Science and Technology Facilities Council

Summary: Instrumentation

Gøran J. Nilsen
ISIS Neutron and Muon Source

Statistics

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- 6 sessions:
  - Scattering Instruments: Inelastic and SANS (Tuesday 15:20) Monika Hartl
  - Scattering Instruments: Various Instrumentation Concepts (Wednesday 9:10) Tianjiao Liang
  - Neutron Instruments: Non-scattering Applications (Wednesday 11:00) Matthew Frost
  - Scattering Instruments: Detectors (Thursday 11:00) Gøran Nilsen
  - Scattering Instruments: Engineering (Thursday 14:50) Melvin Borrego
  - Scattering Instruments: Diffraction (Thursday 16:00) Masatoshi Arai

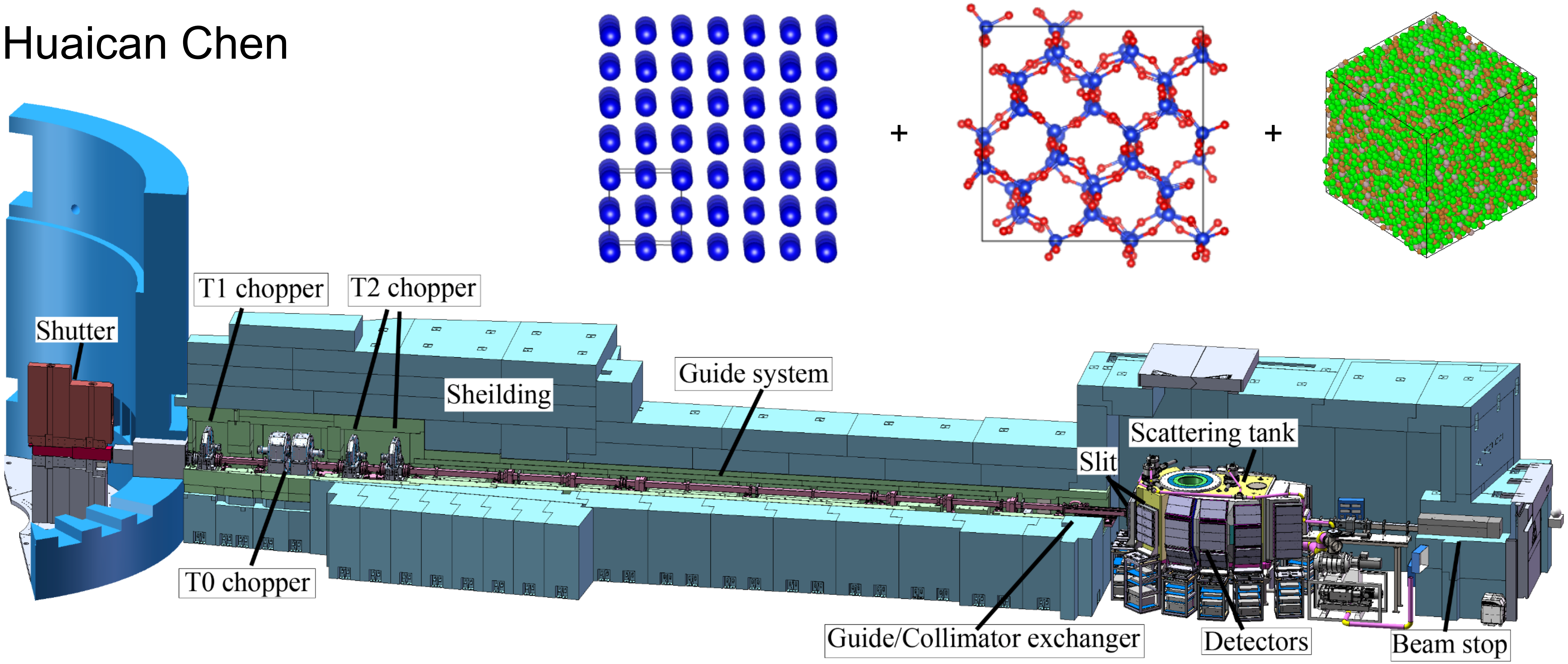
Statistics

- 6 sessions:
  - 20 talks from 8 countries
    - **China: 8**
    - US: 4
    - Sweden: 3
- Also >5 posters…
- Young people well represented among speakers!

Elastic scattering and imaging

- MPI - total scattering diffractometer at CSNS

Huaican Chen

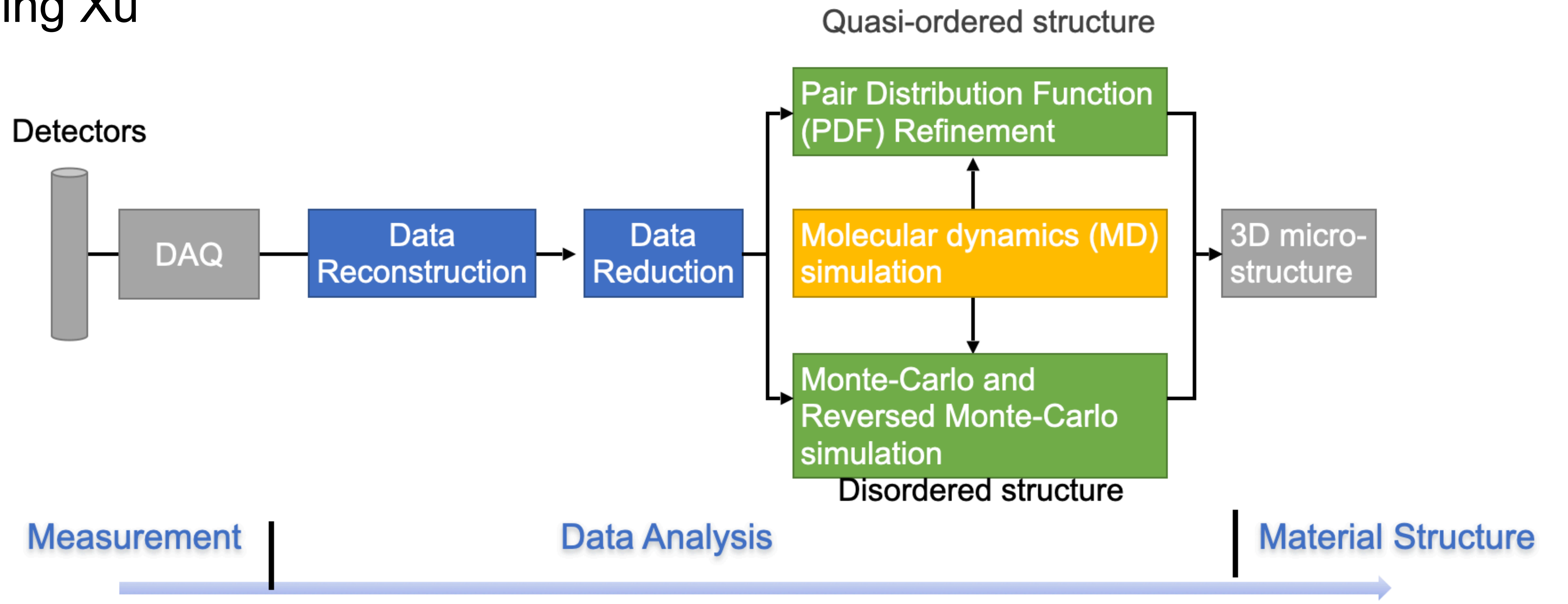


Elastic scattering and imaging

- Well integrated software workflow can help to get the most out of experimental data:

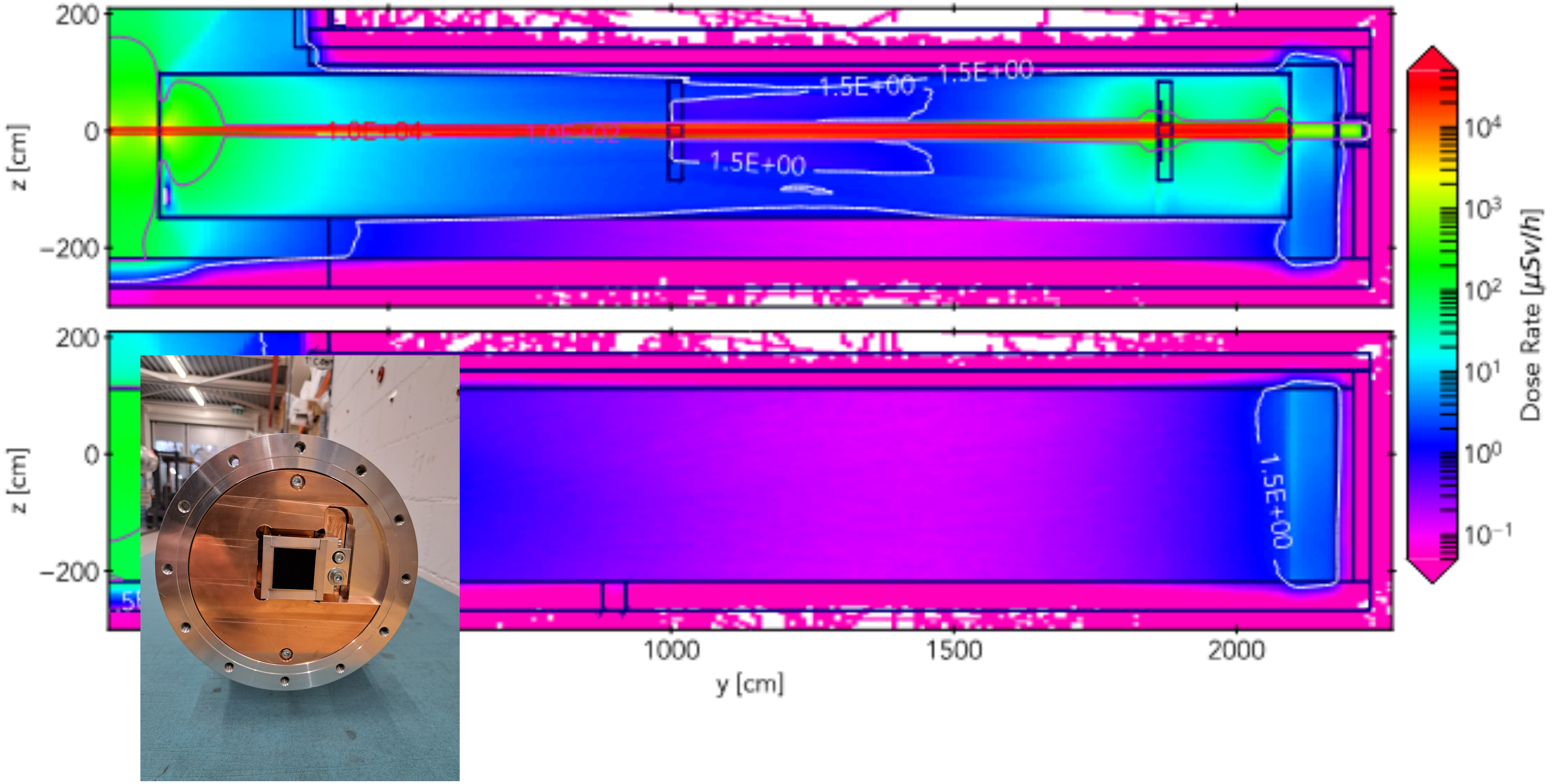
Huaican Chen
Juping Xu

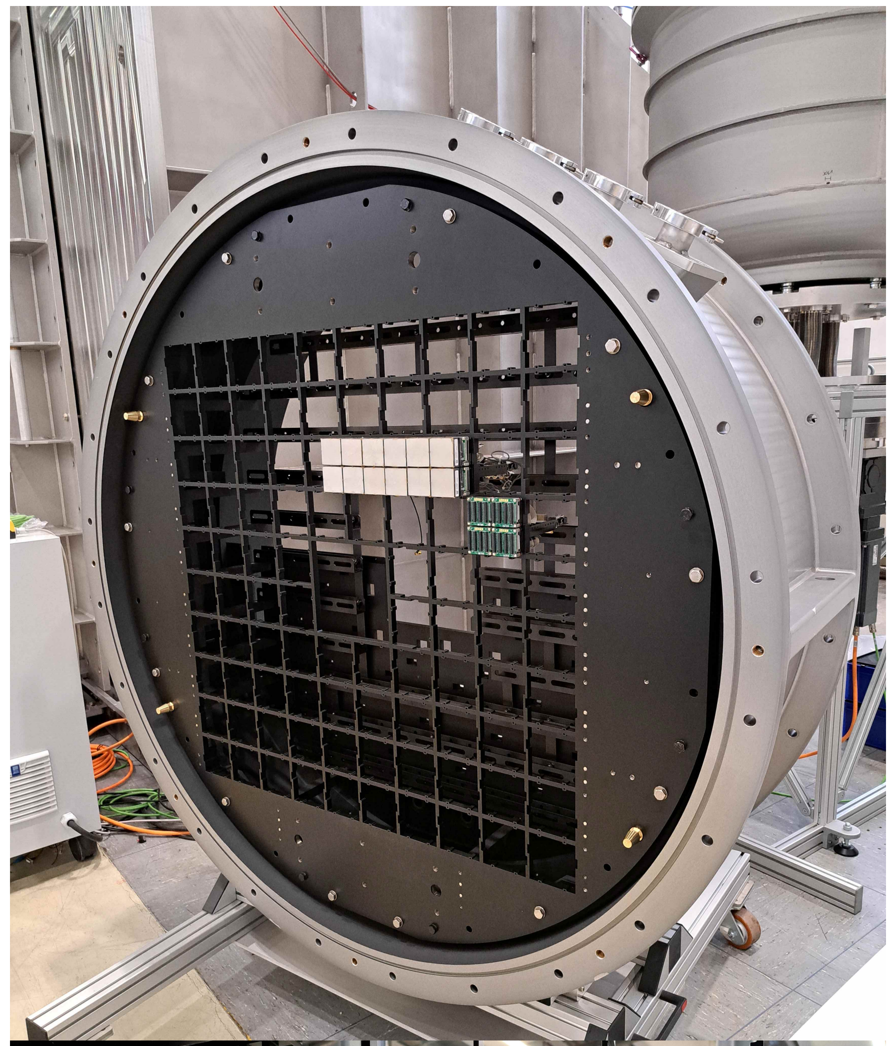
Data analysis process for MPI



Elastic scattering and imaging

- SKADI - ESS (S. Jaksch) - background reduction and detector:

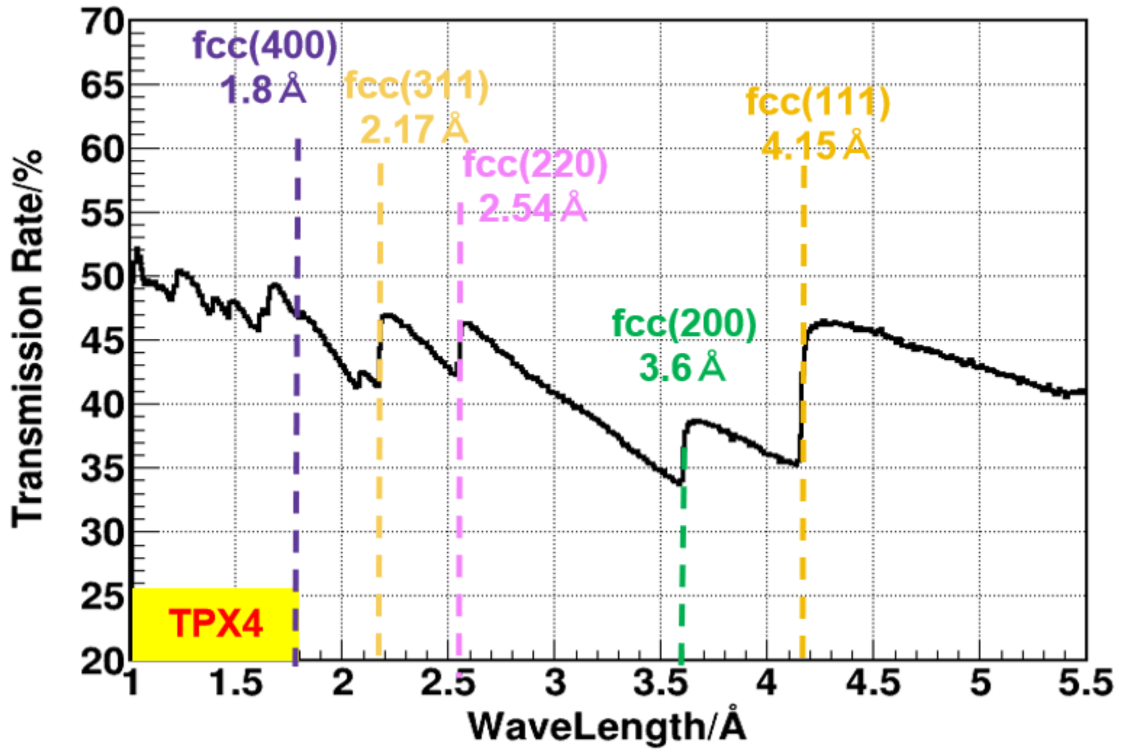


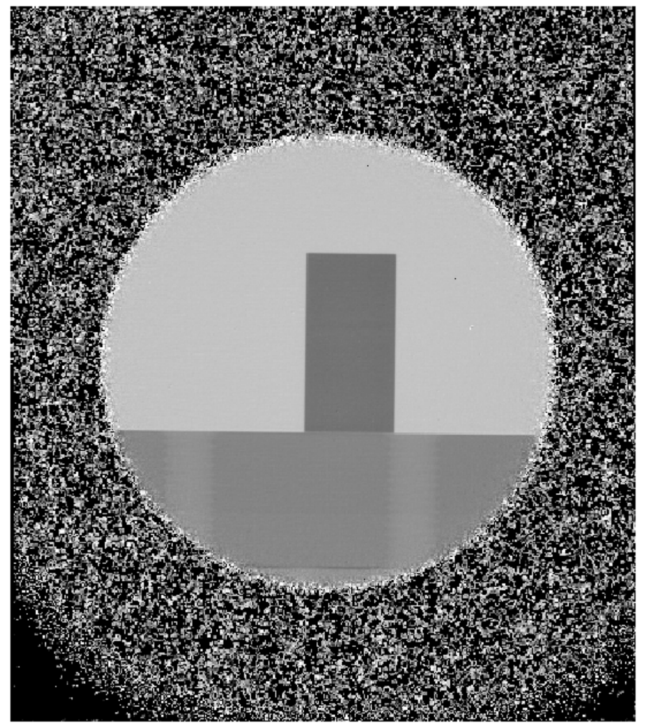


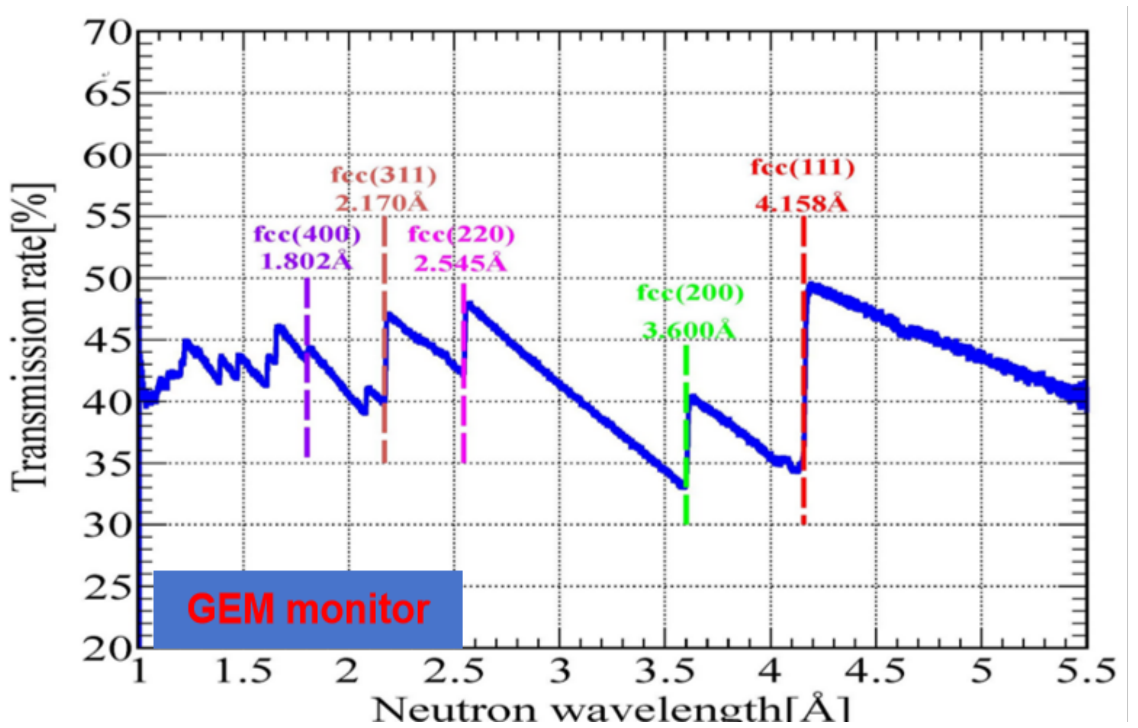
Elastic scattering and imaging

- New detectors are pushing spatial resolution, count-rate, efficiency, and cost, opening up for new applications:

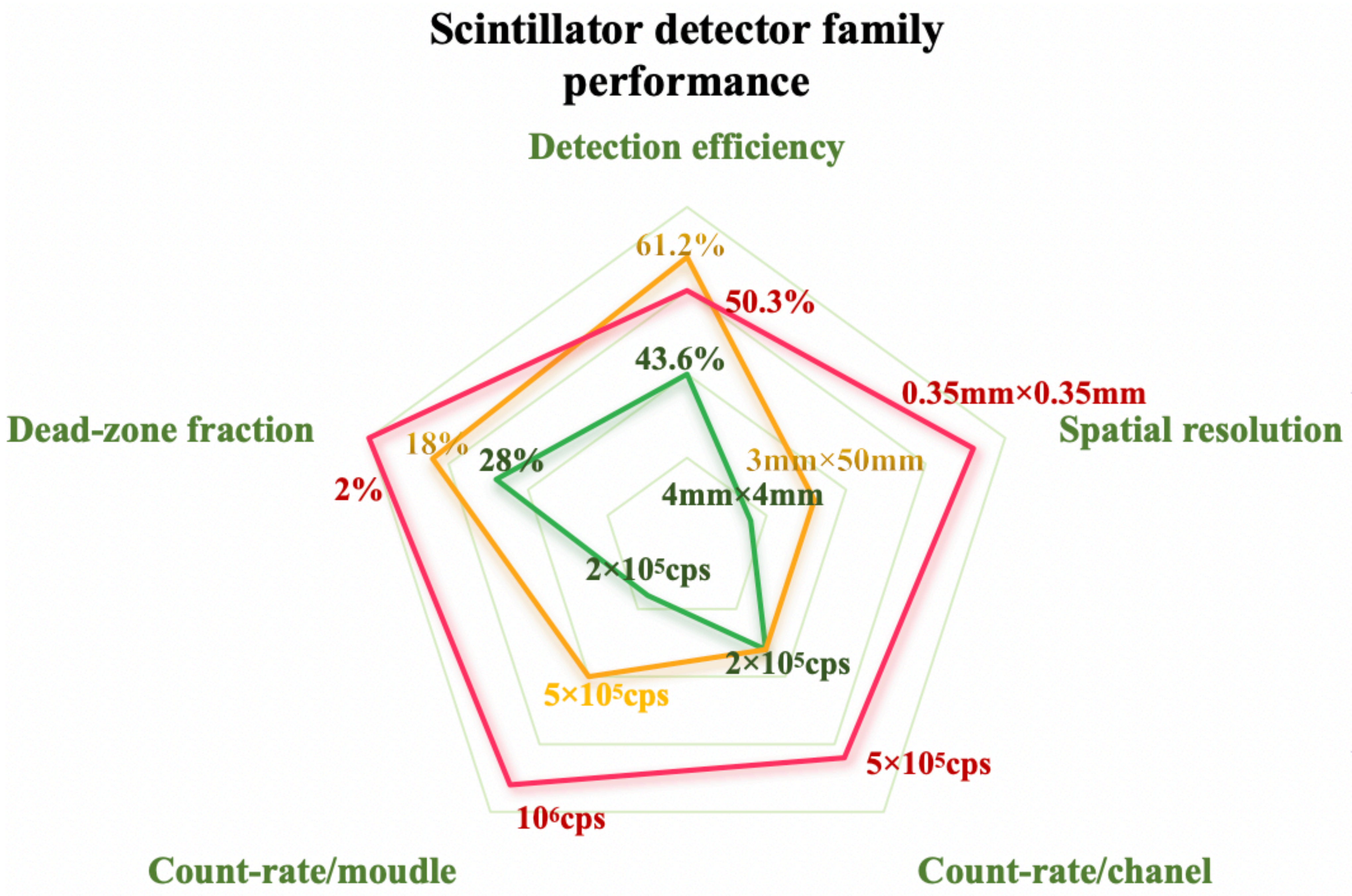
Zhong Sun







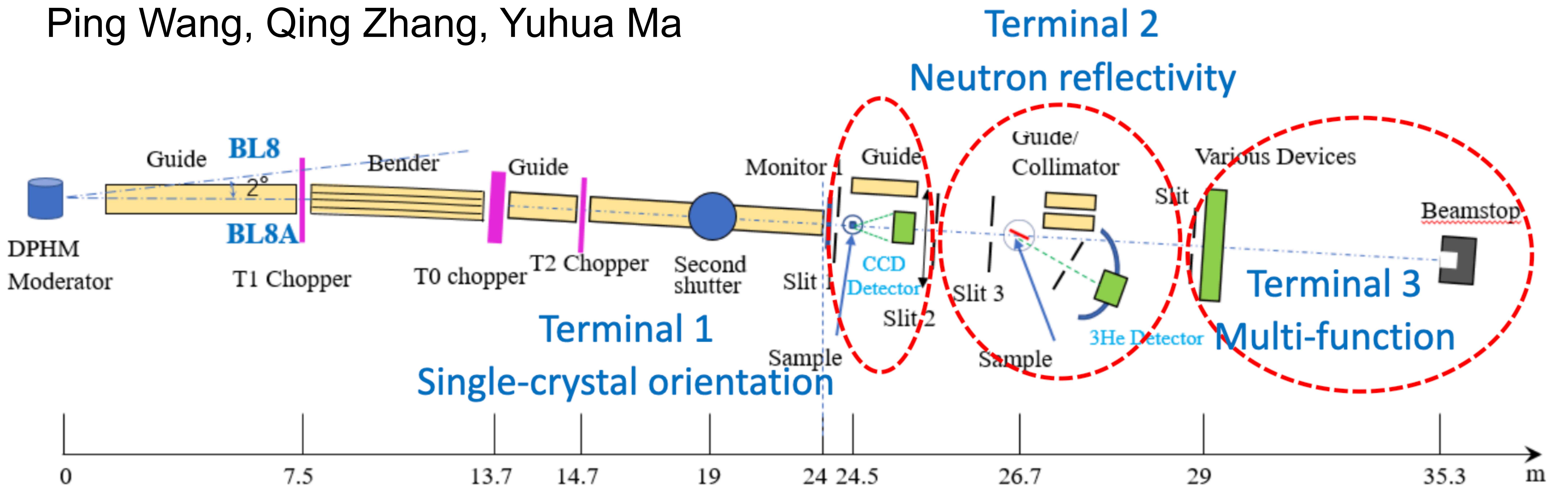
Bin Tang



Elastic scattering and imaging

- New detectors are pushing spatial resolution, count-rate, efficiency, and cost, opening up for new applications:

Ping Wang, Qing Zhang, Yuhua Ma



Inelastic scattering instruments

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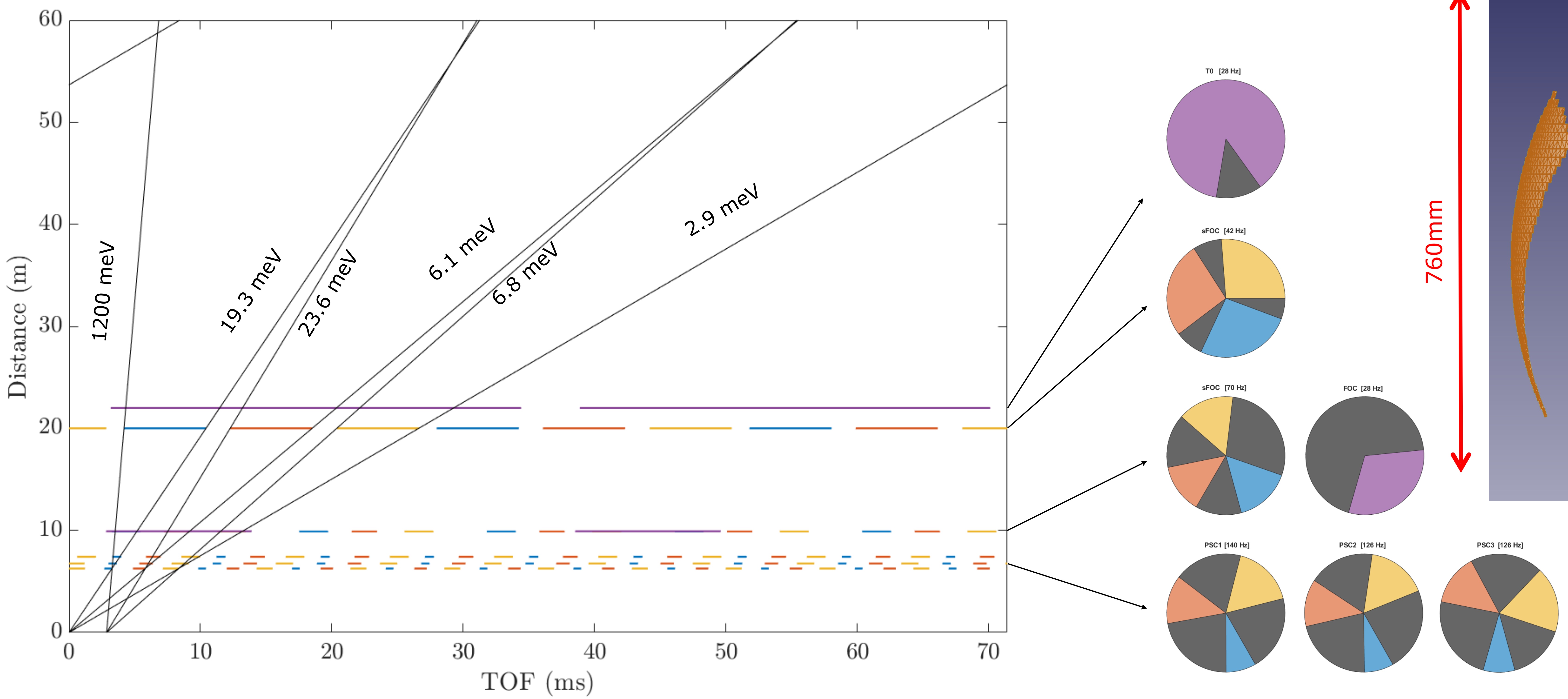
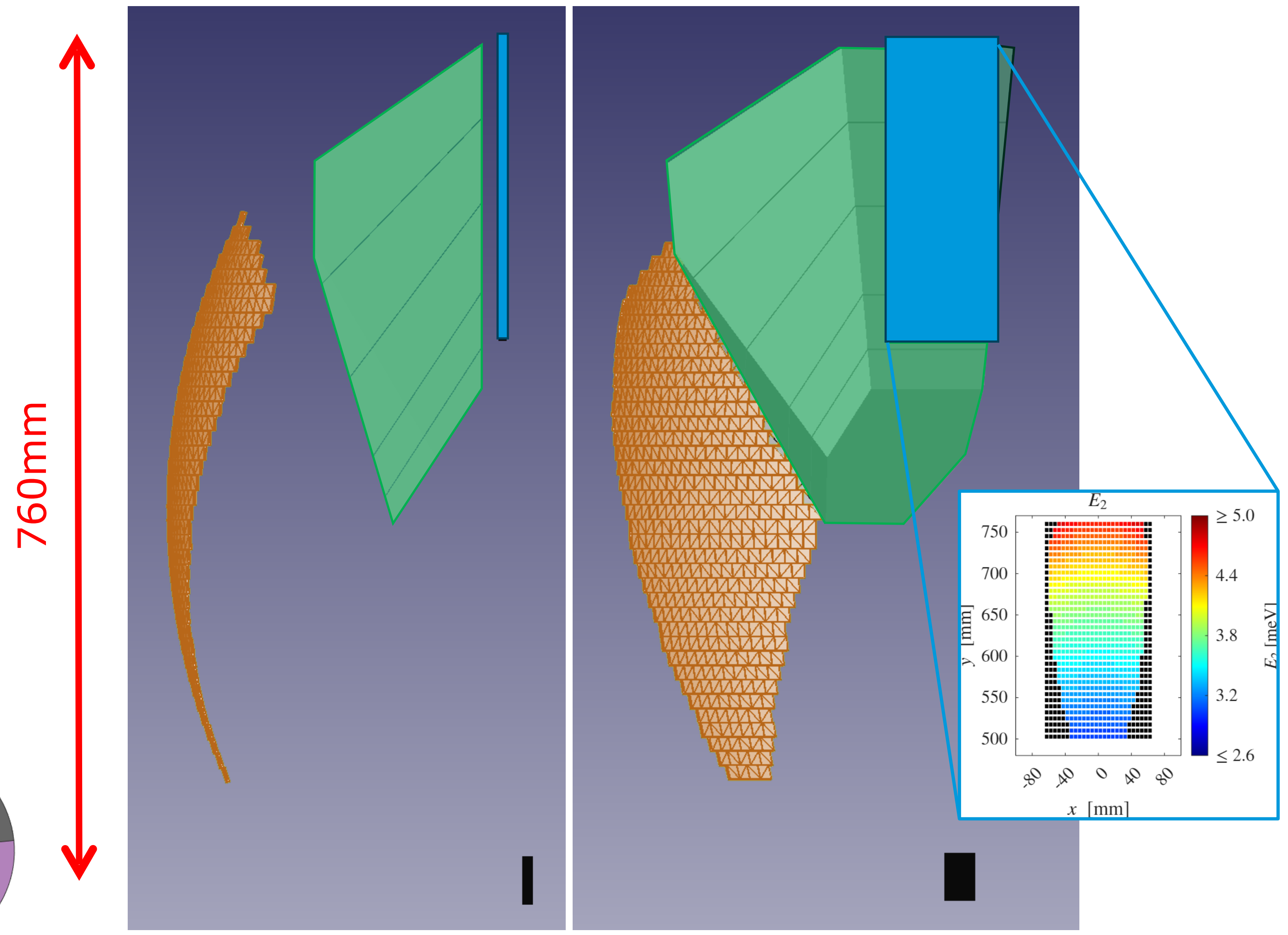
- Several indirect geometry instruments with novel secondary spectrometers:

  e.g. VESPA (Monika Hartl, Adrien Perrichon)

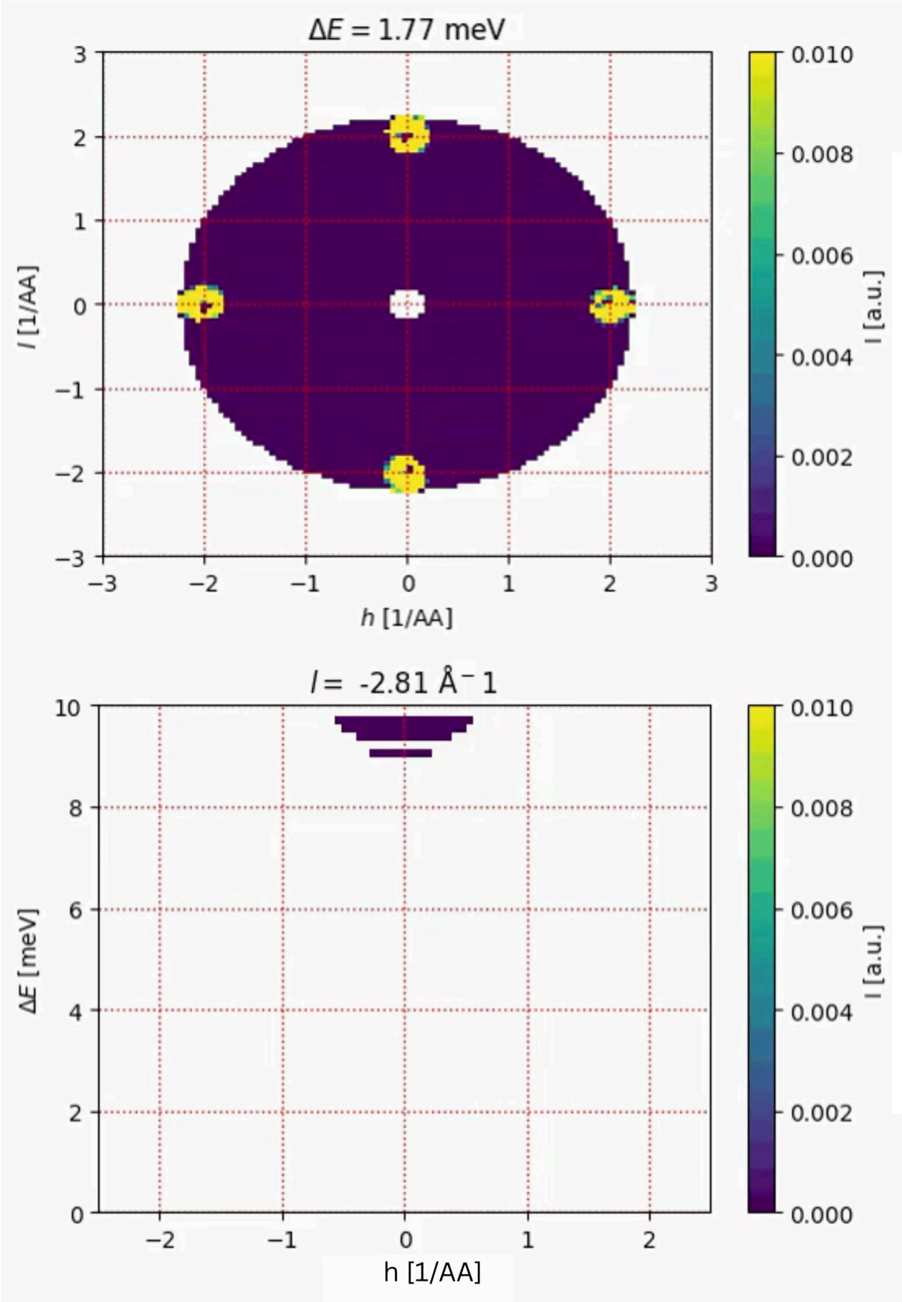


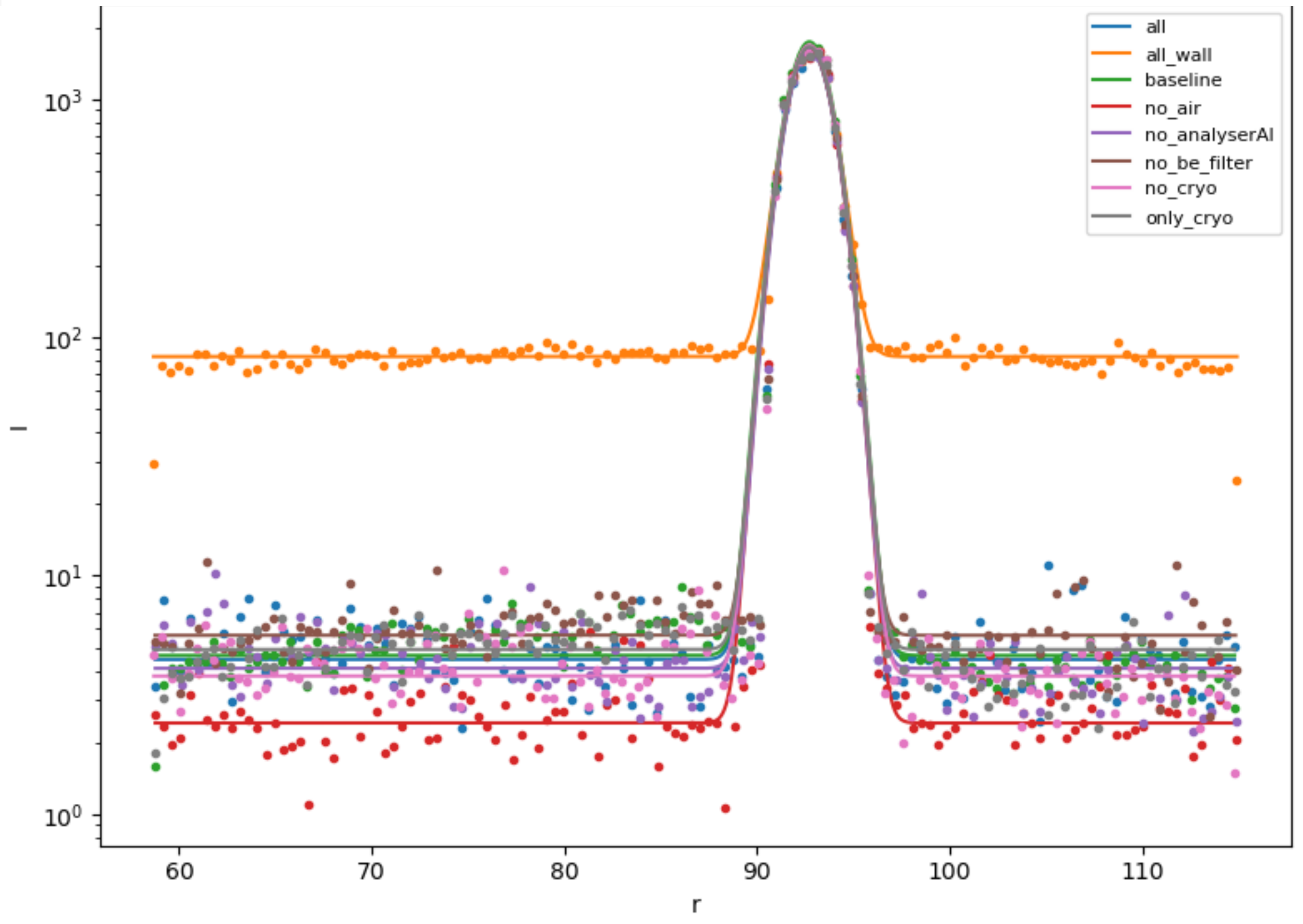


Inelastic scattering instruments

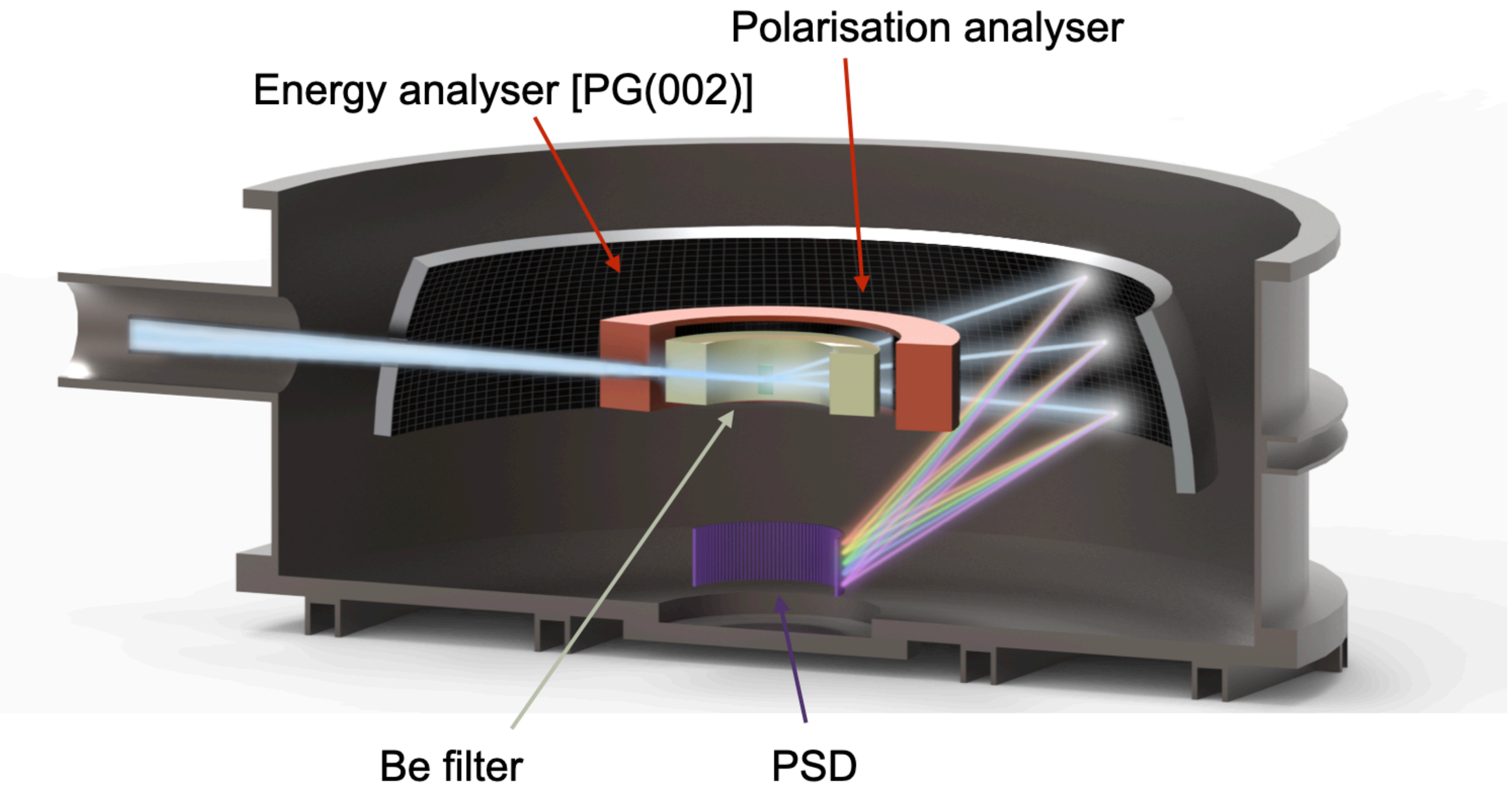
- Several indirect geometry instruments with novel secondary spectrometers:

e.g. FANTASTIC (K. Karyos)





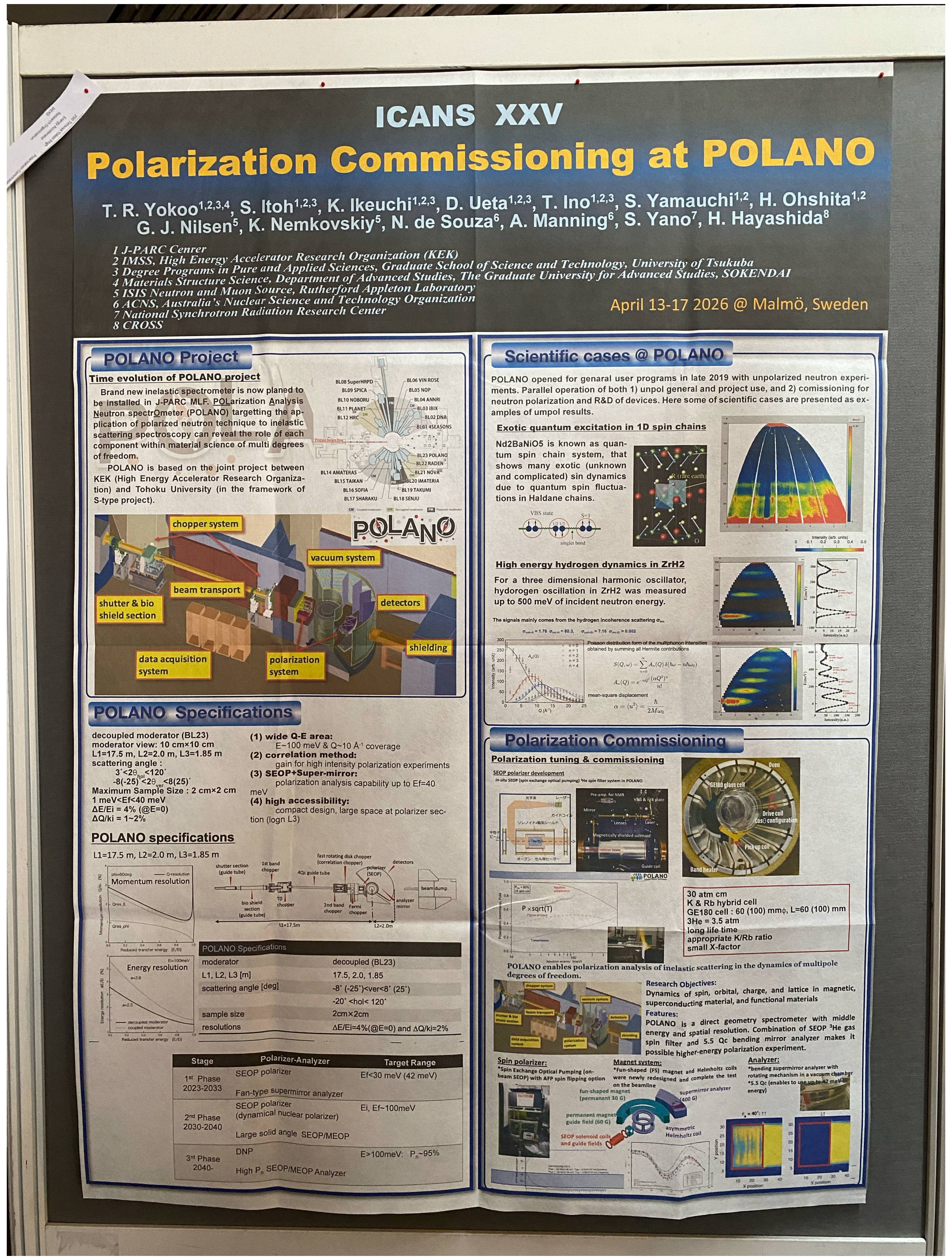
e.g. SHERPA (G. Nilsen)

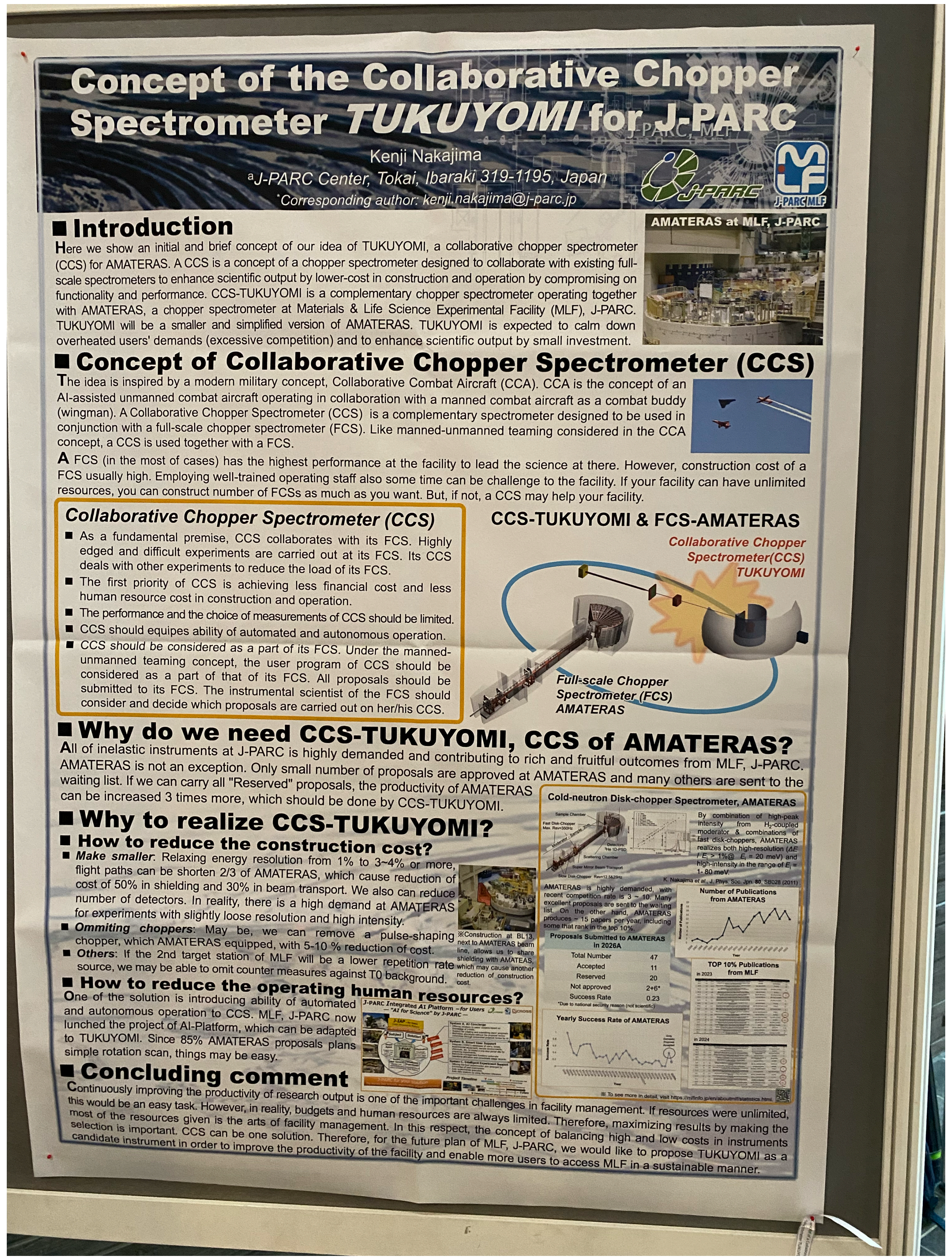


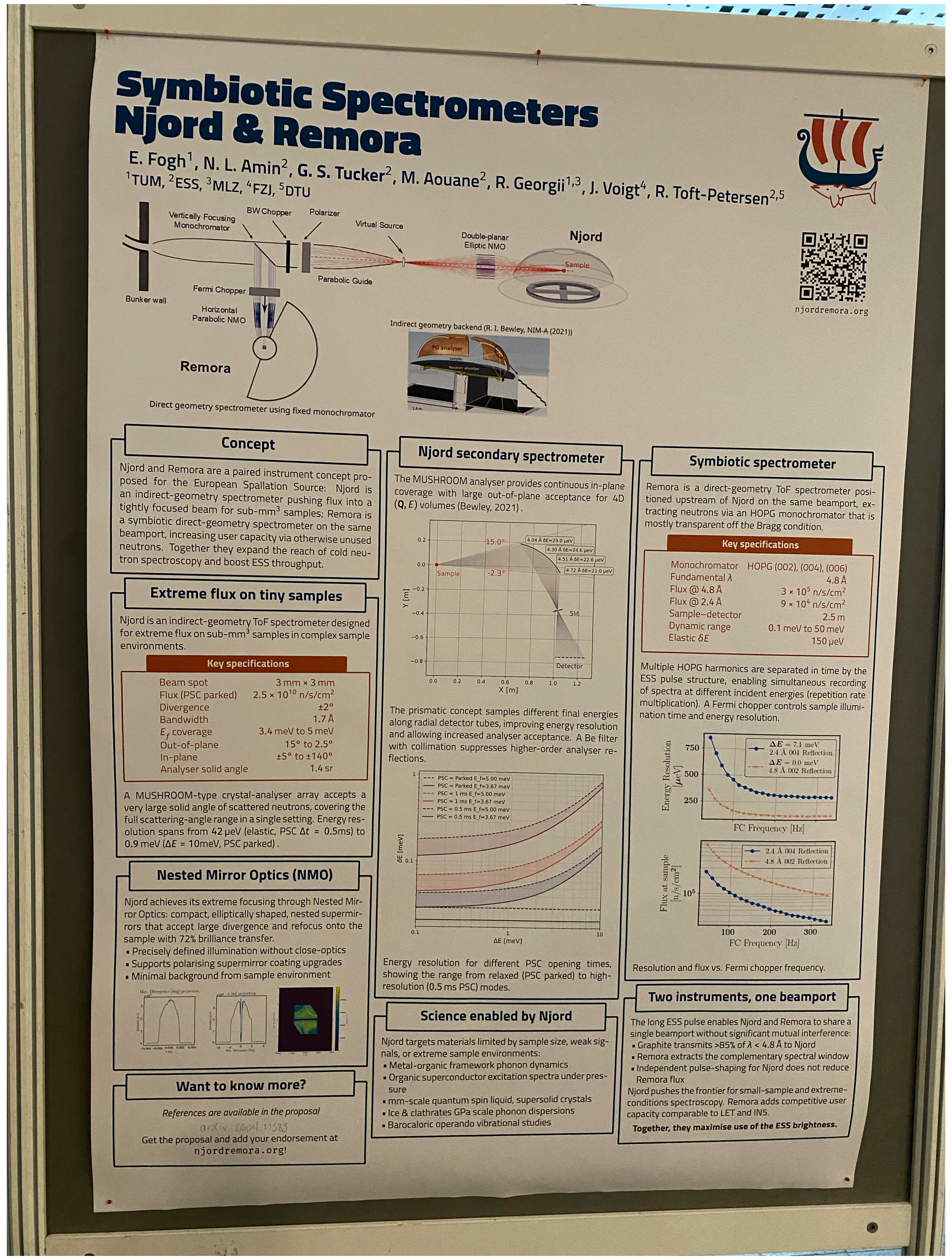
200x IRIS

Inelastic scattering instruments

- New functionalities and concepts in the poster session:







Other instruments

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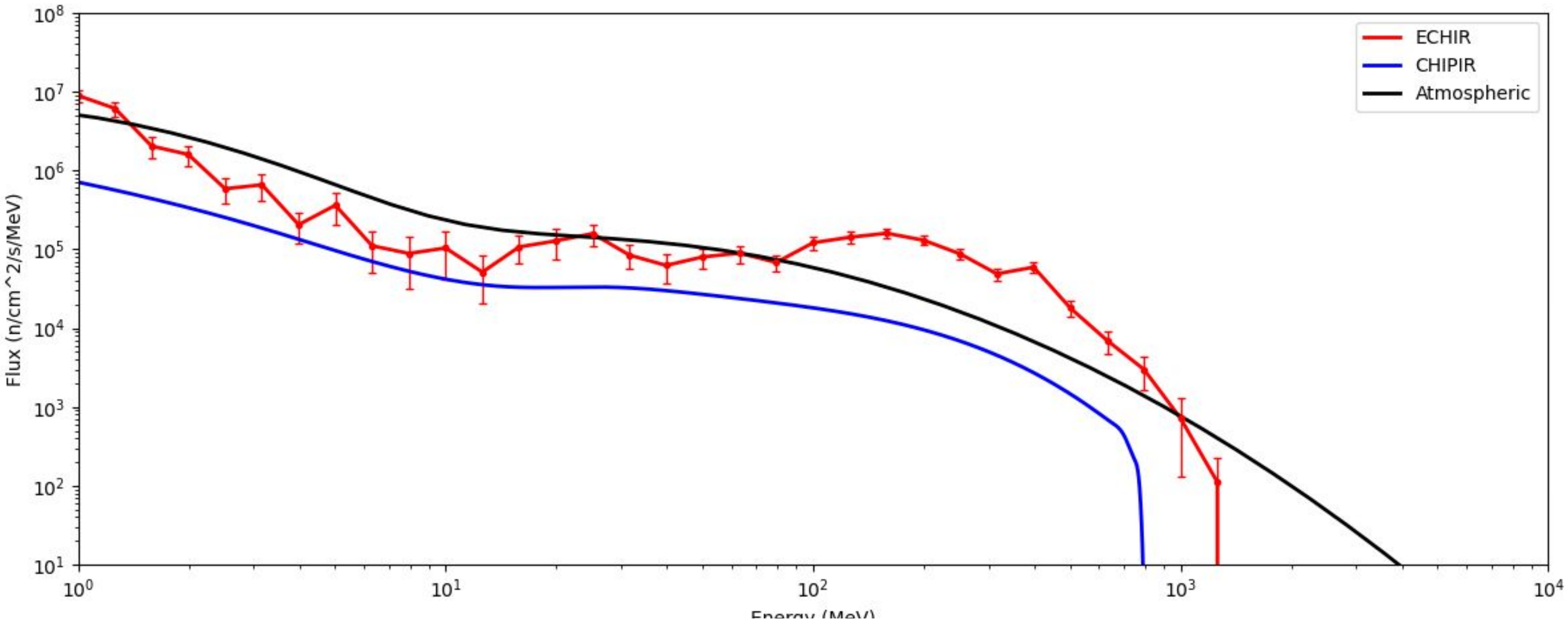
- A large fraction of the instrumentation talks were about non-scattering instruments:

  ECHIR - Mila Myllymäki



Other instruments

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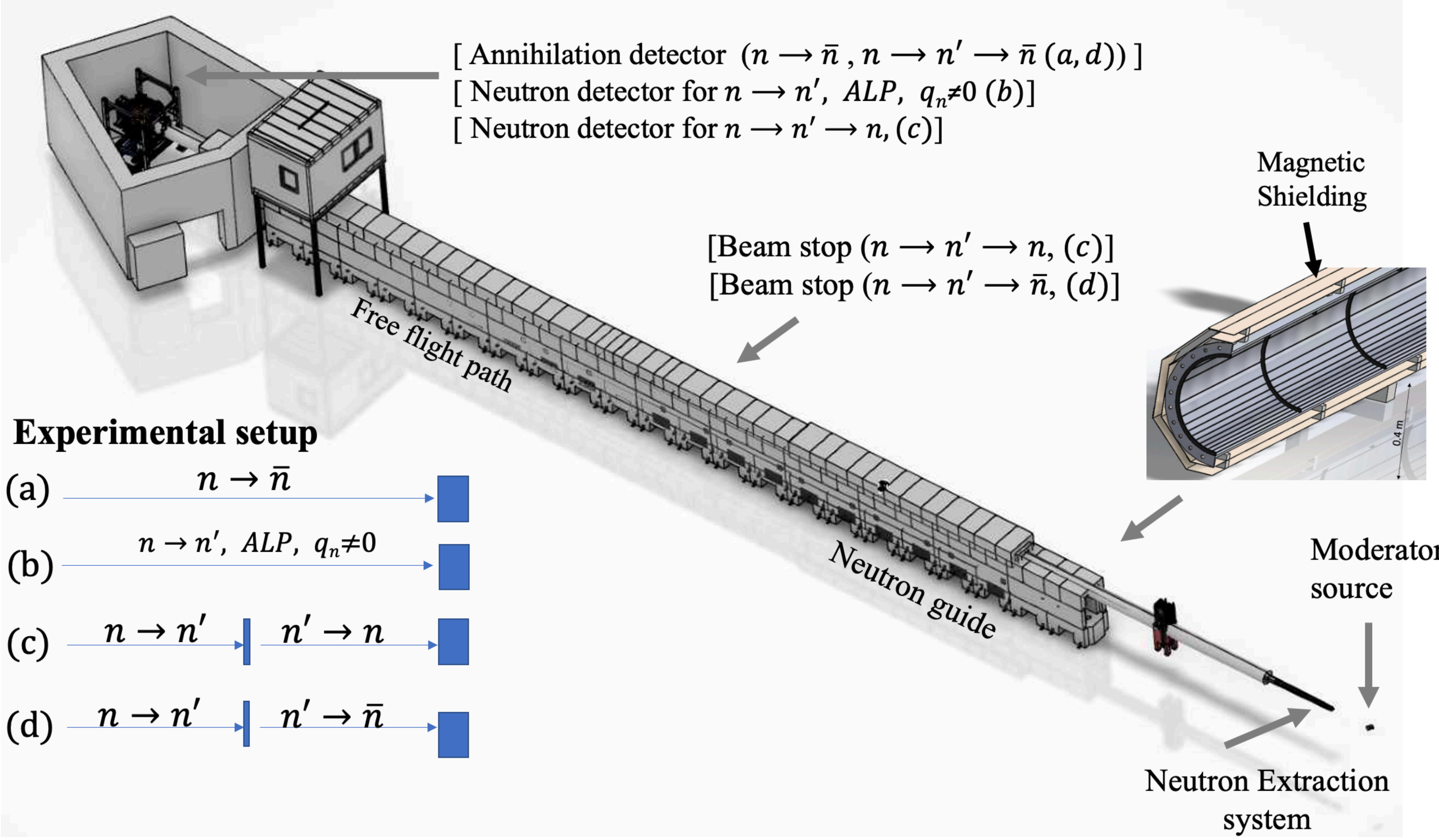
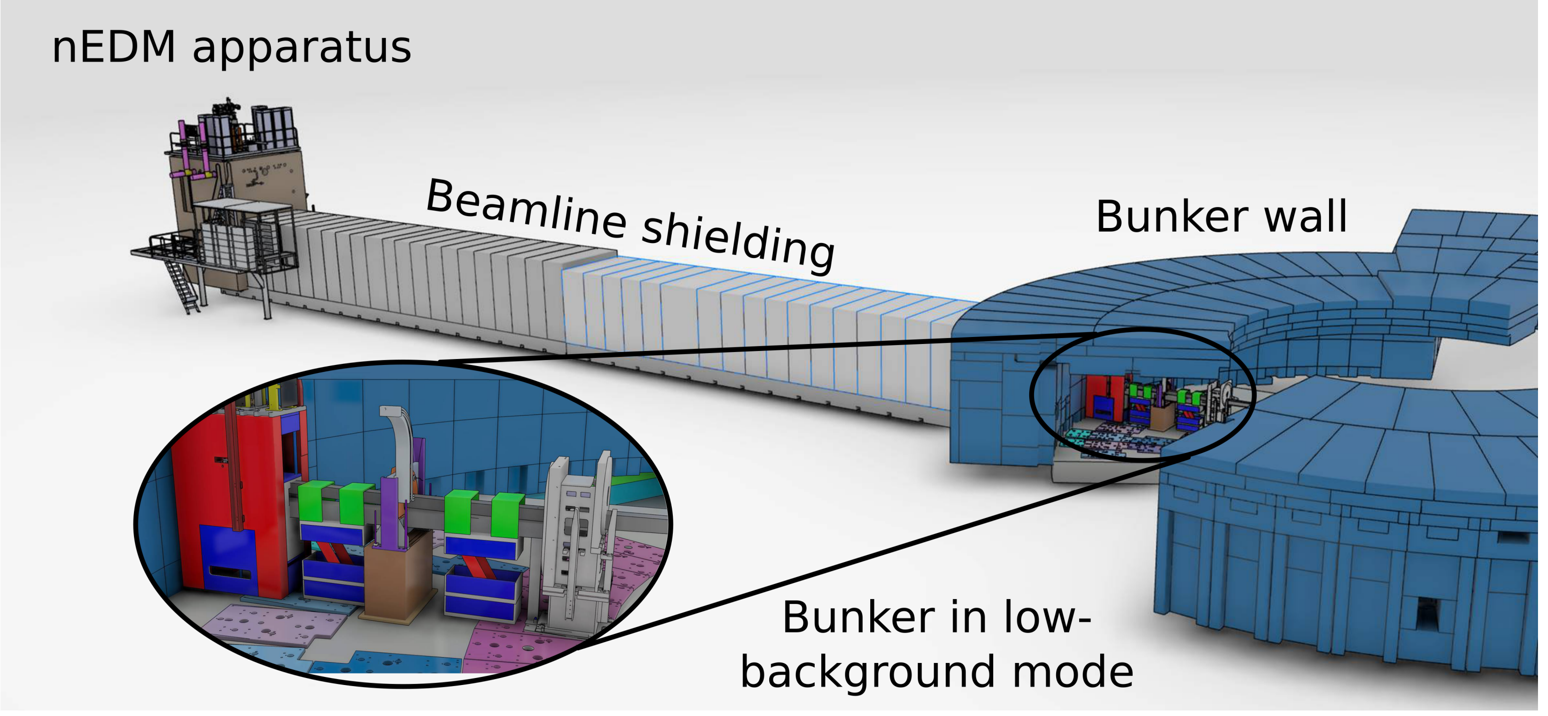
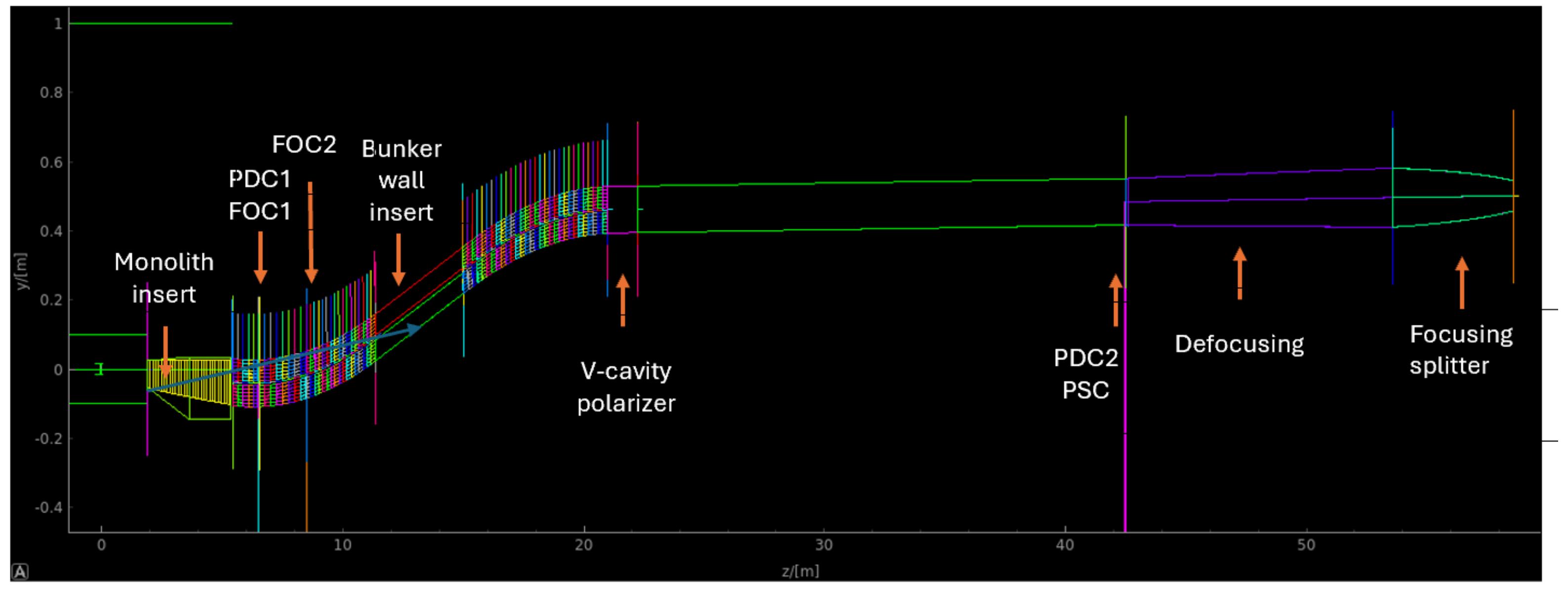
FINESSE/NNBAR Valentina Santoro







Moderators

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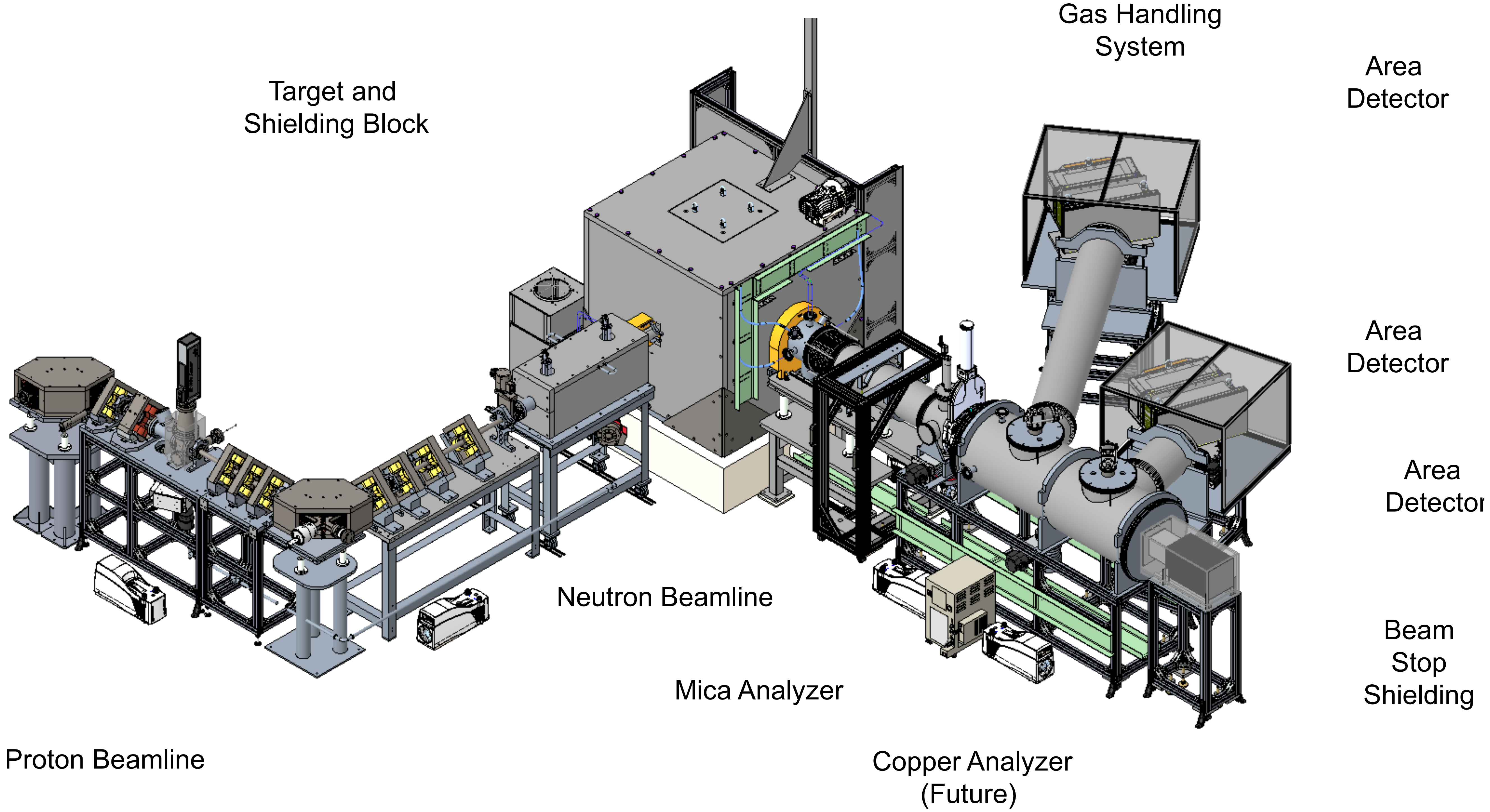
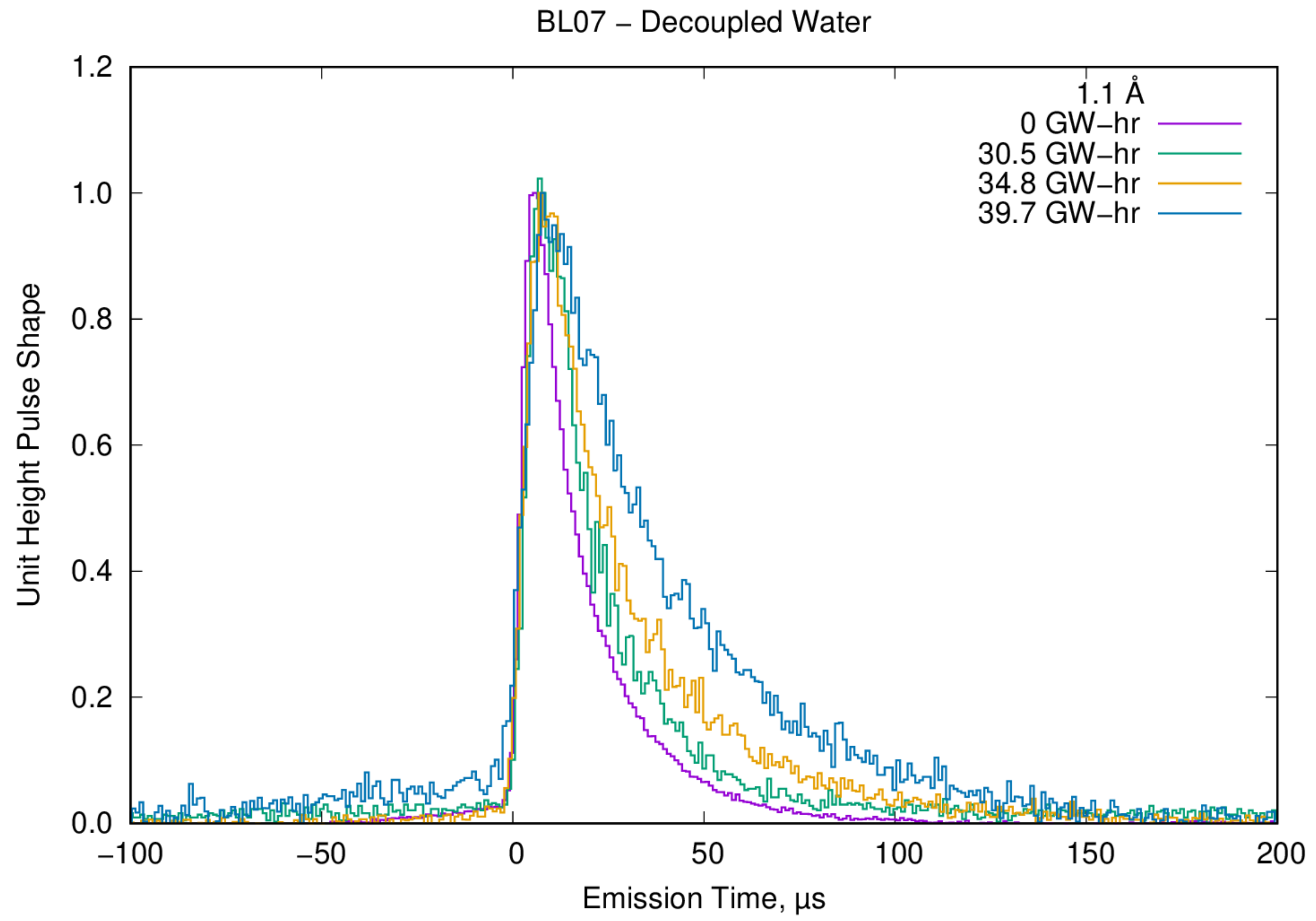
- Brighter and more efficient moderators can provide large gains
- Continuous monitoring of performance critical



E. Iverson



Simulations

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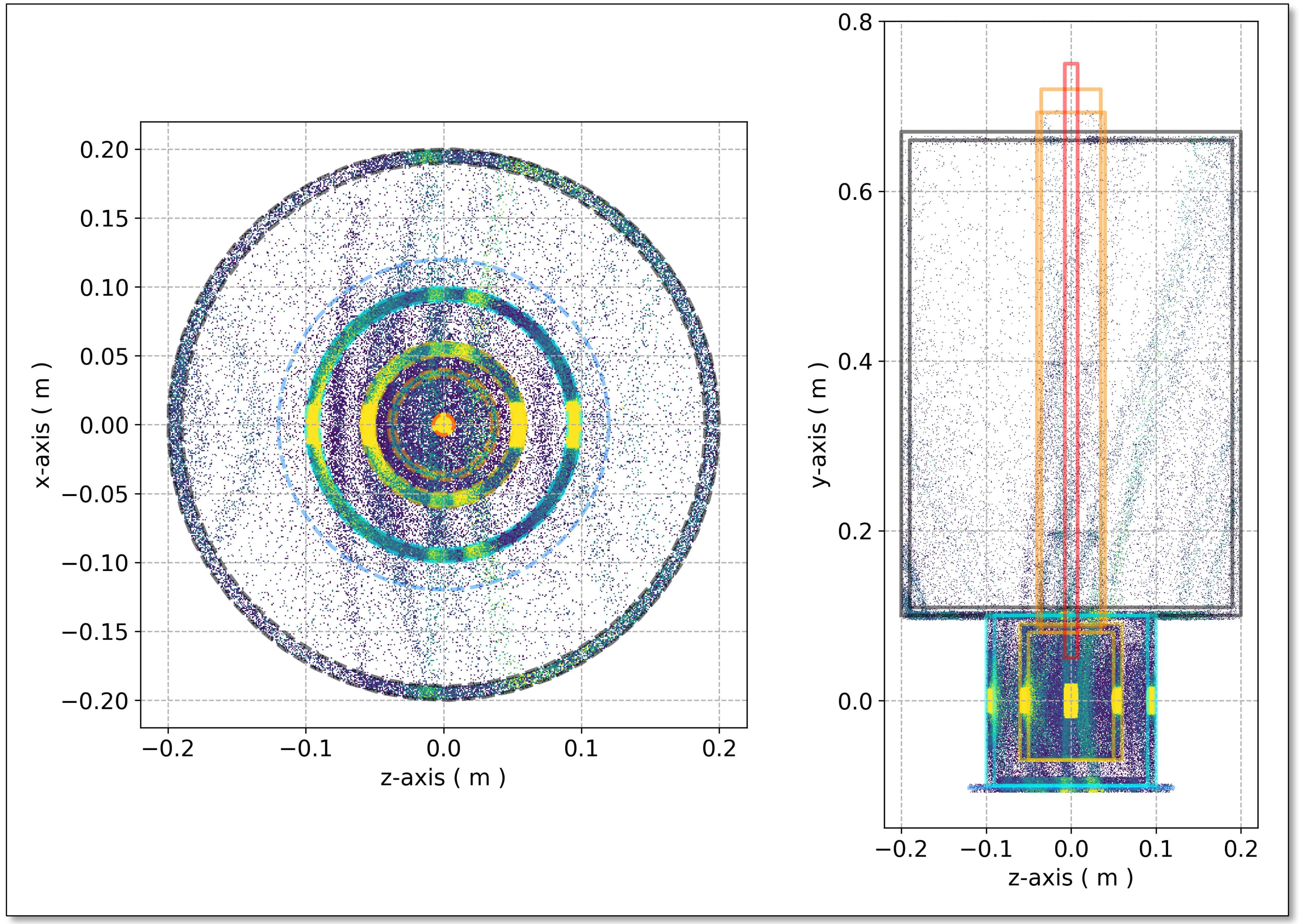
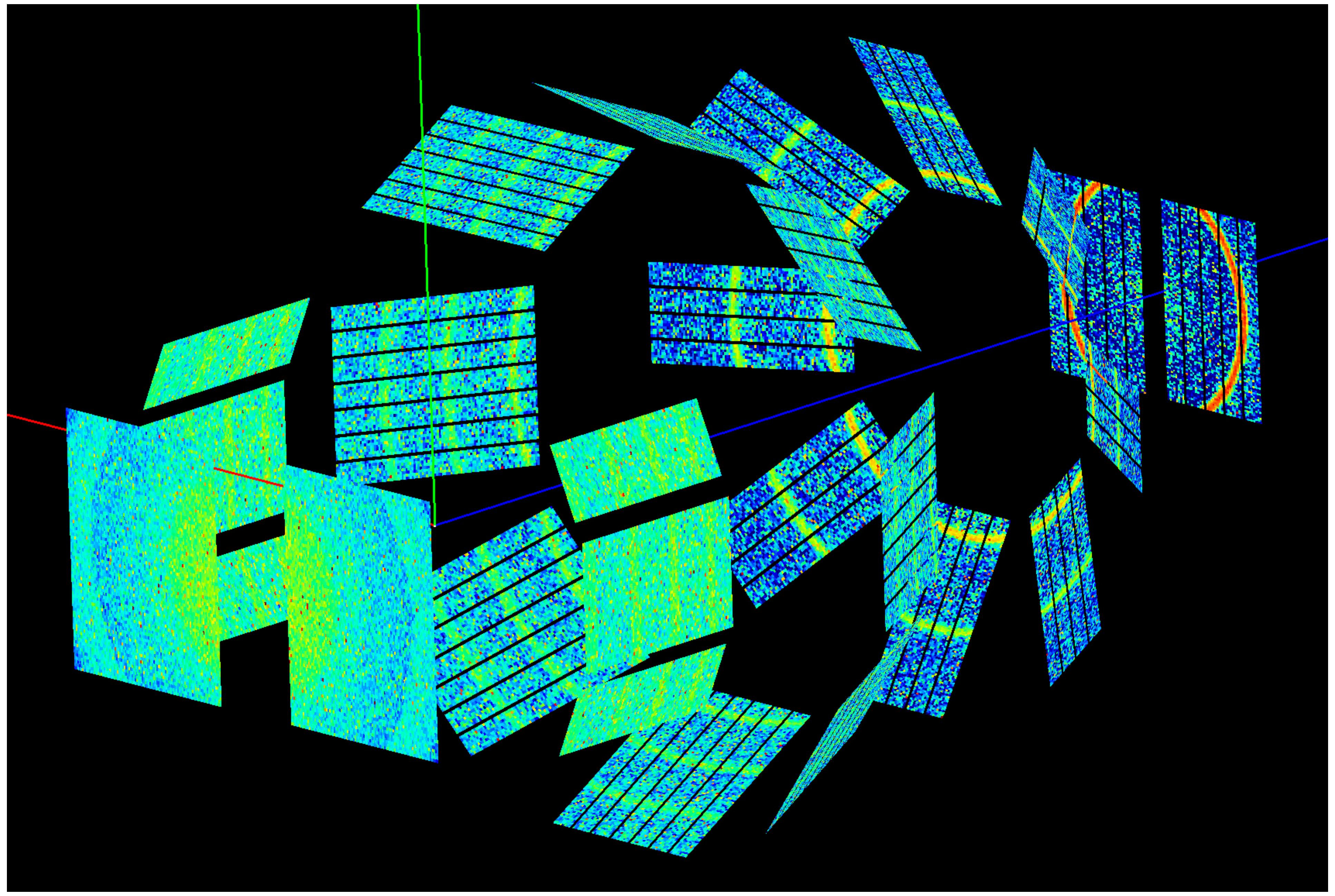
- Developments in mean that instruments can be simulated in more detail than even, including multiple scattering background from sample environment:



G. Sala



BL21 NOVA

A few takeaways…

- There are still plenty of new instrumentation ideas, particularly for spectrometers
- Even on smaller sources, optimized instrument designs can be useful/competitive
- These developments are driven by advancements in software and technology, particularly:
  - Simulations (McStas, Vitess, NCrystal, OpenMC, MCNP etc.)
    - Virtual experiments
    - Realistic background calculations
  - Optimized moderators and neutron delivery systems
  - Detectors (Timepix, wavelength shifting fibres etc.)

Acknowledgements

- Thanks to all the presenters and to the session chairs:
  - Monika Hartl
  - Tianjiao Liang
  - Mel Borrego
  - Matt Frost
  - Masatoshi Arai
  - Mads Bertelsen