

LHCb PromptDQ

shift training



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Shifts

Shifts are Monday to Monday; the DQ part of shift takes around 10 hours

Before the shift:

- Read the documentation pages: <https://lhcb-dqcs-docs.web.cern.ch/lhcb-dqcs-docs/main.html#shift-organisation>
- Check if the training slides were updated since you took the training.
- Go through the PromptDQ shift pages and read the instructions for each page.
- Sign up to mattermost channel: can be used to reach out to DQ contacts, as well as coordinators.

DQ shift starts with a shift handover on Monday at 11:00 CET

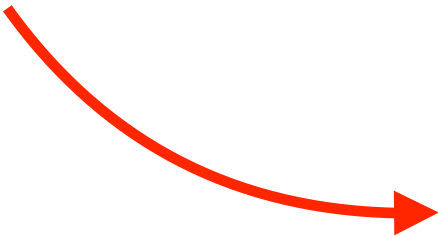
- can be changed upon request for different timezones
- you attend twice: at the start and end of the shift

Introduction to PromptDQ

- PromptDQ is used to decide whether data is good to use for physics analyses. Every run that is sent offline needs to be checked.
 - You're the first person to look at new data in this much detail!
 - Evaluated after HLT2 has finished running
 - Histograms (and references) provided by subsystem experts
 - Set DQ flag per run; either OK/BAD/UNCHECKED
 - Flags are set in the bookkeeping by DQCS shifters using Monet
 - DQCS shifters report to the DQ coordinators, in Run meeting and General Performance meeting
- Communication channels between subsystems and shifters, shown in next slides
 - DQ contacts per subsystem
 - ProblemDB + Shift logbook
 - Run meeting and General Performance meeting

DQ contact people per system

- Every subsystem has a DQ contact, with following tasks:
 - providing pages in Monet and references for plots to check
 - being the contact person for DQ coordinators as well as DQCS shifters when they have questions about data, or the plots
 - up-to-date overview of DQ contacts can be found here: [codimd DQ contacts](#)



System	Contact
VELO	David Friday
UT	Wojciech Krupa, Paolo Gandini
RICH	Federico Betti, Chris Jones
SCIFI	Elisabeth Maria Niel
CALO	Irene Bachiller
MUON	Andrea Contu, Lorenzo Paolucci
RTA	Gregory Max Ciezarek, Titus Mombacher
PLUME	Chenxi Gu, Vladislav Balagura
SMOG2	Chiara Lucarelli

ProblemDB overview

- Problem Database: <https://lbproblems.cern.ch/problemdb/>
 - Describe the issue observed in monitoring/data in a ProblemDB entry and assign a sub-system. Subsystem piquets and DQ contacts receive an email (lhcb-<system>-problemdb; lhcb-<system>-oncall).
 - Update the start and/or end dates as appropriate (this will enable people to look problems up based on run numbers).
 - Link any relevant code/issues/merge requests from GitLab.
 - ProblemDB is updated by shifters (SL+DM), piquets, DQ contacts, DQCS shifters.

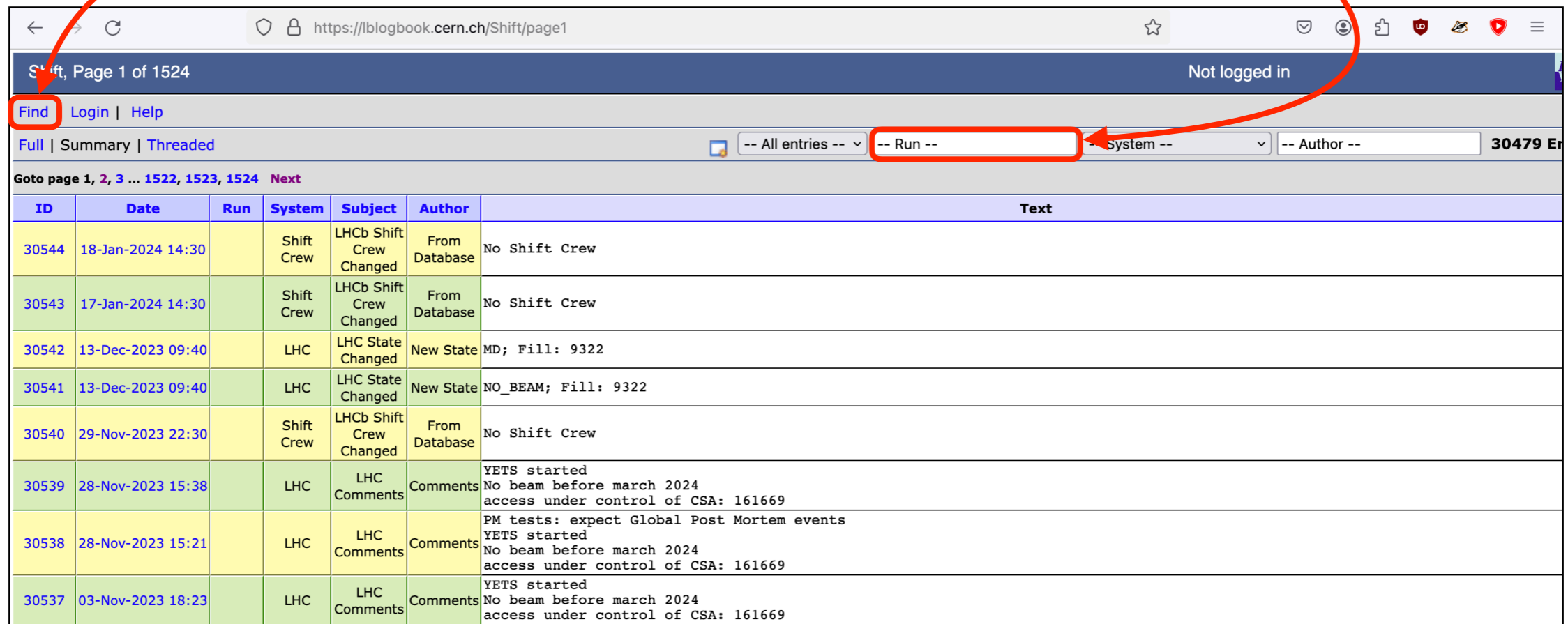
The screenshot displays the LHCb Problem Database interface. At the top right, it says "Hello Suzanne Klaver" with a "Logout" button. Below this, there are navigation buttons: "List of problems", "Report a problem", and a "Search" button with an input field. A section titled "Browse problems by system" contains buttons for various subsystems: BEAM (0), ECAL (7), HCAL (0), LUMI (0), MUON (3), ONLINE (1), PLUME (0), RICH1 (1), RICH2 (1), RTA-AC (1), RTA-HLT1 (4), RTA-HLT2 (0), SCIFI (18), SMOG (0), UT (0), and VELO (4). Below this is a table of "Active problems" with a "Print" button. The table has columns for "#", "Problem", "System", "Severity", "Started", and "Ended".

#	Problem	System	Severity	Started	Ended
35	Muon noisy channels	MUON	MINOR	20-09-2023 01:00:00	
26	T3L1Q3M2H0 excluded from data-taking	SCIFI	MAJOR	03-06-2023 20:08:00	
6	T2L2Q0M3H0 excluded from the FSM	SCIFI	MINOR	11-05-2023 16:18:00	
7	T1L3Q1M4H1 (SFA_FE) ERROR when running	SCIFI	MINOR	29-04-2023 03:27:00	
3	TELL40 errors on START_RUN	SCIFI	MINOR	28-04-2023 15:22:00	

Logbooks

- Data Quality logbook: <https://lblogbook.cern.ch/Data+Quality/>
 - keeps track of all flags and changes in references
- Shift logbook: <https://lblogbook.cern.ch/Shift/>
 - information about data-taking during shifts

search for information about a specific run



Shift, Page 1 of 1524 Not logged in

Find Login | Help

Full | Summary | Threaded

-- All entries -- -- Run -- -- System -- -- Author -- 30479 Entries

Goto page 1, 2, 3 ... 1522, 1523, 1524 Next

ID	Date	Run	System	Subject	Author	Text
30544	18-Jan-2024 14:30		Shift Crew	LHCb Shift Crew Changed	From Database	No Shift Crew
30543	17-Jan-2024 14:30		Shift Crew	LHCb Shift Crew Changed	From Database	No Shift Crew
30542	13-Dec-2023 09:40		LHC	LHC State Changed	New State	MD; Fill: 9322
30541	13-Dec-2023 09:40		LHC	LHC State Changed	New State	NO_BEAM; Fill: 9322
30540	29-Nov-2023 22:30		Shift Crew	LHCb Shift Crew Changed	From Database	No Shift Crew
30539	28-Nov-2023 15:38		LHC	LHC Comments	Comments	YETS started No beam before march 2024 access under control of CSA: 161669
30538	28-Nov-2023 15:21		LHC	LHC Comments	Comments	PM tests: expect Global Post Mortem events YETS started No beam before march 2024 access under control of CSA: 161669
30537	03-Nov-2023 18:23		LHC	LHC Comments	Comments	YETS started No beam before march 2024 access under control of CSA: 161669

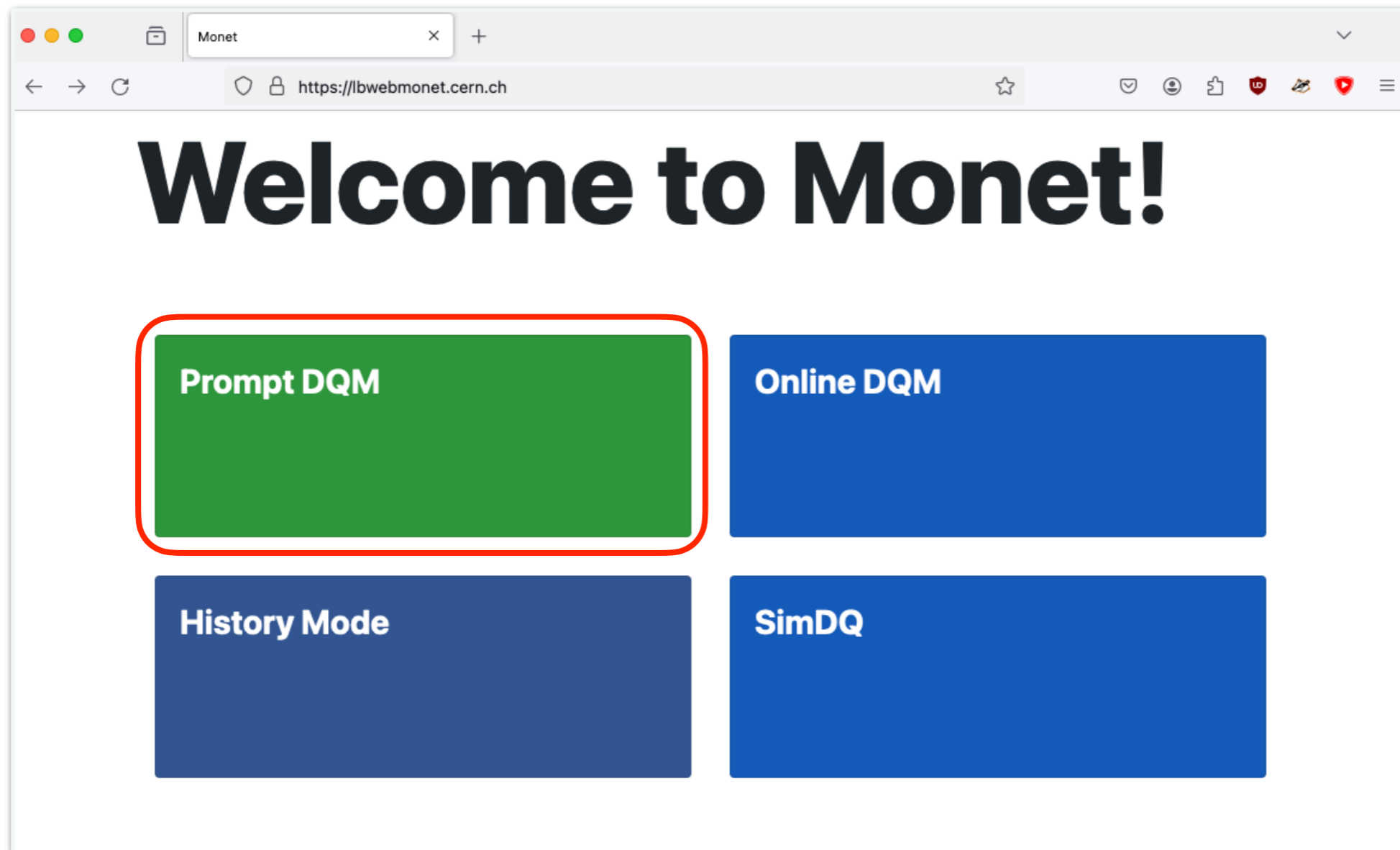
Spreadsheet

- Spreadsheet provides a list of runs to flag for the DQSC shifters, and is organised per fill:
 - has a field per monitoring page in Monet to make remarks
 - easy to gather findings while waiting for response from experts
 - get in touch with DQ coordinators if you cannot access the spreadsheet
 - 4 options for runs: **BAD**, **OK**, **UNCHECKED (to be flagged)** and **UNCHECKED (intentionally)**. Last one used for runs that don't need to be flagged: too-short runs, VDM/BGI runs, etc.

	A	B	C	D	E	
1		Flag	TCK	FullStat (LumiStream)	Duration	Infos
168	Fill 9043					
169	269366	UNCHECKED	0x0	6.76	0:03:56	
170	269367	UNCHECKED	0x0	5.73	0:03:23	
171	269368	UNCHECKED	0x0	16.25	0:09:13	
172	269369	UNCHECKED	0x0	6.14	0:03:46	
173	269370	OK	0x10001000	5.35	0:03:10	
174	269371	OK	0x10001000	35.29	0:19:49	
175	269372	OK	0x10001000	22.97	0:12:59	
176	269373	OK	0x10001000	107.78	1:00:03	
177	269375	OK	0x10001000	29.36	0:19:43	
178	269377	OK	0x10001000	68.93	0:40:11	
179	269378	OK	0x10001000	6.01	0:03:33	
180	269379	OK	0x10001000	63.61	0:35:36	
181	269380	BAD	0x10001000	5.32	0:05:22	
182	269381	OK	0x10001000	23.25	0:13:10	

Monet

- All runs are shown in Monet, we use Prompt DQM:
https://lbwebmonet.cern.ch/prompt_dq/

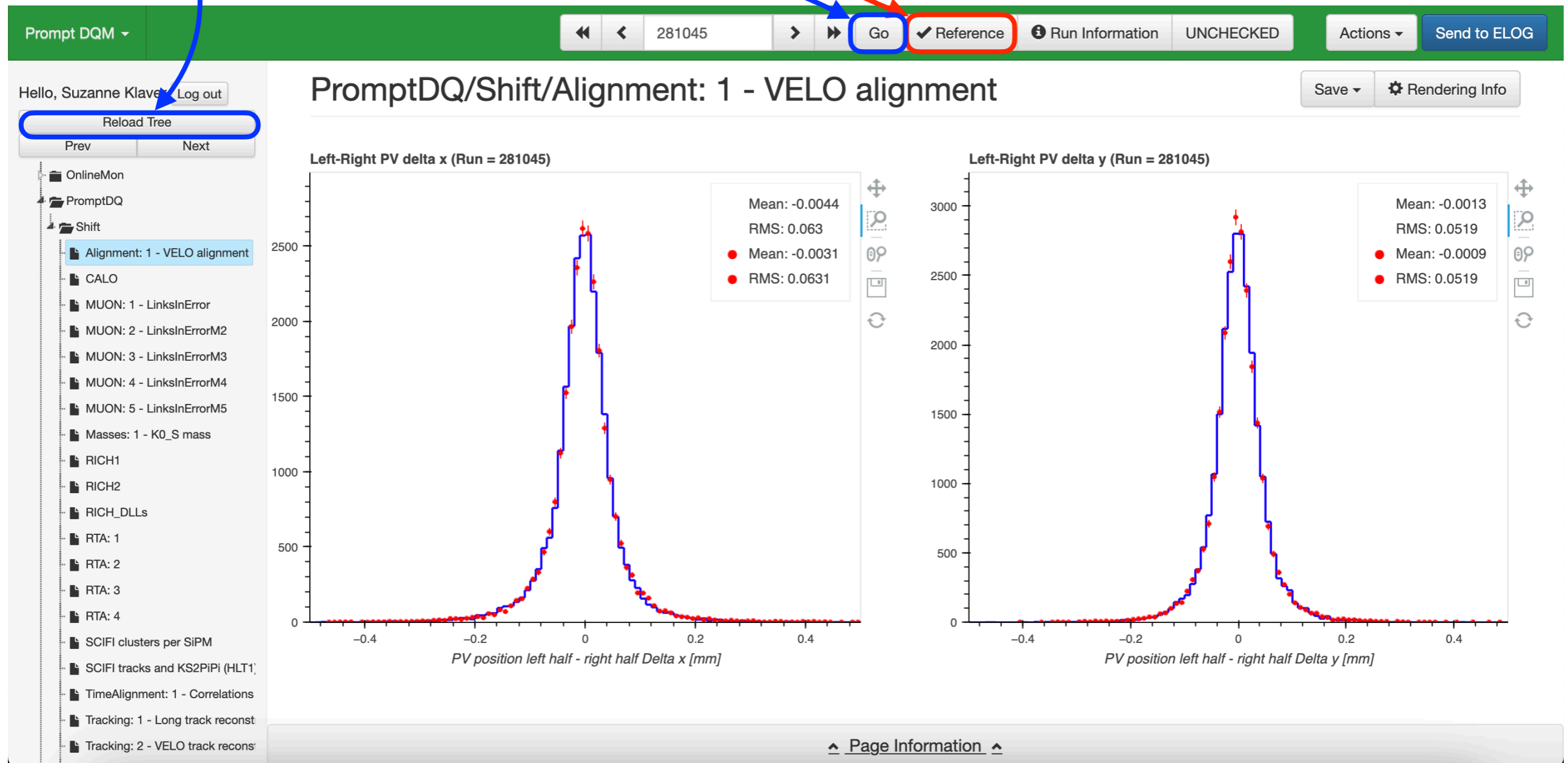


Content of the PromptDQ pages

- PromptDQ gathers plots from different input streams, extending the online monitoring.
- PromptDQ input streams:
 - HLT1 monitors (K_S^0 mass)
 - Dedicated monitoring tasks (subdetectors and reconstruction), including AutomaticAnalysis (e.g. Velo ASIC monitor)
 - HLT2: monitoring from HLT2 lines, e.g. masses
 - High-level performance and trend plots:
 - tracking efficiencies
 - PID performance

Monet

- At the start of shift: Reload Tree and Go
- References (in red) switched on/off here
- Includes reference values for stat box



- Shift pages are at PromptDQ → Shift

Monet

The screenshot displays the Monet web interface for PromptDQ/Shift/Alignment: 1 - VELO alignment. The top navigation bar includes a green header with 'Prompt DQM', navigation buttons for run 281045, and a 'Send to ELOG' button. A sidebar on the left shows a tree view of the data structure, with 'Alignment: 1 - VELO alignment' selected. The main content area features two histograms: 'Left-Right PV delta x (Run = 281045)' and 'Left-Right PV delta y (Run = 281045)'. Each histogram shows a distribution of data points with a blue fit line and red error bars. The left histogram has a mean of -0.0044 and an RMS of 0.063. The right histogram has a mean of -0.0013 and an RMS of 0.0519. Below the plots is a 'Page Information' section, which is highlighted with a red box and an arrow. This section contains the following text:

Difference between the PV positions as determined from the left and the right VELO half.

To check:
The distributions should have a mean compatible with zero and a width that fits the reference. For 2023 variations of up to 20% are still ok.

In case of issues:
For questions on the plot content, page description, or empty plots, get in touch with the [RTA contact](#)

- Instructions for each page can be found under Page Information
- Includes the relevant contact person in case you have a question, or the page, reference, or one of the plots is not working

How to flag a run

- Check runs fill by fill. For every fill:
 - check if there's a known issue for this run in the ProblemDB; it could say that data of specific runs or the entire fill are BAD
 - read/skim the Shift logbook for additional information
- For every run: go through each of the pages and see if the data matches the reference within the ranges specified in the Page Information description
- If not:
 - Is this problem understood and reported in ProblemDB?
 - if a problem was not yet reported: open an issue in the ProblemDB
 - In case of doubt, contact the relevant DQ contact person or DQ coordinators
 - they can help decide what is the impact on data and which flag to use
- If a problem is found in one or more subsystems (**except PLUME, SMOG or UT**), the run is flagged as BAD. Always check every single page, such that we understand all issues and analysts can follow up offline.

DQ flags

- Run flag can have three different values:
 - UNCHECKED: default flag, run is not yet checked, or deliberately left UNCHECKED: not good for physics
 - OK: run is checked and has no issues: good for physics
 - BAD: run is checked and has issues: not good for physics
- There are three additional fields, which give valuable information on the respective subsystems, but do not impact the global DQ:
 - SMOG
 - PLUME
 - UT: the DQ flag for 2024 is independent of UT; when UT is part of global data-taking, this flag is not optional.

Flagging a run

The screenshot shows the Monet web interface for run 281045. The page title is "PromptDQ/Shift/Alignment: 1 - VELO alignment". The status bar at the top indicates "UNCHECKED". A red box highlights the "Actions" menu, which contains the following options:

- Flag Run (indicated by a red arrow)
- Report MONET problem
- Documentation

The main content area displays two histograms:

- Left-Right PV delta x (Run = 281045)**: Mean: -0.0044, RMS: 0.063. The plot shows a distribution of PV position left half - right half Delta x [mm] with a peak at 0.
- Left-Right PV delta y (Run = 281045)**: Mean: -0.0013, RMS: 0.0519. The plot shows a distribution of PV position left half - right half Delta y [mm] with a peak at 0.

The left sidebar shows a tree view of the data structure, with "Alignment: 1 - VELO alignment" selected. The bottom of the page has a "Page Information" button.

Flagging a run

The screenshot displays the PromptDQM web interface. A modal dialog titled "Set Run flag" is open in the center. The dialog contains the following fields:

- Run flag:** A dropdown menu with the selected option "OK or BAD".
- Flag for SMOG (optional):** An empty dropdown menu.
- Flag for PLUME (optional):** An empty dropdown menu.
- Flag for UT (optional):** An empty dropdown menu.
- ELOG submission comment (optional):** A text area containing the text "Logbook entry for this run".

Additional annotations on the dialog include a red dashed box around the three optional flag dropdowns with the text "additional flags" written in red, and the text "Logbook entry for this run" written in red inside the comment field.

The background interface shows a navigation bar with "281045", "Go", "Reference", "Run Information", "UNCHECKED", "Actions", and "Send to ELOG". A sidebar on the left lists various detector components like "OnlineMon", "PromptDQM", "Detectors", "HLT2Lines", "HLT2Masses", "RTA", "Shift", "Alignment: 1 - VELO alignment", "CALO", "MUON: 1 - LinksInError", "MUON: 2 - LinksInErrorM2", "MUON: 3 - LinksInErrorM3", "MUON: 4 - LinksInErrorM4", "MUON: 5 - LinksInErrorM5", "Masses: 1 - K0_S mass", "RICH1", "RICH2", "RICH_DLLs", "RTA: 1", "RTA: 2", "RTA: 3", "RTA: 4", and "SCIFI clusters per SIPM". The main plot area shows a histogram of "PV position left half - right half Delta y [mm]" with a mean of -0.0013 and an RMS of 0.0519.

- In the ELOG submission field, write down anything out of the ordinary: why a run is BAD, but also imperfections for OK runs.

Short runs

- During commissioning phase, runs are frequently changed.
When is a run too short to judge DQ?
 - If plots are empty (usually <20 seconds): run is too short and is flagged as BAD
 - If some data is there, but is difficult too judge (<1 minute):
 - have a look at the ProblemDB and Shift logbook to find know issues for this run
 - if nothing is there and runs before and after are OK, this run can be flagged OK
 - These criteria may change when we get to more stable conditions

Meetings to attend

- Run meeting:
 - The DQ shifter reports their findings during one of the Run meetings. Usually this is the one on Friday morning, at the end of the shift week. If this doesn't work, it can be presented on the next Run meeting.
 - Indico: <https://indico.cern.ch/category/669/>
- General Performance meeting:
 - DQ shifter also gives PromptDQ status report during GP meeting to inform collaboration about data quality and get feedback from analysts. This is on Monday afternoon, at very end of the shift.
 - Indico: <https://indico.cern.ch/category/16517/>

PromptDQ report

- Slides for reports in both meetings can be the same, but the audience is different. Detector experts give feedback in the Run meeting; analysts in the GP meeting.
- In the slides, explain:
 - which fills you looked at
 - how many runs were flagged
 - which issues were encountered: add plots
 - why data was flagged as BAD
 - add references to ProblemDB and the DQ logbook
- Slides should be circulated to DQ coordinators beforehand.
- For the Run meeting, please keep the spoken report focused only on the issues that were found in data.

Conclusion

- You'll be the first person to look at new data in this much detail and to find potential problems!
 - take it seriously, and enjoy :)
- If you have any questions, don't hesitate to contact DQ coordinators and DQ contacts. This can be done one-to-one, or in the PromptDQ mattermost channel.

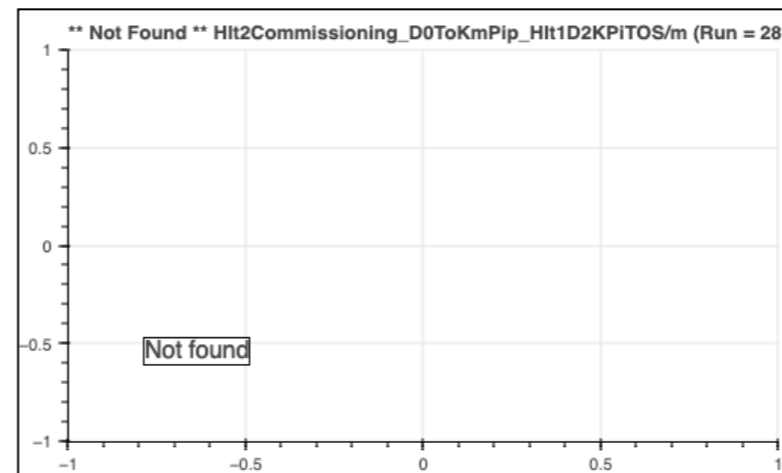
BACKUP

Questions

- An issue is found in the SciFi plots, do you check the other pages?
 - yes, we need to gather and understand all issues in the data
 - no, the data is BAD anyway, it doesn't matter what we find in the other plots
- During 2024, the UT data page shows BAD data, while all other subsystems are OK. How do you flag the data?
 - Run=OK; UT=BAD
 - Run=BAD; UT= BAD
 - Run=OK; UT=OK
 - Run=BAD; UT=OK

Questions II

- A page shows histograms which are **** Not Found ****, what do you do?
 - refresh the browser, reload tree, and press GO. If this doesn't help: ask your supervisor
 - refresh the browser, reload tree, and press GO. If this doesn't help: find and contact the contact person on the Page Information
 - refresh the browser, reload tree, and press GO. If this doesn't help: close Monet and try again tomorrow
 - refresh the browser, reload tree, and press GO. If this doesn't help: contact Monet experts



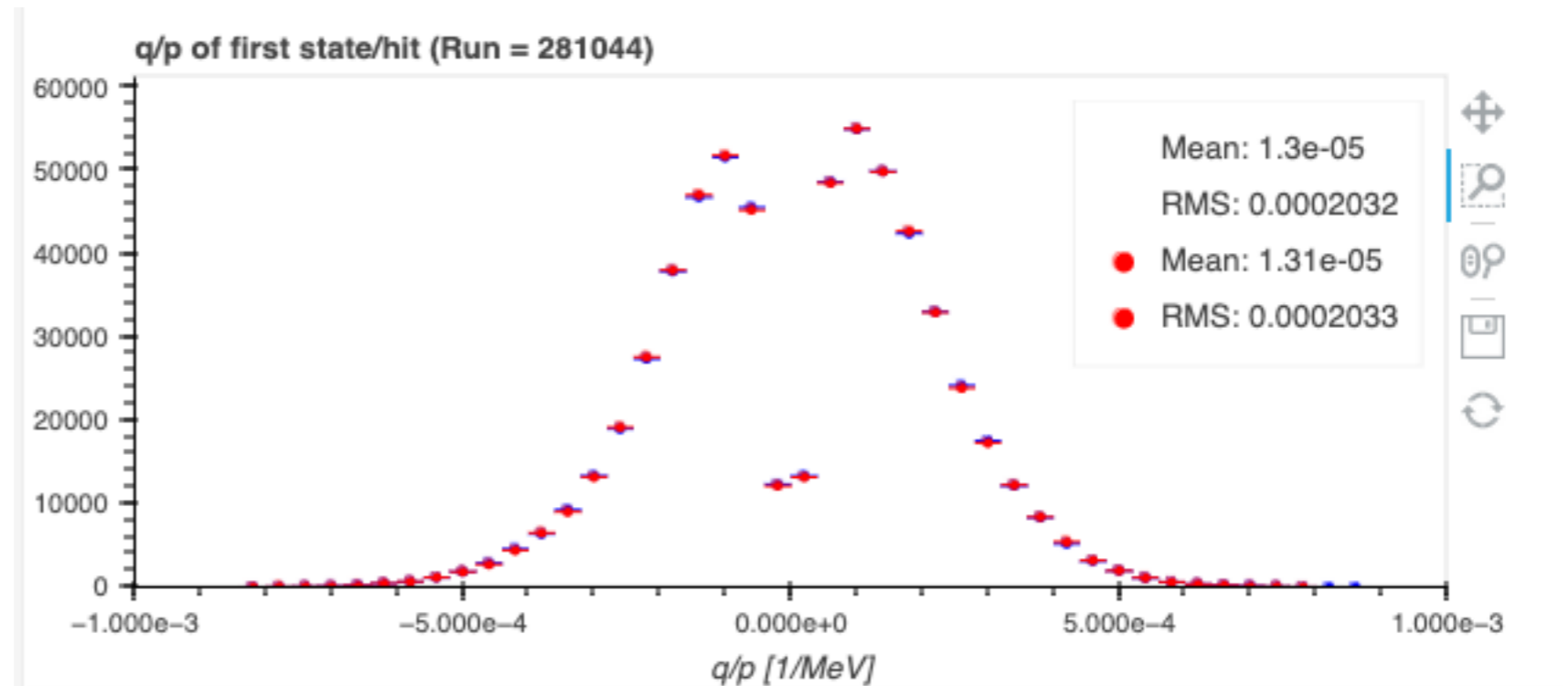
Questions III

- You're unavailable to flag data for one day in the week. What do you do?
 - You inform the DQ coordinators and make up for it another day
 - You find a replacement shifter
 - You flag less runs
- What is the first thing you do when you start flagging data?
 - go to Monet and look at the plots of a random run
 - go to the ProblemDB and Shift logbook to check for known issues
 - contact the DQ person for every page

Questions IV

- The instructions for the q/p plot say that “The mean of q/p should not exceed 1e-5.”. What is the mean value of q/p in this example?

- 1.3e-05
- 1.31e-05
- 0.0002032
- 0.0002033

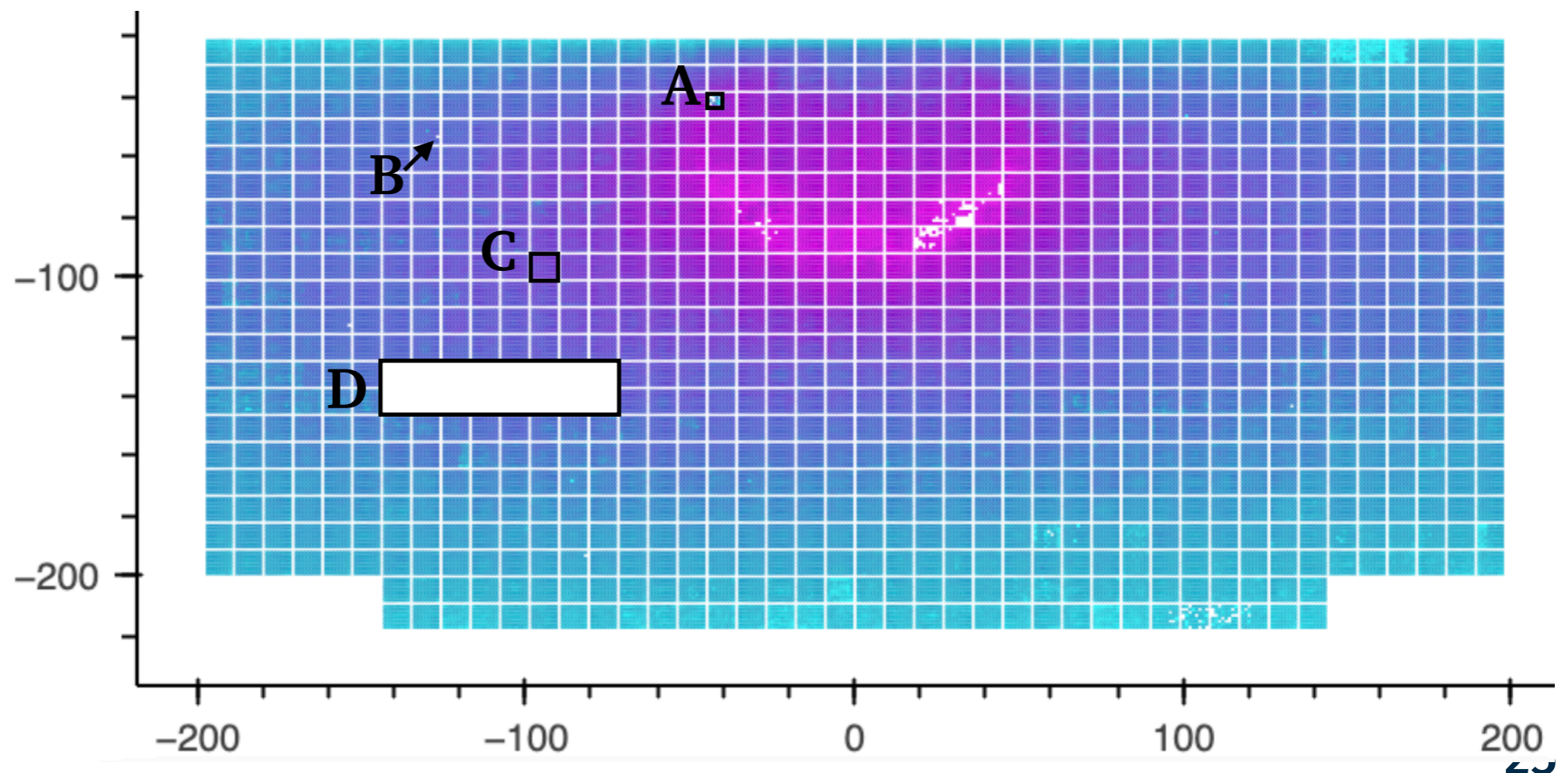


- (note: the data in red is from the reference)

Questions V

- In the instructions of the RICH page it says: “If the empty (or almost empty) region has a size smaller or roughly equal to the size of an Elementary Cell (that is the small rectangle in which pixels are grouped), it is OK.” Which letter indicates an elementary cell in the RICH?

- A
- B
- C
- D



Questions VI

- Which information should be presented at the Run meeting?
 - show all plots that were OK
 - show summary of flagged runs, and discuss BAD data if you found anything
 - show run numbers and flags only
- The SMOG, UT and PLUME flags are BAD; what is the value of the Run flag?
 - Run flag = OK
 - Run flag = BAD
 - I don't know, the Run flag is independent of the SMOG, UT and PLUME flags.