

# Review of actions from the last meeting

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# Main progress since the last meeting

- Last meeting 27-28 June at Cockcroft – less than 9 months ago
  - <https://indico.cern.ch/event/646235/>
- Development of expertise and tools for the understanding of:
  - Generation and propagation of the gas jets
  - Different gas species for the jet
  - Interactions between beam and gas
  - Optimisation of the optics for candidate gases
- Design and construction of new experimental equipment
  - Second (v2) experimental gas curtain set-up and Cockcroft
  - Installation for fluorescence measurement in the LHC
- Development towards an instrument for practical application in HL-LHC
  - Integration plans for test of the v3 instrument in the LHC
  - BI group baseline instrument in the Hollow e-lens
- Strong team across Europe
  - Regular and lively 2-weekly video conferences (17 video meetings since last June)
  - 3 presentations at the HL=LHC collaboration meeting last November
  - Papers in IPAC, IBIC,

# Experimental questions

- Look for a more powerful electron gun (Action: Adriana)
- Buy an upgrade to the existing gun (Action: Hao)
- Updating the costings and cost estimates for the new (v2) setup (Action: Hao)
- Experimental programme for the new BGC (Action: Hao, Edward)
  - Selection of the gauges. (Action: Hao, Gerhard)
  - Assure availability of a retractable gauge and retractable mirror on new system. (Action: Hao, Edward)
  - After the measurement and the simulation, decide if a thinner slit or thinner 3rd cone should be produced.

# Simulation questions

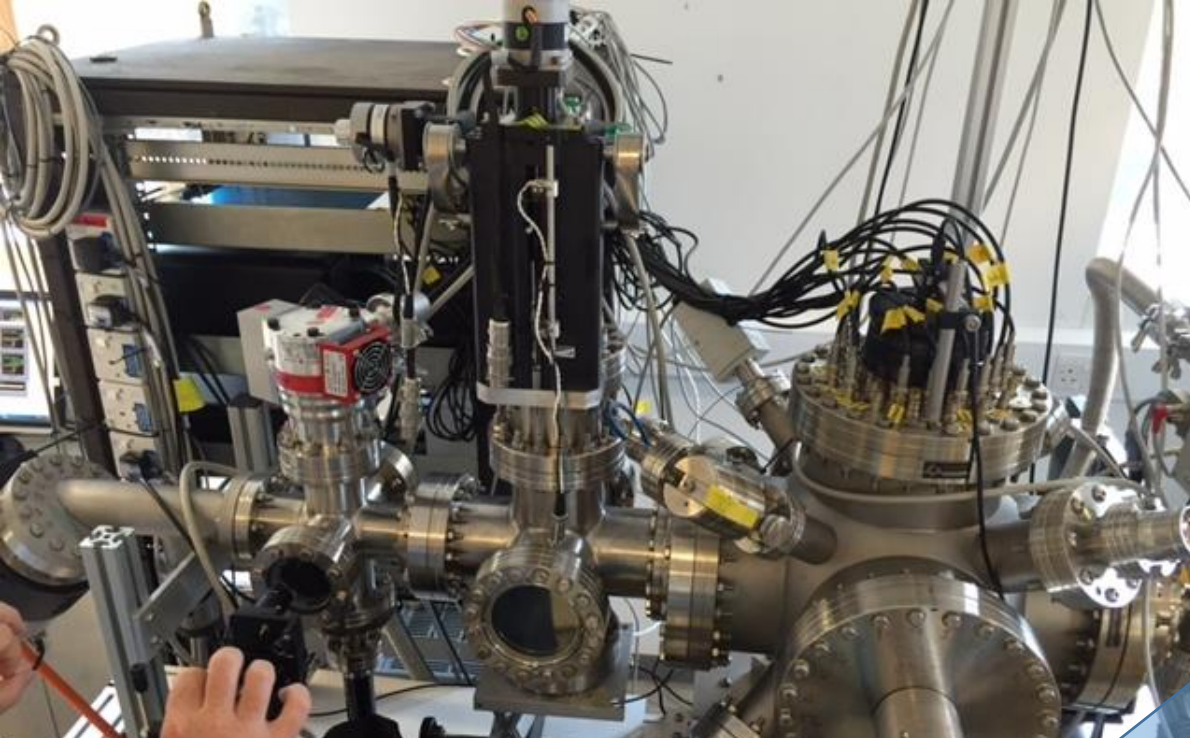
- Need someone to take-up the CFD analysis
- Consider 3rd skimmer geometries with a lower width to improve the resolution and reduce the gas load? Action: Cockcroft to check the fluorescence measurements with the 4x0.4 mm 3rd skimmer.
- Make a simulation for a flat plate rather than a cone. Can we increase the gas jet angle and reduce the expansion section length? (Action: Marton)
- Simulation for the illumination by a LED of the alignment target. (Action: Serban)
- Cross-sections for fluorescence, possibly get data from the BGV or from LHCb?

# LHC / Hollow e-lens Integration questions

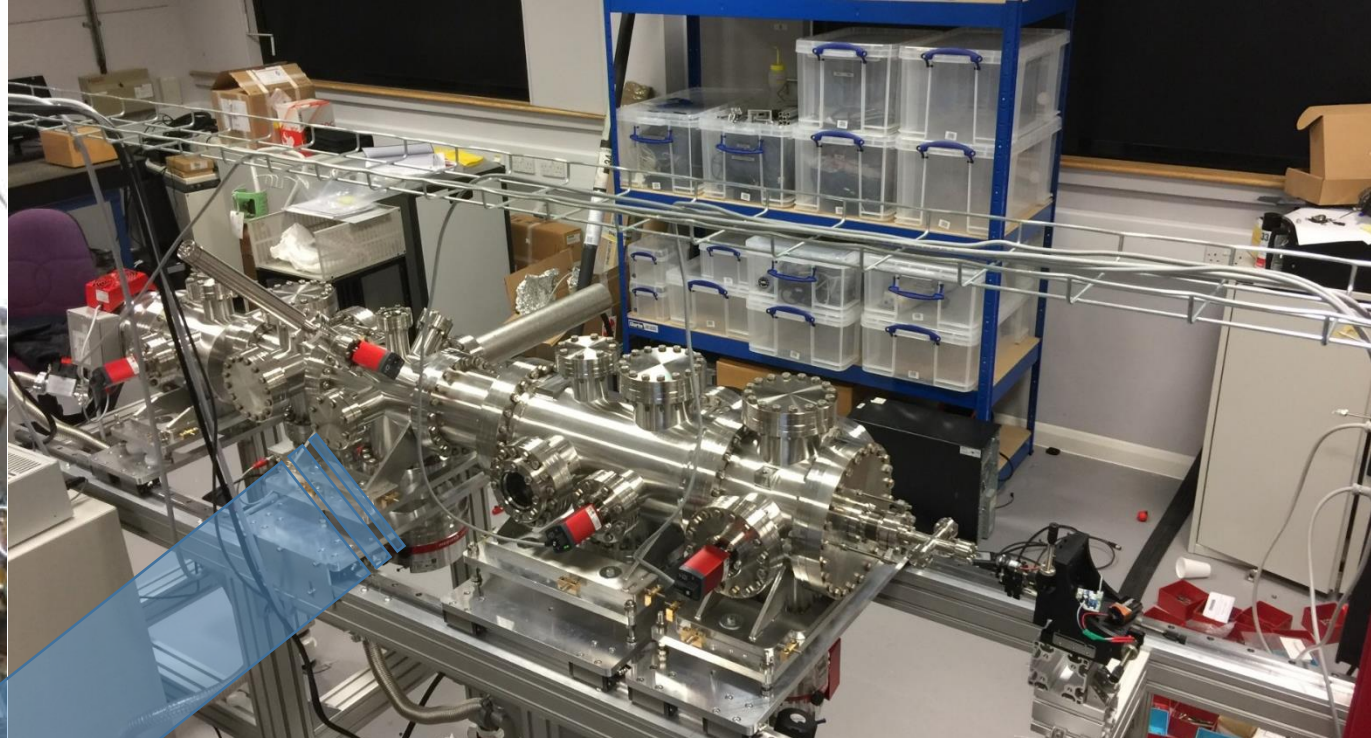
- What are the requirements concerning the precision and resolution for the BGC function as an overlap monitor. Could a specification be made to answer this question?
- Is a BGC monitor was needed before and after the solenoid magnet for the HEL integration?
- Costing for an installation in the LHC for a design review. (Action: To be decided)
- BGC installation in the LHC (v3)
  - Space reservation for the BGC demonstrator, to be installed in LS2. (Action: Adriana)
  - Change vacuum sectorisation (Action: Gerhard and Adriana with VSC)
  - DIR, DIC, DIF requests (2 racks, cables for vacuum pumps, gauges, camera system) (Action: Gerhard)
  - Prepare for CERN internal committees (HL Technical Committee, LMC)(Action: Ray)
  - Write ECR (after TCC, before LMC) (Action: Gerhard)
- Pump design: Cryopump at the dump? Which capacity is needed? (Action: Adriana, Gerhard)
- Check radiation hardness requirements (Action: To be discussed)
- Could we use similar monitors in other areas of the machine, e.g. replace the BGI in the LHC and ELENA?

# Objectives for our meeting

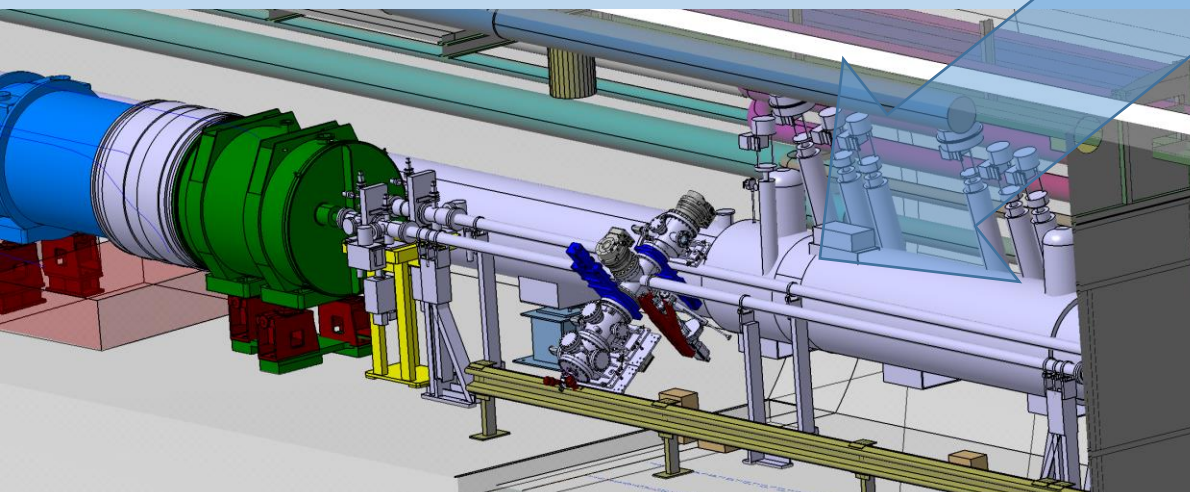
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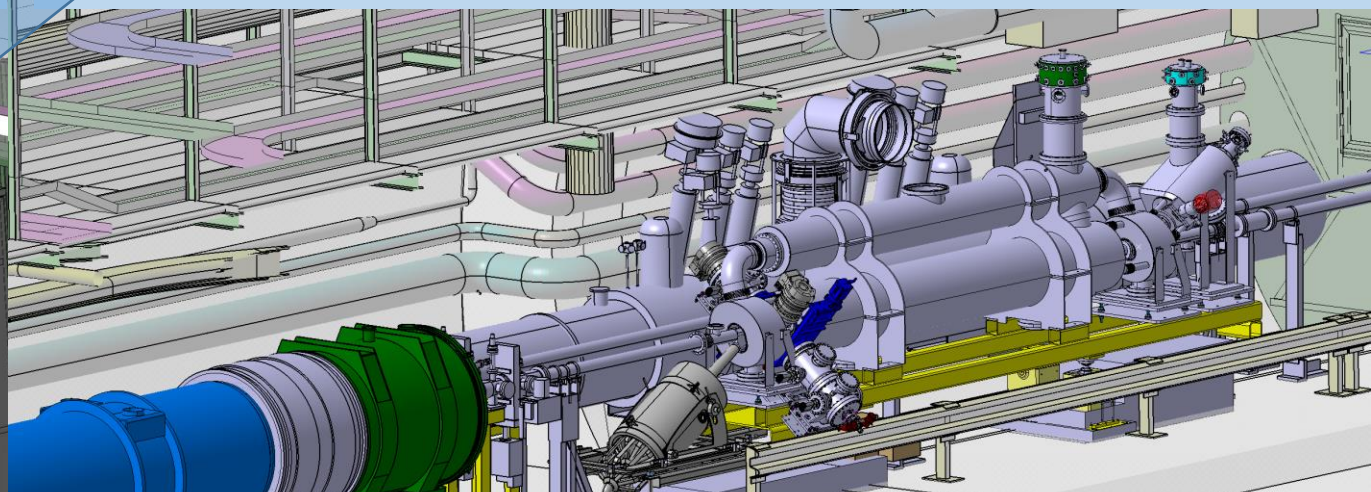
Version 1 (v1) – the existing operational set-up at Cockcroft



v2 – the set-up currently in assembly at Cockcroft



v3 – the functional prototype instrument planned for installation in the LHC ~2020



v4 – the 'operational' instrument for the Hollow e-lens in the LHC ~2024

# Objectives of this meeting

- **Plan for an demonstrator instrument installation during LS2 at CERN**
  - Evaluate realistic goals for the performance concerning precision and resolution
  - Define the strategy to decide on a gas species
- Agree on what we need to learn from the experimental programmes to make this design:
  - Cockcroft 1 test bench (v1)
  - Cockcroft 2 test bench (v2)
  - LHC fluorescence tests in 2018
- Agree on what simulations we need to make this design
  - What gas density will be possible in the curtain?
  - What will be the gas load to the LHC vacuum system?
- Review the status and compatibility with the hollow e-lens instrument (v4)



# How do we get there?

- All of the topics and the people working on them are 'heavily cross-linked'
  - Eg. Selection of gas depends on fluorescence cross-section, vacuum pumping design, optics design...
  - Eg Resolution and precision will depend on gas jet density and thickness, gas species, optics, trapped electrons(?) ...
  - Simulation → experiment → simulation
- Discussion and active participation between all of us, on all presentations and informally