

Cockcroft Collaboration

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Status of the collaboration

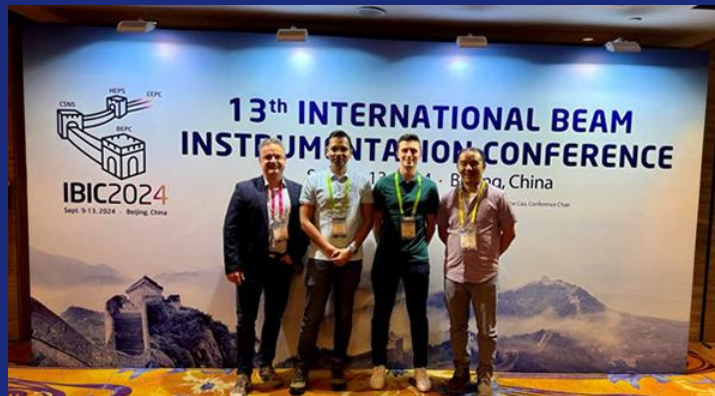


- Steady progress made on basis of outstanding 2023 successes
- Some changes to the core group
- Getting into the final part of *HLLHC-UK Phase II*



- 'Gas jet-based beam profile monitor for the electron beam test stand at CERN', O. Stringer, et al. – **invited talk**
- 'Experimental study into the invasiveness of a gas jet beam profile monitor for charged particle beams', W. Butcher, et al.
- 'Gas jet dosimeter measurements at DCF for medical accelerator applications', N. Kumar, et al.
- 'Ionization profile monitor for in-vivo dosimetry in medical accelerators', M. Patel, et al.

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- 'BGC monitor: first year of operation at the LHC', H. Zhang, et al. – **contributed talk**
- 'Halo monitor for high-intensity hadron beams based on supersonic gas curtain', H. Zhang, et al. – **contributed talk**
- 'First proof-of-concept transverse beam profile measurements with gas jet in-vivo dose profiler for medical accelerators', N. Kumar, et al.

Planned journal articles (2023)

From 2023 plans:

- “*Beam Gas Curtain monitor Phase II: vacuum studies for LHC integration and operation*”, C. Castro Sequeiro, et al., Phys Rev AB 27 (043201)

Did not happen ☹

- Simulation and experimental studies into a supersonic gas jet curtain for beam profile monitoring, in preparation for Vacuum or Nucl Instr Meth A
- EBTS results @ COOL23 –expand to full article in Nucl Instr Meth A or Rev Sci Instr
- Measurements at 7 TeV with protons and lead ions – PRL or PRX
- V3 with full technical details – Phys Rev AB (Ondrej’s thesis)
- Cross section measurements – Phys Rev C?
- Gas jet applications: Microscopy, medical accelerators (DCF), plasma targets, nozzle-skimmer optimization, simulations,...

Planned conference papers

- **IPAC25**
 - ‘*Supersonic Gas Curtain based In-Vivo Transverse Beam Profile Monitoring for Medical Accelerators*’, N. Kumar et al.
- **IBIC25 (Liverpool)**
 - Many contributions possible – and desirable!
 - We hope you can all come and join us! 😊





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Liverpool, UK 7 - 11 September 2025

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Funding

- *HLLHC-UK phase II, no-cost extension by one year until 03/2026*
- *Non-HLLHC studies included at low level in CI core grant*
- *HLLHC-UK phase III, uncertain – need to make strong case and demonstrate CERN (operational) need*
- *Medical and LhARA – uncertain*
- *FCC/EIC/ESS/etc, quantum scanner and microscope, HPC studies - uncertain*

Recruitment

- Team grew steadily:
 - Dr Shakti Sehti joined us this year
 - EuPRAXIA-DN Fellow started as well: Farhana Thesi MP
- Additional PhD student to start in 2024 between ULIV and CERN within LIV.INNO framework was denied ATAS and is probably unlikely to join – delay by 1 year;
- Oliver and Ondrej about to finish their theses 😊
- Will consolidate team size in the QUASAR Group

Outreach



- Invited talk @ APS March Meeting in Minneapolis 2024
- Invited talk at SPIN annual conference in June 2024, Switzerland
- *Science and Faith* cathedral events in Liverpool and Blackburn – reaching new communities
- *Hollywood Physics* talk at EuPRAXIA conference on Elba, Italy in September – also planned at CERN in February 2025
- Effort should probably be distributed more across group and collaboration?!



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Summary & outlook

- Good progress made over the year. Many thanks to everyone for the fantastic collaboration.
- Consolidating our work and discussing potential next phase
- Publications need to be focus!
Journals (more) and conferences

Need to discuss and agree future use and program



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