey	0	2021-08-19 00:00:00.000647225	
BCT	LHC-B1-cmp	0	2021-03-23 00:01:00	
BCT	LHC-B1-cmp-det	0	2018-11-11 00:00:00	
BCT	LHC-B2-cmp		2021-03-23 00:01:00	
BCT	LHC-B2-cmp-det	0	2018-06-15 00:00:00	
BCT	LHC-calib	0	2018-06-24 00:00:00	
BCT	LHC-cmp	0	2018-11-11 00:00:00	
BCT	LHC-didt-cal	0	2021-02-08 00:00:00	
BCT	LHC-fast-ldm	0	2018-05-06 23:40:00	
BCT	LHC-noise	0	2018-11-11 23:50:00	
BCT	LHC-survey	0	2021-08-30 00:00:00.000363275	
BCT	SPS-safety	0	2018-06-15 00:00:03.735000	
BEL		0		Problem generating alarm row for analysis L4
BLM	BR-hum	0	2018-12-20 00:00:00.065000	
BLM	BR-humx	4	2021-07-30 00:00:00.065000	
BLM	BR-humz	0	2018-06-15 23:00:00.065000	
BLM	BRFIC-hum	0	2018-11-15 00:00:00.065000	
BLM	BRFIC-humz	0	2018-06-15 23:00:00.065000	
BLM	Belen	0	2021-02-11 23:00:00	
BLM	BelenTst	0	2021-02-12 23:00:00.000363525	
BLM	CPS	0	2018-06-15 23:00:00.700000	
BLM	INJ-opticalPower	0	2021-06-16 21:00:00.065000	
BLM	LHC-conn	0	2021-07-04 23:59:55.000363525	
BLM		0		Problem generating alarm row for analysis LHC-temp

Table was last updated at: 2021-09-15 08:09:04 UTC

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Thank you for your attention! :)

Any questions?