

# Welcome!

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Wilke van der Schee (CERN), Urs Wiedemann (CERN), You Zhou (NBI Copenhagen)**

Light ion collisions at the LHC - 2025

# Light Ion Collisions at the LHC 2025

Workshop on light-ion collision results  
and future opportunities

Dec 1-3, 2025, CERN  
[cern.ch/lightions2025](https://cern.ch/lightions2025)

**Programme:**  
 Experimental overviews of collectivity and energy loss  
 Hydrodynamics and non-equilibrium dynamics  
 Jet quenching in small systems  
 nPDFs of light ions  
 Synergies with nuclear structure physics and other areas  
 Accelerator and experiments perspectives for future light-ion runs

**Organizers:**  
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 Giuliano Giacalone (CERN)  
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- **Idea of the workshop in *early Sep***  
[a compact 2–3 day CERN meeting Nov or Dec 2025]
- ***Four-fold* goals**  
[review first results, assess emerging physics, shape the motivation for future light-ion runs, focused precursor to a larger, in-depth workshop/whitepaper]
- **Large community *participation***  
[>220 participants from accelerator, experimental & pheno/theo]

# Workshop Goals & Vision

## Core Goals

*Debrief O+O / Ne+Ne runs: status, limitations, open puzzles.*

*Assess emerging physics: data vs theory (cold/hot nuclear effects, pre-equilibrium vs hydro).*

*Define next steps: measurements + modelling of QGP in small systems; plans for future light-ion data.*

*Sustain LPCC Heavy-Ion WG for experiment–theory coordination (centrality, baselines, ..).*



## Broader Vision

- **Do lighter ions show true QGP behavior?**
- **Which ion(s) maximize physics reach?**
- **How light ions enable YR priorities?**  
*(do we need to re-prioritize?)*

# Scientific Program: Day 1 – Collectivity & Nuclear Structure

*Collectivity: Multi-experiment comparisons; key observables & planned analyses.*

*QGP Dynamics: Hydro vs transport vs pre-equilibrium in small systems.*

*Nuclear Structure: Sensitivity to many-body properties of nuclear ground states ( $\alpha$ -clustering, deformation, ...); interplay with sub-nucleonic structure &  $x$ -evolution.*

Discussion sessions (2):

- Do we understand collectivity in small systems?
- Imaging nuclei in high-energy collisions

Machine and experimental soft-probes reports (6)

Soft Physics in Light-Ion Collisions (8)

Nuclear structure (3)

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# Scientific Program: Day 2 – nPDFs & Energy Loss

*nPDFs: comparisons; how  $p_0$  reduces uncertainties.*

*Hard Probes: Which observables show quenching?  
Statistics limitations?*

*Energy Loss: Model consistency, system-size dependence, predictions for new analyses.*

*Light-Heavy collisions at LHCb's SMOG2; cosmic rays.*

Discussion sessions (2):

- Centrality determination in light ions
- What have we learnt & still to be learnt with hard probes?

Hard Probes and nPDFs in  
Light-Ion Collisions (7)

Energy loss in light-ion collisions  
(6)

SMOG2 & cosmic rays (3)

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# Scientific Program: Day 3 — Future Capabilities & Roadmap

*Post-LS3 Beams: Injector R&D; luminosity for different species; priorities for future runs.*

*Synergies: What light ions add to heavy-ion & lower-energy programs; which future species/energies matter.*

*Workshop Conclusions*

Discussion session (1):

- Workshop summary & concluding remarks

Machine Performance and Science  
Cases for Future Ion Runs (4)

Inputs on the 2026 Ion Run and  
Beyond (3)

# Practicalities / social events

## Physical room:

We stay at 6/2-024 - BE Auditorium Meyrin for the entire workshop

Map here

[https://maps.cern.ch/?xmin=2486637.84&ymin=1119467.48&xmax=2499574.93&ymin=1125715.89&mode=2D&n=\[%276/2-024%27\]&floor=2](https://maps.cern.ch/?xmin=2486637.84&ymin=1119467.48&xmax=2499574.93&ymin=1125715.89&mode=2D&n=[%276/2-024%27]&floor=2)

## zoom room:

Connect here <https://cern.zoom.us/j/68167500395?pwd=bS6H7qsOpxqaJ2TswDrqnhhAoz8Sie.1>

## Coffee/tea breaks (2 / day, cf. the timetable):

Will be served at the workshop venue (offered thanks to CERN TH Department!)

## Lunch breaks (cf. the timetable):

On our own

CERN Restaurants 1&2, Caf  teria 6, other locations too, summary here

[https://cern.service-now.com/service-portal?id=service\\_element&name=cern-catering](https://cern.service-now.com/service-portal?id=service_element&name=cern-catering)

## Welcome drink:

Monday 6–8 PM at the workshop venue (offered thanks to You Zhou!)

## Workshop dinner:

Tuesday 7 PM, at reduced price of 40CHF (also thanks to You Zhou!)

Caf   de Mategnin, further info here [Workshop dinner](#)

## Workshop photo:

For remote participation feel free to upload your photo at <https://cernbox.cern.ch/s/OwQLvvPQTaGwGZx>

For in person participation TBA stay tuned!

# CODE OF CONDUCT—PLEASE READ



As organizers, we **pledge to follow** the CERN Code of Conduct

*"Integrity, commitment, professionalism, creativity, and diversity"*

All workshop participants **are also expected to** provide a welcoming and supportive environment for all people, regardless of background or identity.

Instances of abusive, harassing, or otherwise unacceptable behavior **won't be tolerated.**

Also for in person participants: please remember **we all agreed to follow** the CERN computing rules throughout **our entire presence** at CERN.