

EIC IAC Working Groups

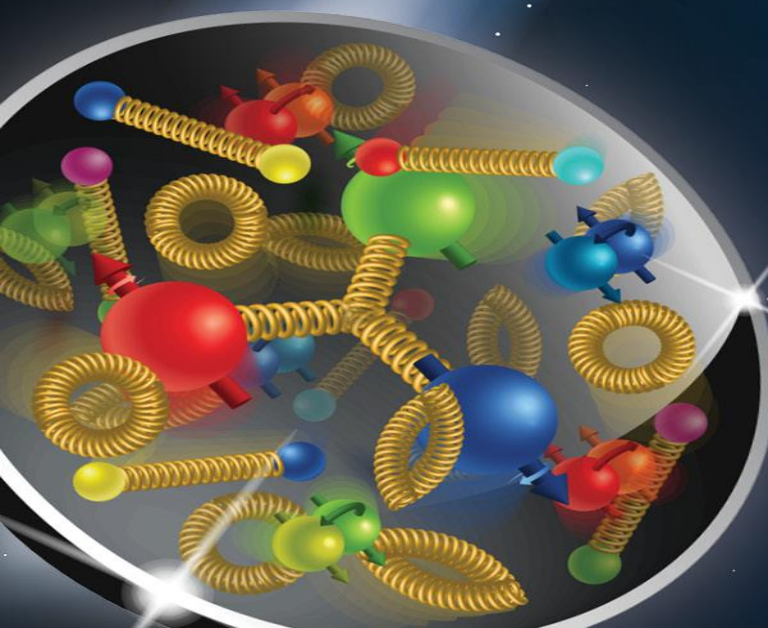
Tatiana Pieloni, École Polytechnique Fédérale de Lausanne,
Switzerland

Wolfram Fischer, BNL, USA

co-chairs of
EIC Accelerator Collaboration

28th May 2026

Electron-Ion Collider



About me Tatiana Pieloni

Current Role:

Senior Scientist at EPFL Laboratory of Particle accelerator
Physics lausanne CH

Swiss Institute of Accelerator Research and Technology
Institute [CHART](#) executive board member

Experience:

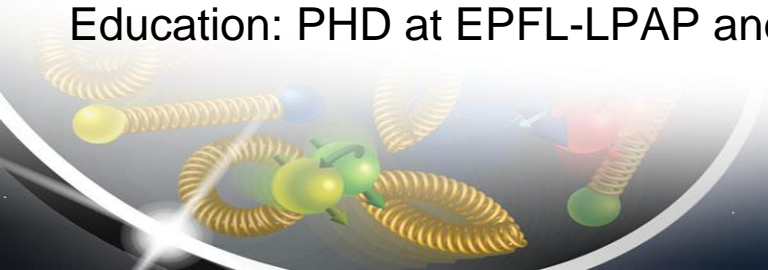
- From 2004-2016 PHD-Staff at Accelerator Beam Physics
CERN LHC beam dynamics, Beam-beam effects, Luminosity
- 2016-present EPFL → FCC related beam dynamics studies :
ecloud, beam-beam, ERL , muon acceleration

Education: PHD at EPFL-LPAP and CERN 2008



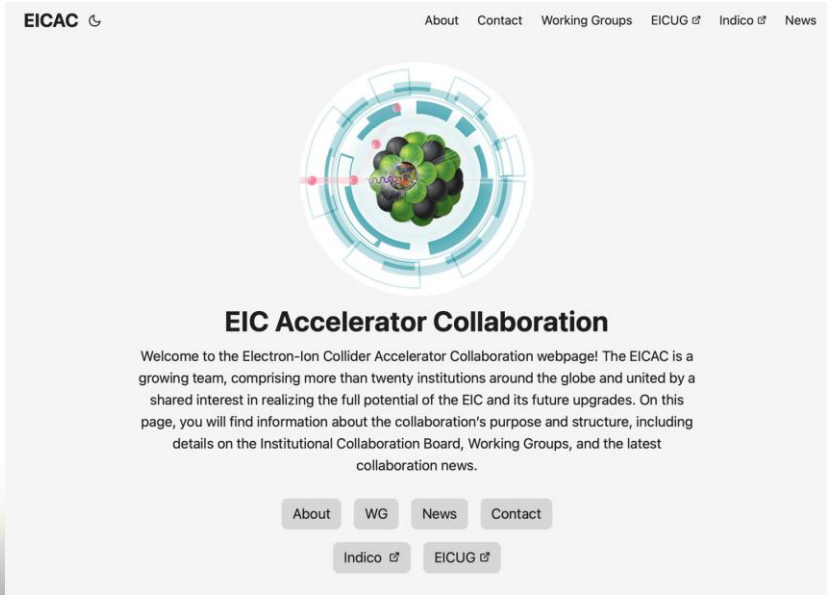
Administrative data

Tatiana.Pieloni@epfl.ch



Information flow and Material Sharing

Official Webpage [EICAC.org](https://eicac.org)



EICAC

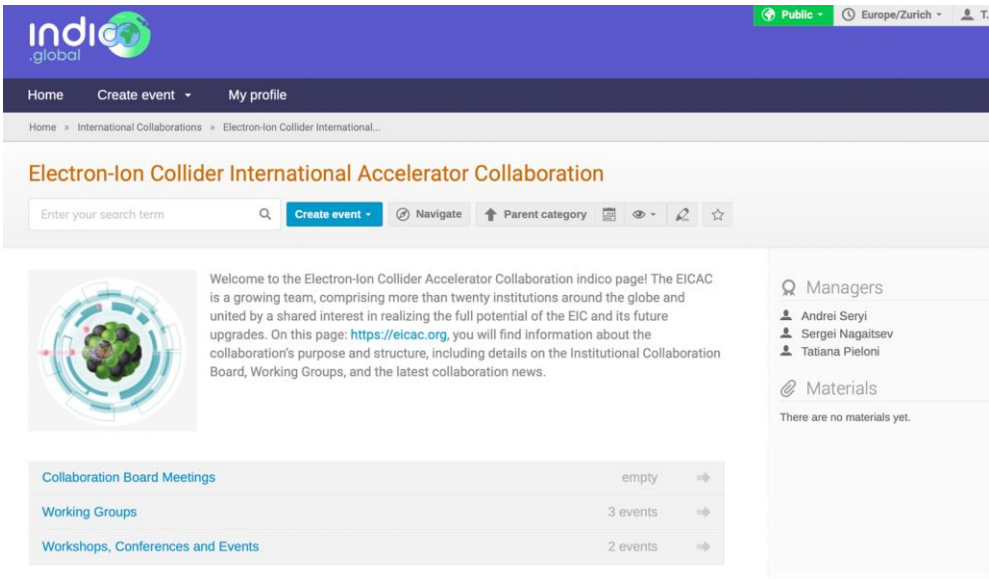
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EIC Accelerator Collaboration

Welcome to the Electron-Ion Collider Accelerator Collaboration webpage! The EICAC is a growing team, comprising more than twenty institutions around the globe and united by a shared interest in realizing the full potential of the EIC and its future upgrades. On this page, you will find information about the collaboration's purpose and structure, including details on the Institutional Collaboration Board, Working Groups, and the latest collaboration news.

About WG News Contact

Indico EICUG



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Electron-Ion Collider International Accelerator Collaboration

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Managers

- Andrei Seryi
- Sergei Nagaitsev
- Tatiana Pieloni

Materials

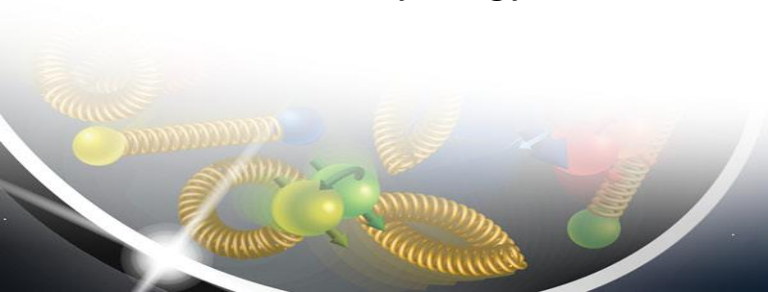
There are no materials yet.

Collaboration Board Meetings	empty
Working Groups	3 events
Workshops, Conferences and Events	2 events

All WG meetings and material migrated soon to: [CERN Global Indico](https://cern-global-indico.org)
Adding past meetings to the general page

Working Groups: Motivation and goals

- Coordinate efforts across EIC studies and accelerator studies and technologies in the global community
- Identify common priorities in areas of mutual scientific interest
- Share expertise between teams working on similar challenges
- Align technical developments such as beam dynamics, instrumentation, and simulation tools
- Develop joint strategies for modelling, measurements, and beam-dynamics studies, technology developments...
- Promote synergy between ongoing EIC work and long-term FCC/other R&D



Working Groups established:

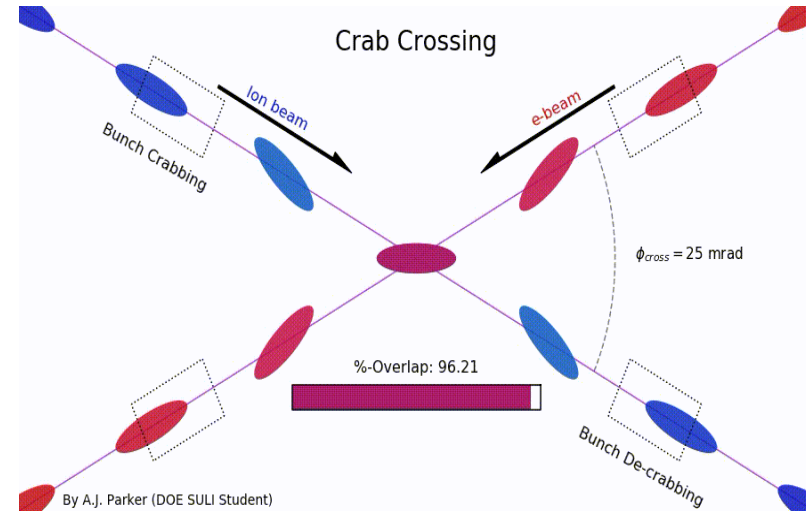
1. **Beam-beam effects** C. Montag (BNL), X. Buffat (CERN)
 2. **Polarized Beams and Polarimetry** F. Rathmann (BNL), G. Hoffstaetter (Cornell)
 3. **EIC commissioning Tools** Y. Hao (MSU/BNL), J.L. Vay (LBNL)
 4. Collimation, Machine protection and MDI – A. Natochii (BNL) and S. Redaelli (CERN)
 5. Injection and sources R&D –tbc P. Craievich (PSI) recruiting co-chair
 6. Impedance and Collective effects - tbc S. Antipov (DESY)
 7. Second Interaction Region recruiting co-chairs
 8. High Energy Beam Cooling tbc Fedotov recruiting co-chairs
 9. Forum on EIC Synergies with Current and Future Projects –recruiting co-chairs
- More WGs to come → Feel free to propose topics and technologies of interest

1. Beam-Beam WG

Coordinators: C. Montag(BNL), X. Buffat(CERN)

- Interaction region is based on 25 mrad crossing to minimize l^* for both beams
- Head-on collision geometry is restored by rotating the bunches before colliding (“**crab crossing**”)
- Bunch rotation (“**crabbing**”) is accomplished by **transversely deflecting SRF resonators** (“**crab cavities**”)
- Actual **collision point moves laterally** during bunch interaction – **to be taken into account** in Physics analysis

Synergies with HL-LHC and FCC-ee



Beam-beam parameter;
 $x=0.01$ for protons and 0.1 for electrons

Beam-Beam Challenges in EIC

- Different species – electrons and hadrons
- Polarized electron and proton beams
- High beam-beam parameters, at the beam-beam limits established at KEKB and RHIC
- Large 25 mrad crossing angle
- Crab crossing of hadrons and electrons
- Flat hadron beam emittances - $\frac{\epsilon_y}{\epsilon_x} = 0.09$
- Not-so-flat electron beam emittances - $\frac{\epsilon_y}{\epsilon_x} = 0.1$ – challenging for polarization
- Frequent electron bunch replacement to maintain high polarization

Transferring Material on
Collaboration Indico

2. Polarized Beam and Polarimetry WG

Coordinators: Georg Hoffstaetter de Torqua and Frank Rathmann

Focus on important EIC-specific and general topics of polarized beams such as:

- **Theory** of spin dynamics in storage rings, including radiative depolarization, spin diffusion, and beam-beam forces.
- Spin **simulation** tools for polarized beams.
- Polarized beam **manipulation and optimization** techniques.
- Polarized **hadron** and atomic beam **sources** for protons, deuterons and Helios.
- Theory and technology of **polarimetry**.
- Polarized **electron sources**.
- **Electron polarimetry** based on Compton scattering.

Registered group members: 24 members from 8 institutions

Purpose:

Identify topics for polarized EIC beams that can receive significant attention from outside BNL.

Identify and form groups that attend to pertinent topics.

Identify funding sources (especially outside BNL).

Identify potential and help in manpower development.

Maintain contact to respective BNL groups and experts for polarized beams.

**Transferring Material on
Collaboration Indico**

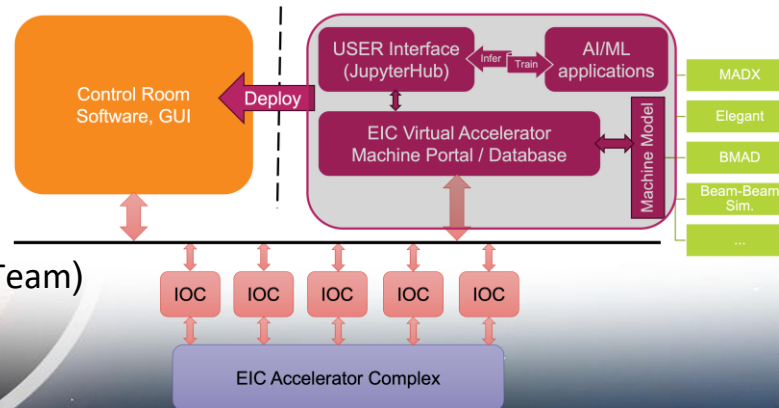
3. EIC Commissioning Tools

Coordinators: Y. Hao (MSU/BNL), J.L. Vay (LBNL)

- A user-friendly interface to the EPICS channel access protocol.
- Facilitate efficient development, test and integration of commissioning tools.
- Start-to-end online model with (multiple) real-time simulation tool for orbit, optics, crabbing properties and spin.
- Model injection / extraction and synchronization
- Multi-fidelity simulations at various time-scale beam quality optimization
- Migrate mature tools to control room applications
- Ready for data-driven/Machine learning model, training and inference
- Development towards digital twin.

Regular Meetings and great collaborative effort around tools for acc modelling and AI!

May 2026	04 May	The May 2026 Working Group Meeting
February 2026	02 Feb	The Feb 2026 Working Group Meeting
December 2025	15 Dec	The Oct 2025 Working Group Meeting (delayed)
November 2025	03 Nov	The November 2025 Working Group Meeting
August 2025	18 Aug	The Aug 2025 Working Group Meeting
July 2025	14 Jul	The Jul 2025 Working Group Meeting
June 2025	09 Jun	The Jun 25 Working Group Meeting
April 2025		



Established parallel initiatives:
[EIC-AI](#) and [MOAT](#) (Multi-Office particle Accelerator Team)



WGs next

Not a review, nor a workshop → Knowledge transfer and maximize performances

Cluster subjects that are closely related from a physics perspective and also from an operational perspective. Focus on preparing for a real machine and critical mass in WGs

Build a critical mass of expertise, Maintain high-level, frequent scientific discussions creating an ongoing forum for dialogue among different experts

AI initiatives should be embedded in the WGs → try to identify key elements from established efforts (EIC-AI and MOAT) to be added to the WGs to push for innovative solutions AI oriented

Working groups under review to **foster a more efficient and productive environment!**

Conclusions and future plans

- Collaboration keeps growing, with new partners and activities emerging
- Working Groups are kicking off with activities and exchanges, and re-optimization is ongoing
 - Topics of mutual interest are being identified, and clustering is encouraged to build critical mass for discussions (proposals for new topics and interest are welcome)
 - Include AI experts within the WGs to strengthen cross-disciplinary work
- Join the established EIC seminar series and include partners' R&D topics
- Need to establish a framework to foster research activities among collaborators (e.g. shared work packages or joint supervision models)
 - EIC/CERN exchange fellowship program under discussion
 - Potential extension to other laboratories and universities; feedback is very welcome
- Ideas are under discussion and feedback is welcome from all collaborators

Thank you!

