



Introduction to 2022 Joint Accelerator Performance Workshop

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<https://indico.cern.ch/event/1194548/>



Many thanks to:

Organising Committee, Session Chairs and Speakers for the hard work in preparation

Lucie Mainoli for the logistics

Participants, for your valuable time and upcoming active contributions

CERN Joint Accelerator Performance Workshop

Objectives and scope:

- **Bring together** clients and accelerator teams **across complex** to focus on 2022 lessons, 2023 desiderata and update longer-term perspective
- Spotlight on **requirements** and **integrated performance**
- Outcome: summary of **performance limitations, priorities** and specific **action proposals for complex improvements** to follow up
- Should provide **input to Chamonix 2023** on expected performance, limitations and priorities for themes of work
- Intended to be a forum for **open and detailed technical discussion**, with focus on **new topics and results**

Rational for merging Montreux + Evian

- ATS teams work across all accelerators
- LHC performance in LHC depends critically on injectors
- Facilitate exchange of tools, methods, ideas and solutions
- Improve cohesiveness across machines and ATS units
- Aim for holistic approach in optimising global physics output
- Deal together with challenges of delivering more physics as efficiently as possible – in terms of resources and of energy

Risks of a big common Workshop?

- *“Not enough time for detailed discussion”?* → Careful session timetables, breaks, speaker discipline, chairperson flexibility
- *“Large sections of the audience not involved”?* → Hosted at CERN, wide invitation list, time for discussion - please participate!
- *“Management presence inhibits free discussion?”* → Objective is to identify and develop where to improve, so we all really, really WANT people to be constructively critical and discuss freely

Try it out this way – and learn from the experience for 2023

Other notes on organisation

- No proceedings – so the INDICO slides and Chairperson summaries with ‘Action list’ will be the legacy
- Important ‘non-technical’ parts of Workshop, since much (most?) of the valuable discussion takes place outside the Sessions proper

Workshop Sessions: outline

Mon	Session 1: Introduction, aims and 2022 recap (Rhodri) Session 2: Accelerator and client view by beam (Bettina, Nikos)
Tues	Session 3: LIU Proton Beams for the LHC (Hannes, Stephane) Session 4: Accelerator performance: LHC (Matteo, Roderik)
Wed	Session 5: Equipment availability and efficiency improvements (Chiara, Giulia) Session 6: Beam related issues throughout the complex (Alexandre, Barbara)
Thur	Session 7: Efficiency, reliability & tools across the complex (Alex, Verena) Session 8: Outlook and roadmap for Run3 and Run4 (Johannes, Reyes) Session 9: Main points and follow-up (Brennan, Rhodri)

Outside the Session program

- Many people pointed out the need for opportunities for discussion in relaxed setting (automatic in ‘outside CERN’ WS)
- To try and provide this, everyone is warmly invited to:
 - Coffee breaks: provided in each Session – please stay around
 - Lunch each day: free-form, but B30 cafeteria and R2 are close
 - Welcome cocktail: Monday, 18:00 in main building (Pas-Perdus)
 - Workshop Dinner: Tuesday 18:00, same place (Pas-Perdus)
 - Physics Seminar: *“Space-based science meets accelerator-based science at CERN”* Urs Wiedemann, Wednesday 18:00, KJA, B30

Workshop spirit

- Asked Chairs and Speakers to concentrate mainly on problems to solve: so a lot of topics and discussion will be based around needs for improvement
- These aims should not detract from impressive 2022 achievements: was in many respects a great success for injectors and LHC (maybe some teams not so visible because they did a perfect job in 2022!)
- Don't perceive this focus as negative: huge appreciation at all levels for fantastic performance achieved across complex, and big improvements already made in 2022 on many fronts

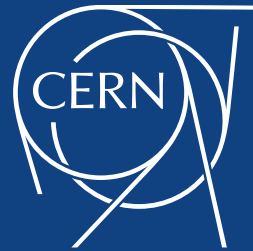
Workshop spirit

- So although it's 5th December, we're **NOT** aiming at Krampusnacht....



Final words

- All trying to push the performance of the machines and maximise physics output of the complex
- There many stimulating and creative opportunities for this – opportunities to make breakthroughs and make a difference
- It should also be fun, so let's enjoy this week together



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Understanding the requirements

- Most important lessons from 2022
- Key experiment/client desiderata for 2023
- Experiment preferences, i.e. peak performance vs. reproducible performance, etc.
- Are there new experiment/client requirements for 2023 or beyond? What do these imply for the machines?

Where are the limits?

- Review of performance ramp-up progress (LIU beams, LHC)
- What are bottlenecks to performance, in terms of maximising beam for physics and data-taking? How can these be improved?
- What needs to be improved for more efficient, reproducible operation?
- Where should availability get even better?
- Are the measurement metrics, instrumentation and tools adequate? If not, what needs to improve?
- What are the priorities for overall performance improvement (in terms of useful physics beam delivered)?

Where should we put our attention?

- Where should the main focus be in 2023 (and possibly beyond) for the key performance improvement threads?
- What are the specific recommendations on fixes/upgrades/additions for improving equipment (HW, SW) ?
- What are the specific recommendations for improving operating the complex (tools, procedures, schedule, coordination)?
- What needs a specific decision process (e.g. on longer-term perspective)?

What's the vision for the future?

- Can we aim to deliver as much physics in 2023 with reduced time available?
- What are the longer-term prospects for doing more physics with less time and less overall power consumption?
- Is increased beam intensity per cycle compatible with beam losses, equipment and experimental limits?
- What are the priorities for CONS or for new developments/breakthroughs?
- Are there any new ideas for performance improvement or synergies to explore?
- What is holding us back in terms of communication, meetings and our decision process?
- Has it made sense to treat injectors and LHC together in this workshop? What are options for the future?