

NMX Project Update

NMX STAP

2022-10-26

Esko Oksanen

Lead Scientist NMX

Outline – project status

1. Beam transport system
(optics & choppers)

2. Shielding (guide shielding &
experimental cave)

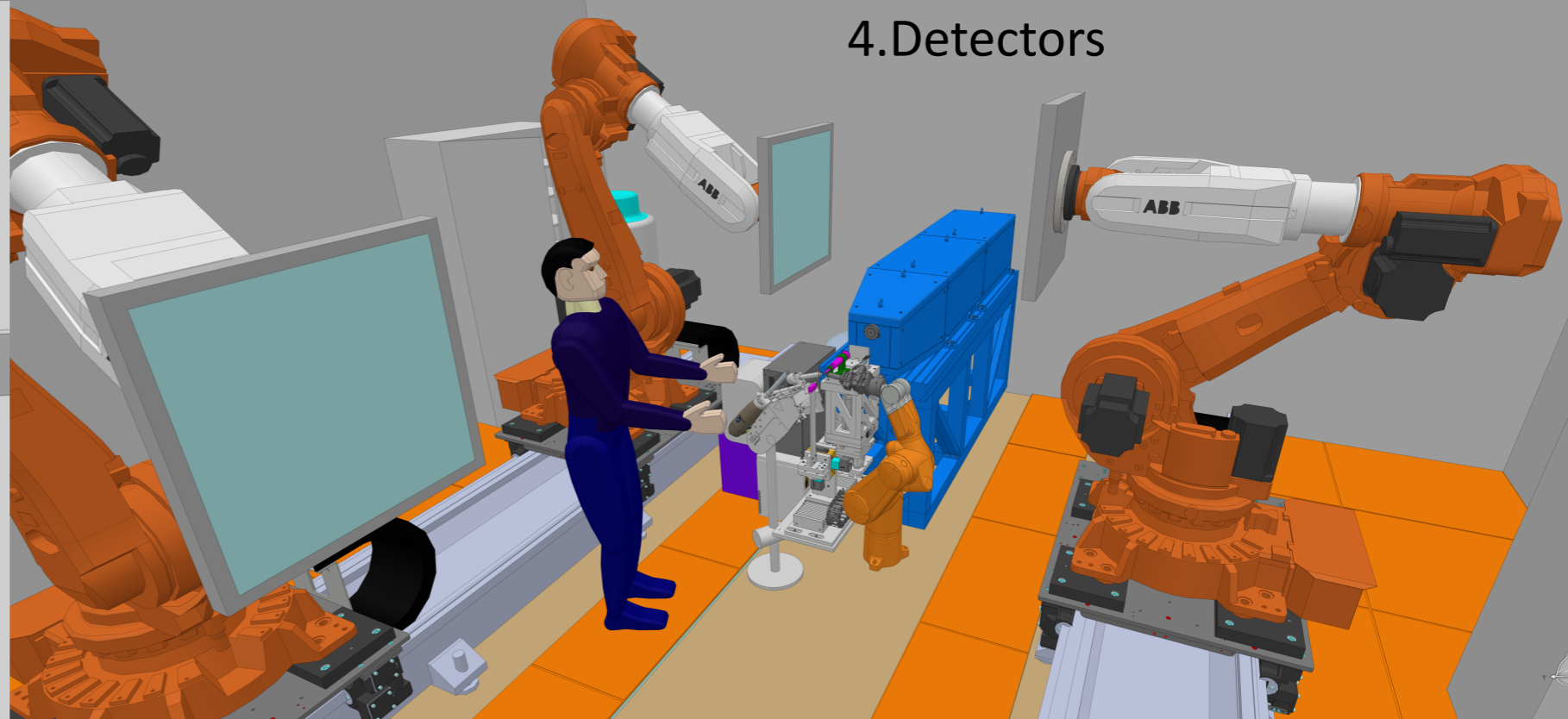
3. Endstation (collimation,
goniometer & detector
positioners)

5. Software
(This afternoon)

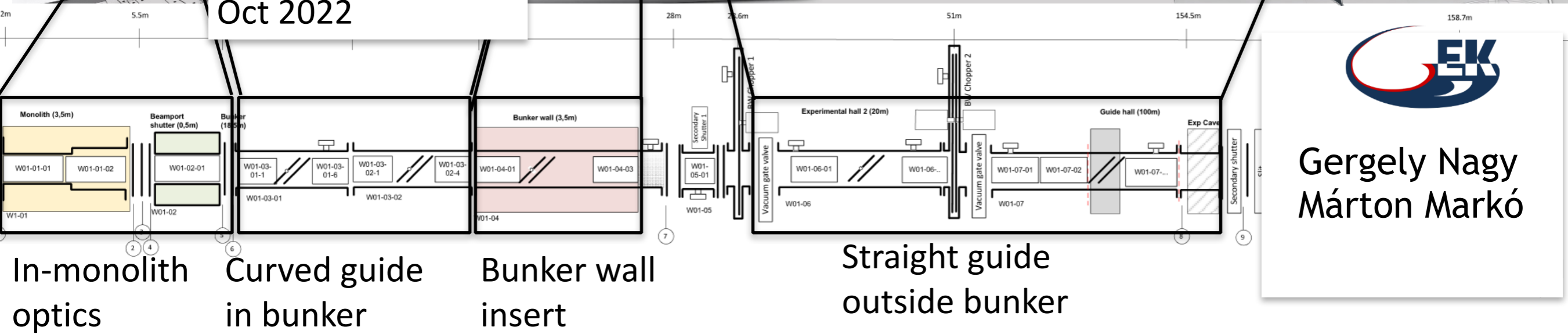
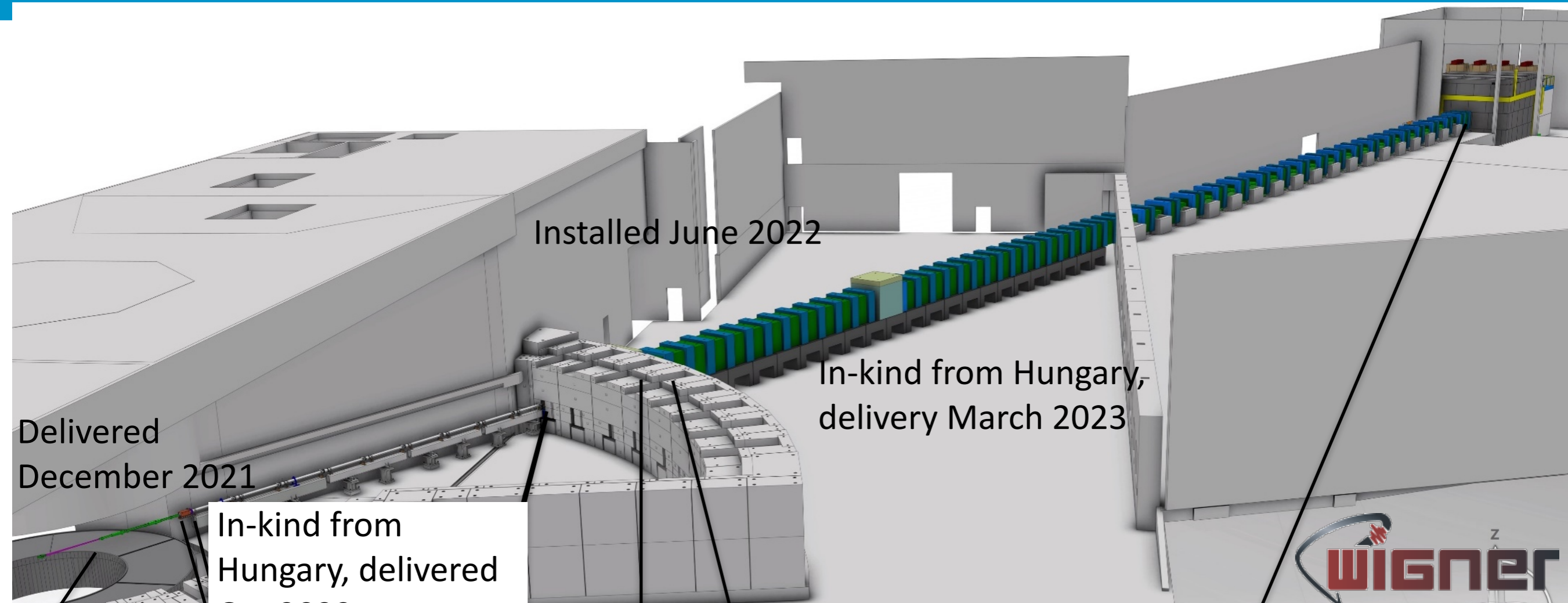
New post-doc
Justin Bergmann



4. Detectors



Beam transport system – neutron optics

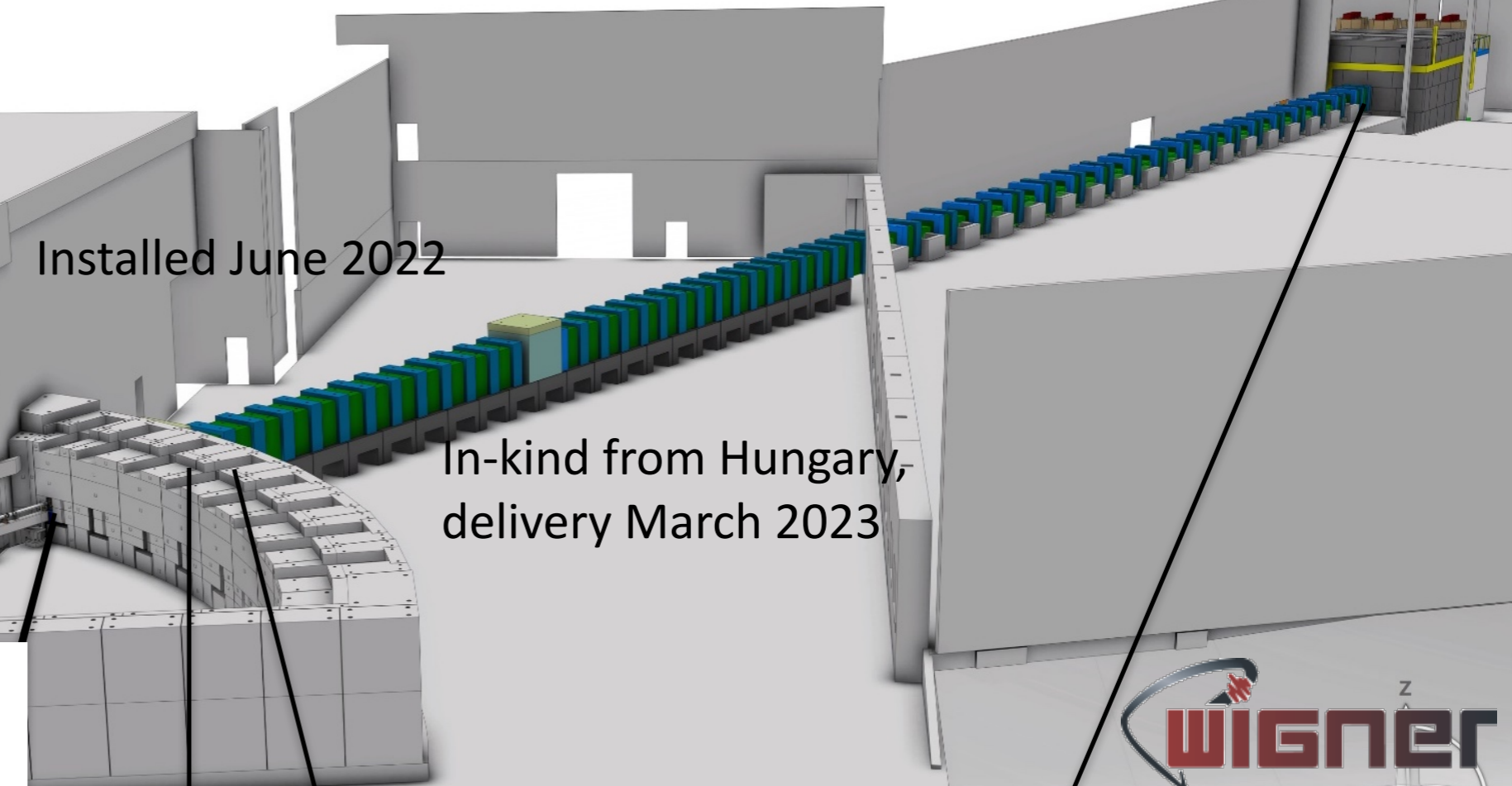


Gergely Nagy
Márton Markó

Beam transport system – neutron optics



Installed June 2022

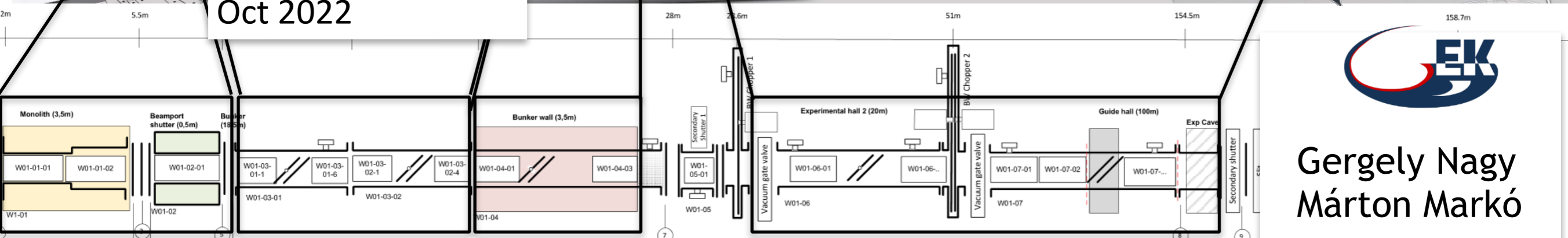


In-kind from Hungary, delivery March 2023



Delivered December 2021

In-kind from Hungary, delivered Oct 2022



In-monolith optics

Curved guide in bunker

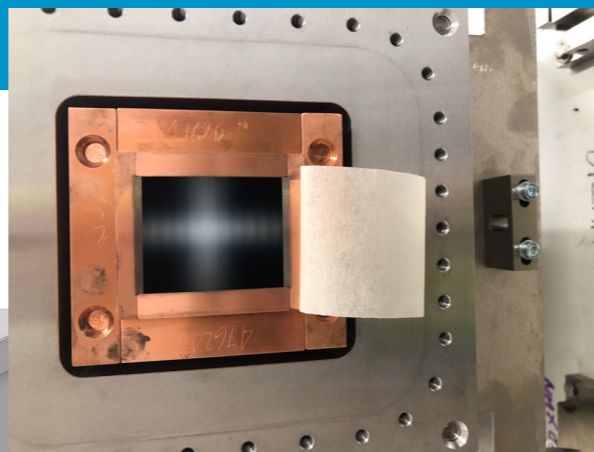
Bunker wall insert

Straight guide outside bunker

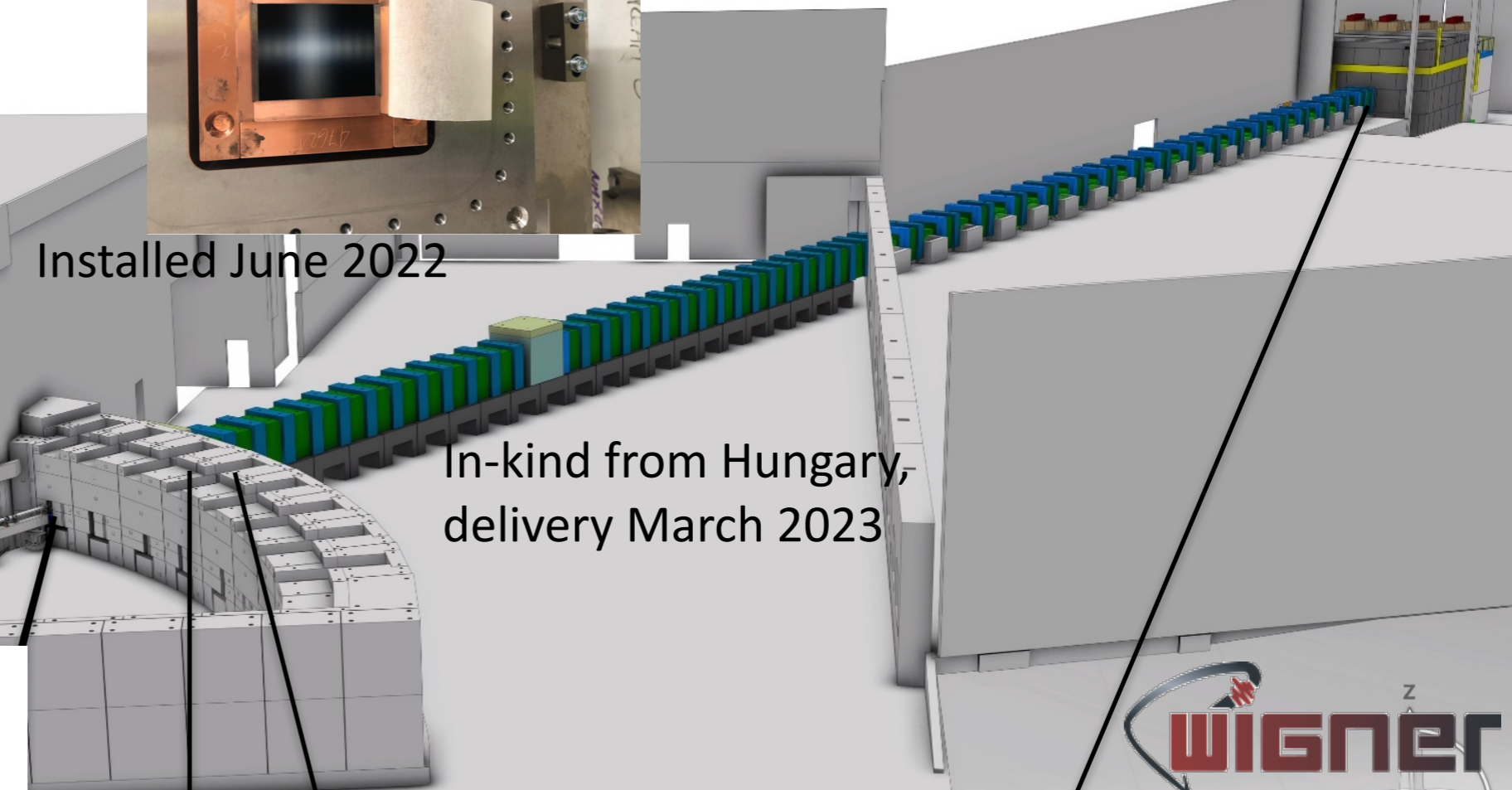


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Beam transport system – neutron optics



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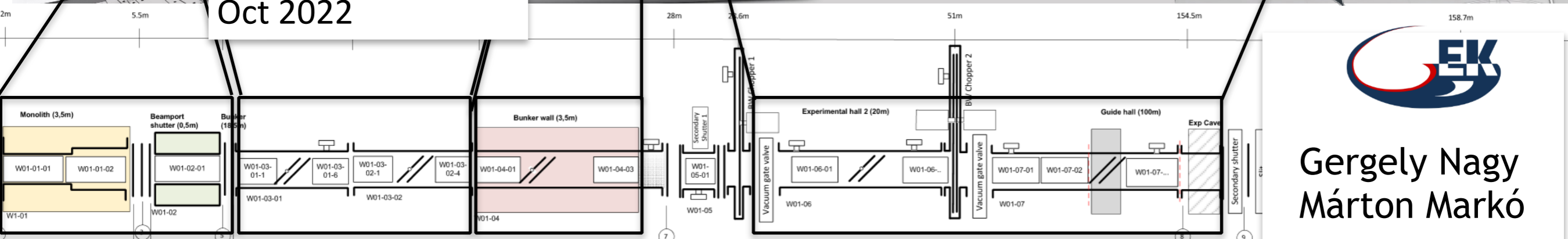


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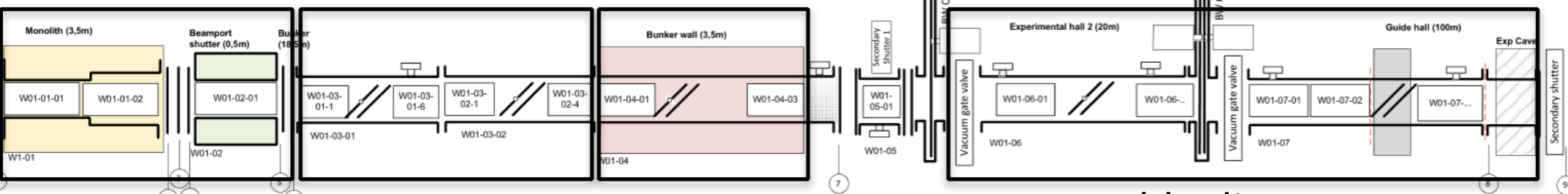
Straight guide outside bunker



Gergely Nagy
Márton Markó

Beam transport system – choppers

Choppers ESS common project,
delivery Q1 2023



Single disc

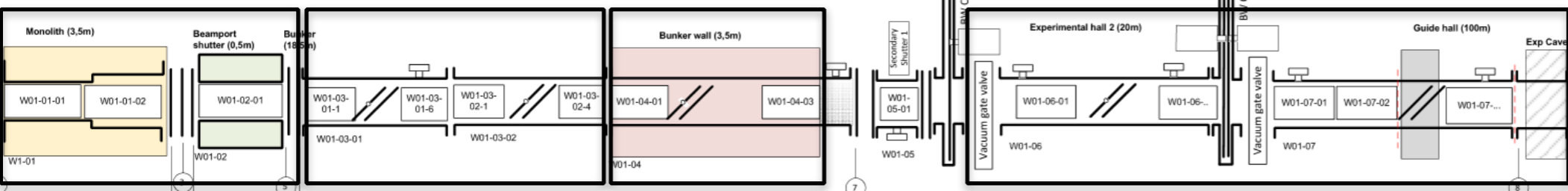
Double disc, co-rotating

Erik Nilsson
Markus Olsson

Beam transport system – choppers



Choppers ESS common project,
delivery Q1 2023



Single disc

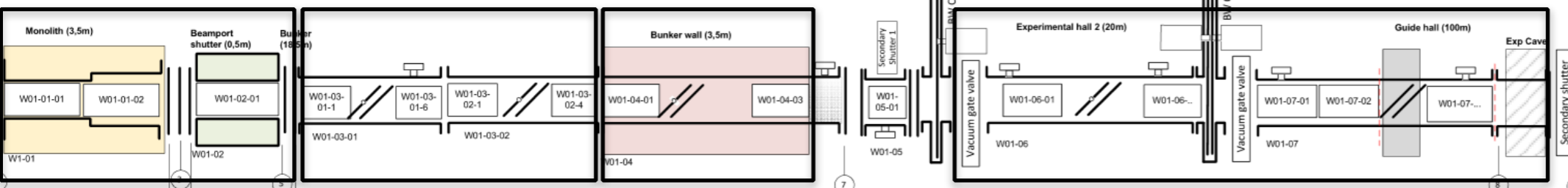
Double disc, co-rotating

Erik Nilsson
Markus Olsson

Beam transport system – choppers



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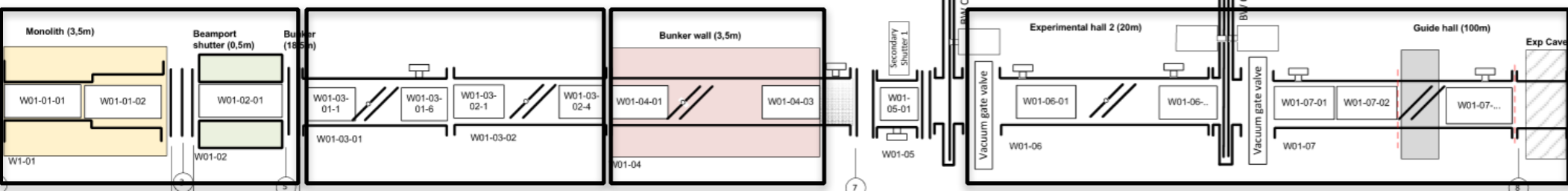
Double disc, co-rotating

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Beam transport system – choppers



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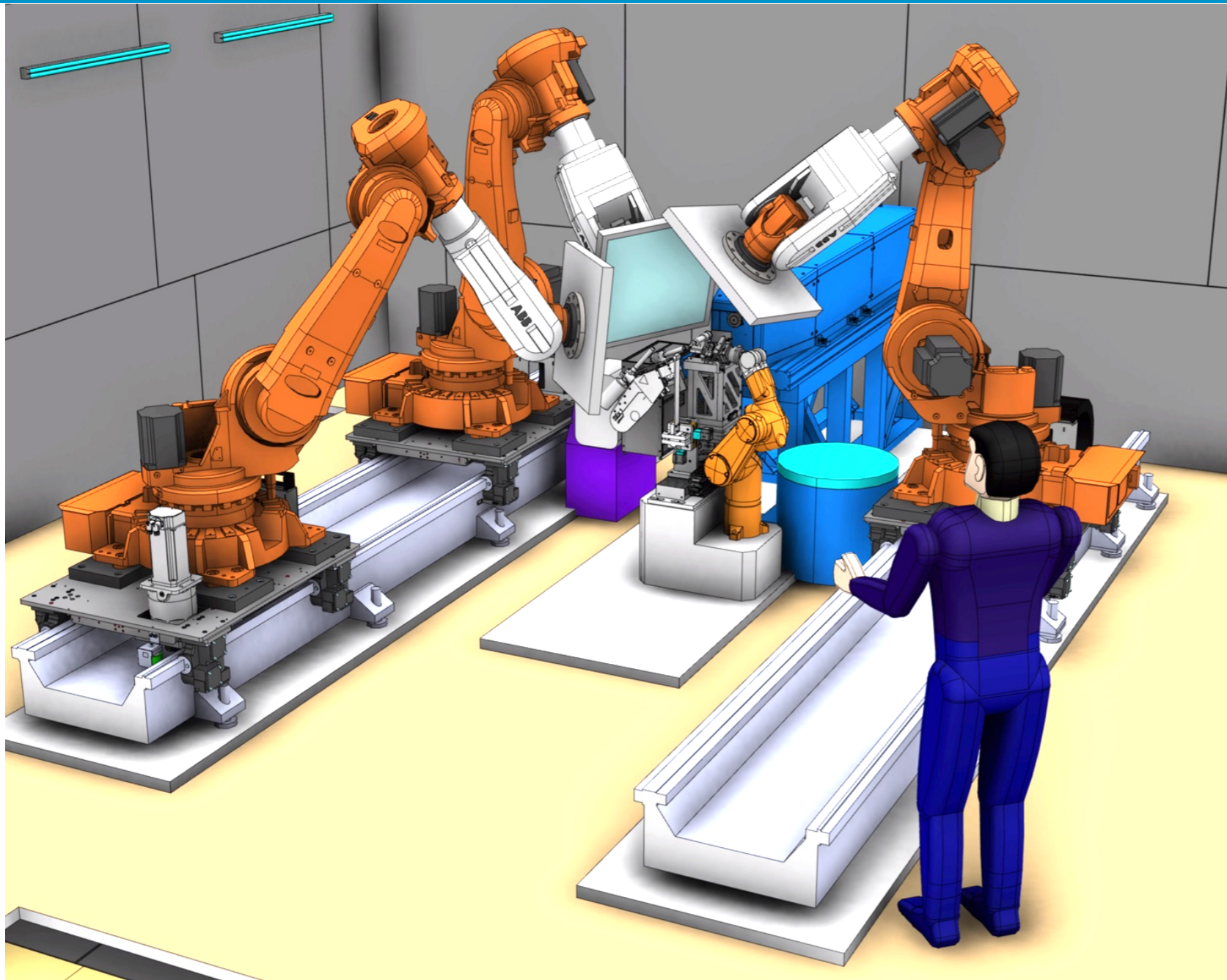
Shielding

- Experimental cave completed and accepted
- Common shielding project delivers guide shielding – neutronics simulations were performed in Hungary
- Delivery Q3-4 2022, installation (ongoing) Q4 2022-Q1 2023



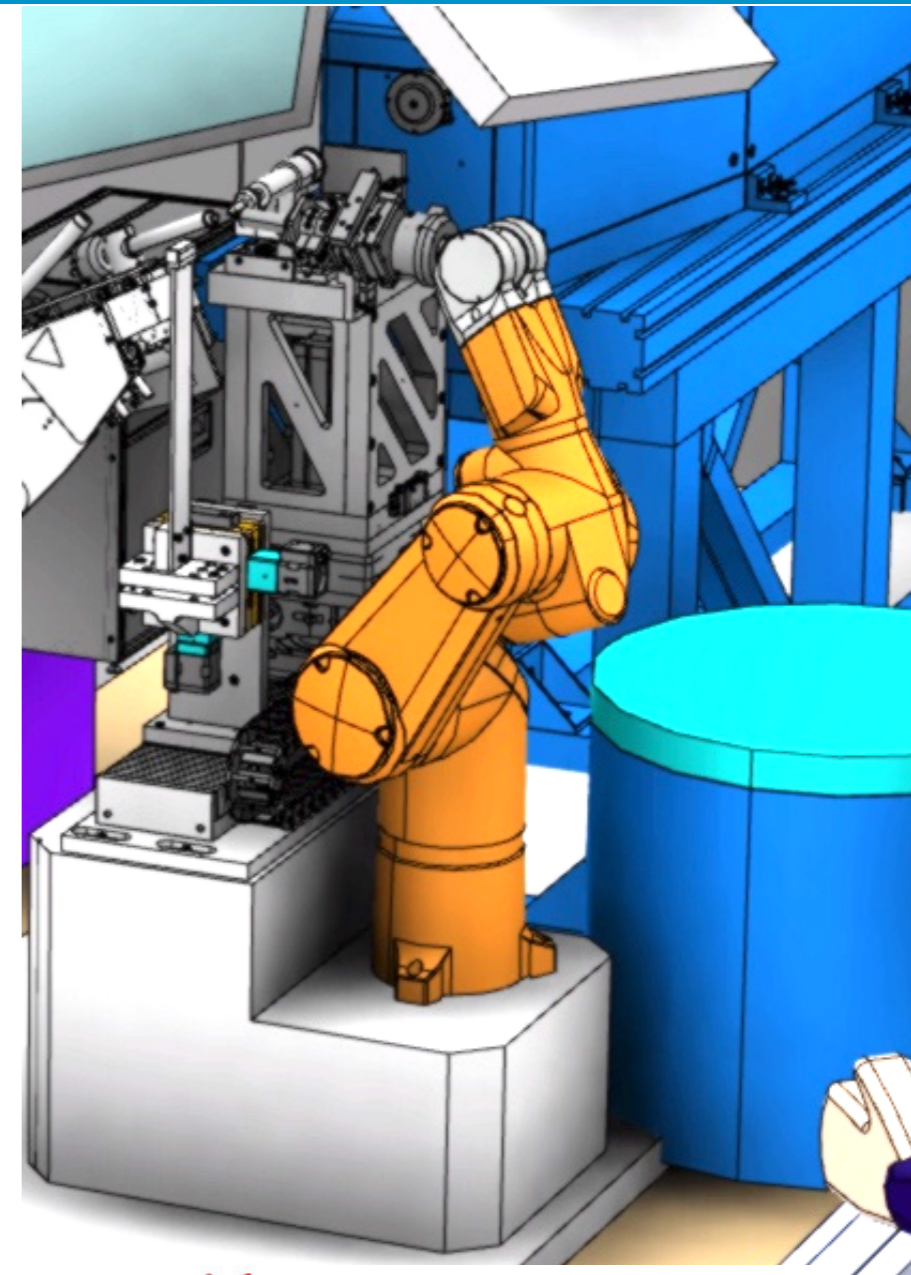
Szabina Török
Gabor Nafradi
Tamás Bozsó

Endstation – Robotics



Design by IBS, but finally no in-kind delivery from France

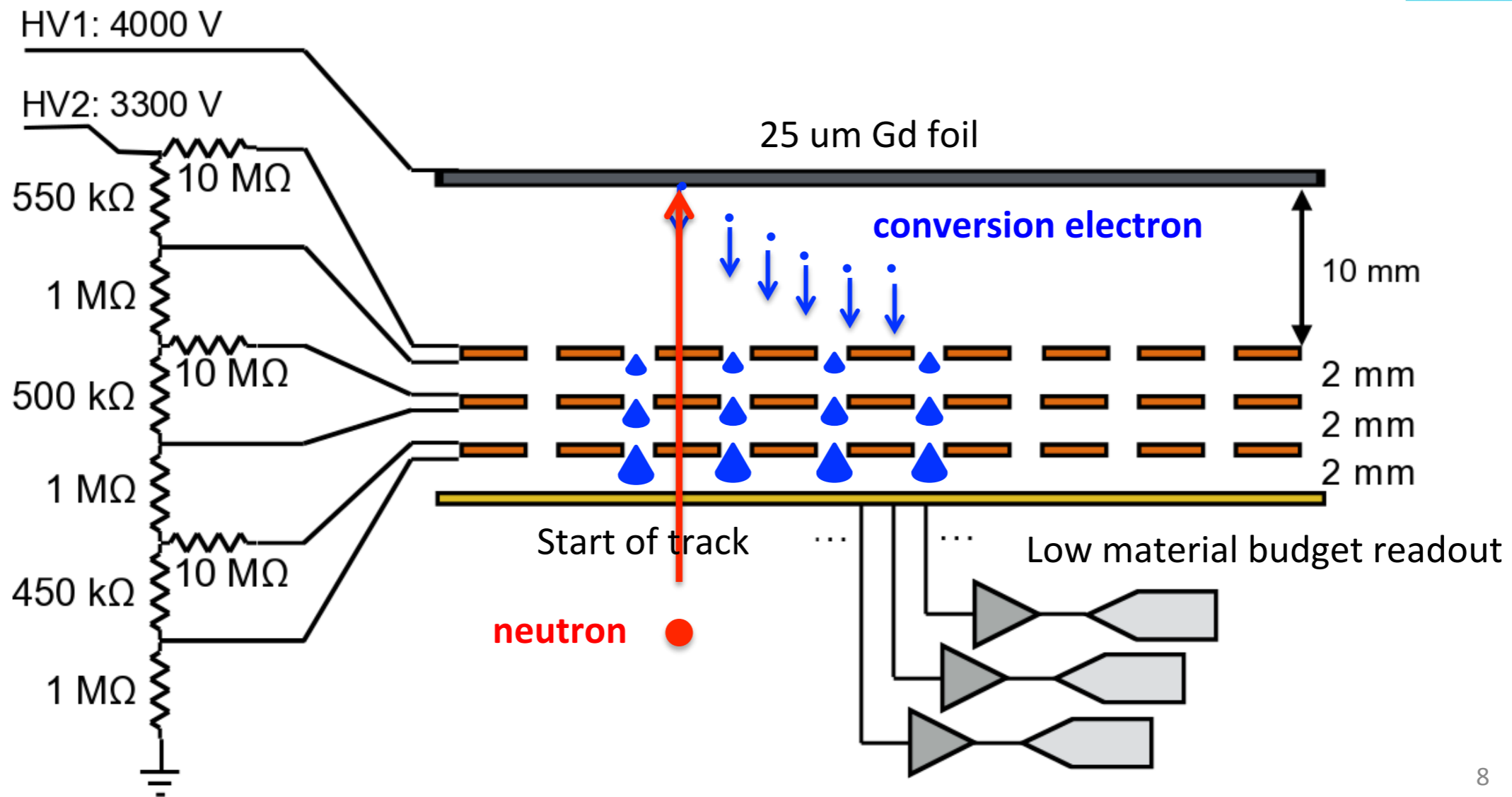
Contract signed with ARINAX, PDR foreseen Q4 2022 expected delivery Q1 2024



A molecular vision of life
Une vision moléculaire du vivant

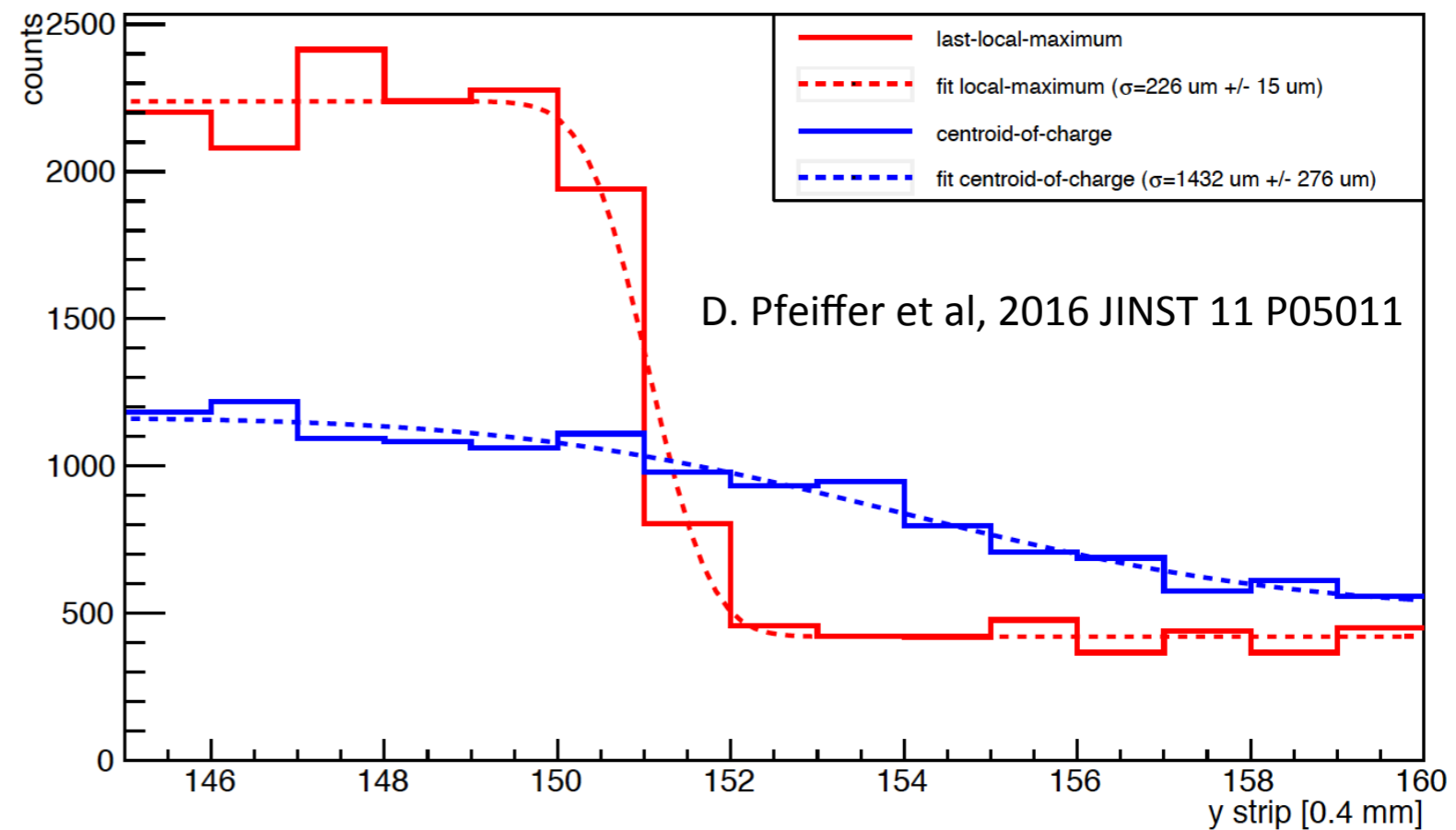
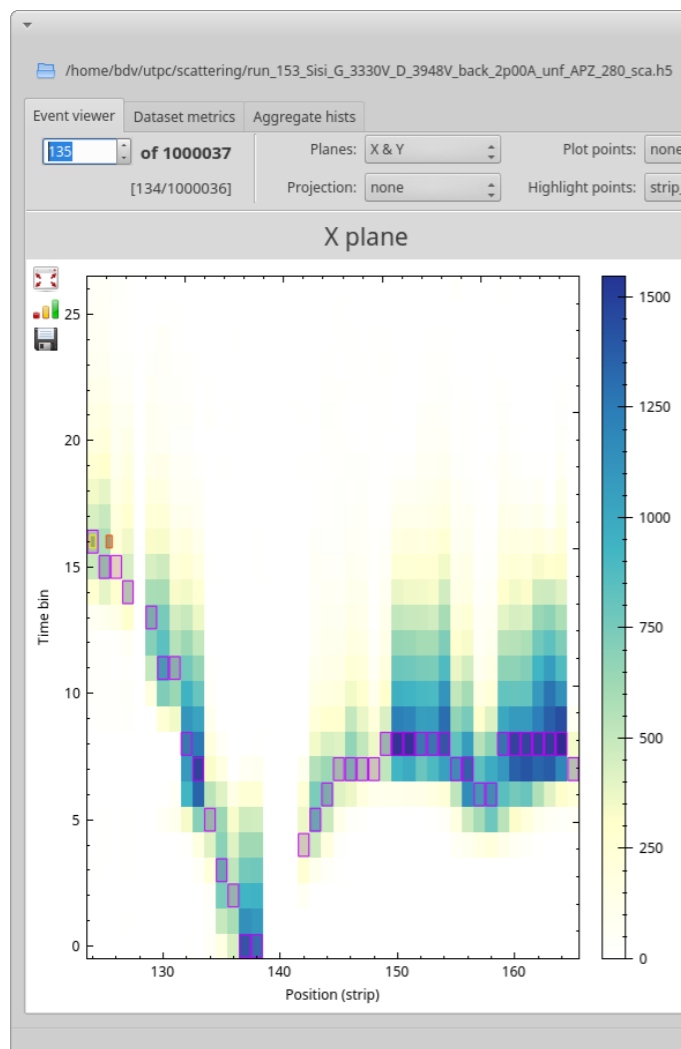
20 μm cylinder of confusion ensured with an extra axis (air bearing or equivalent)

Gd-GEM detectors



μ TPC method gives resolution

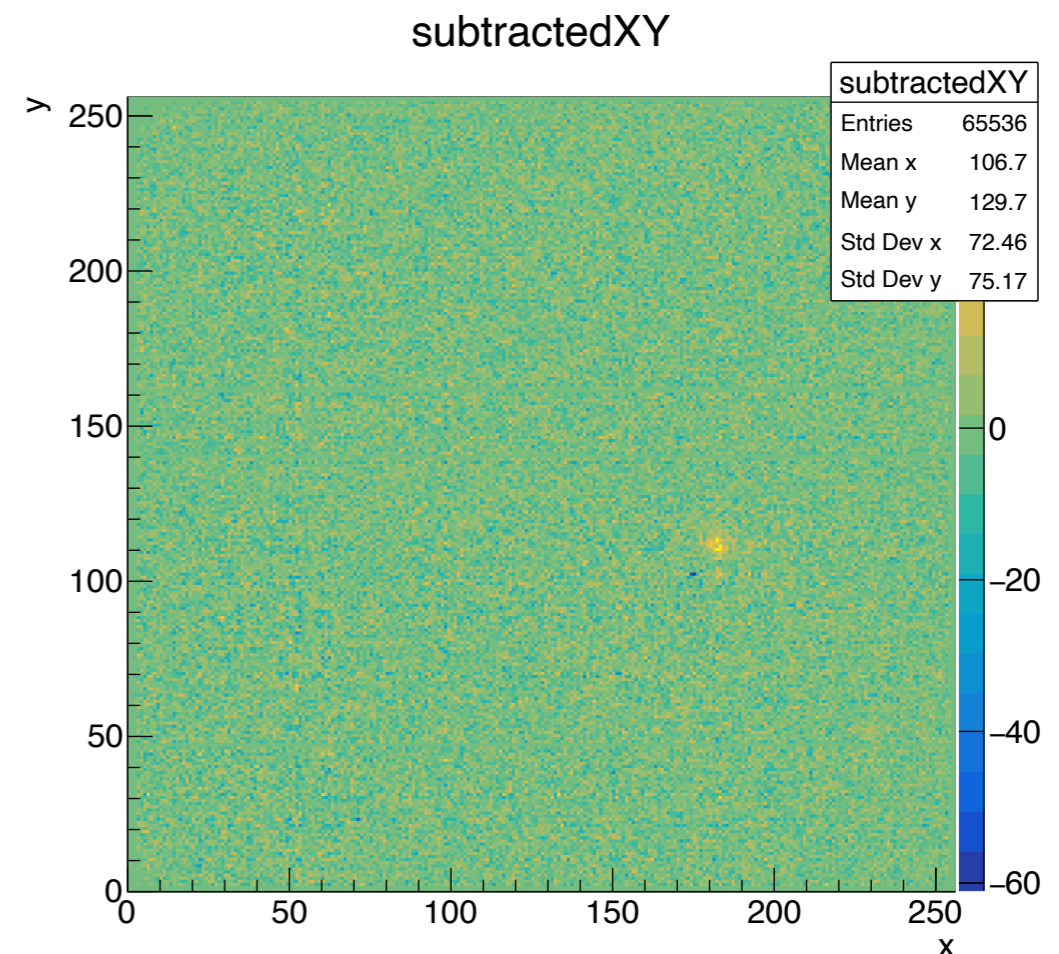
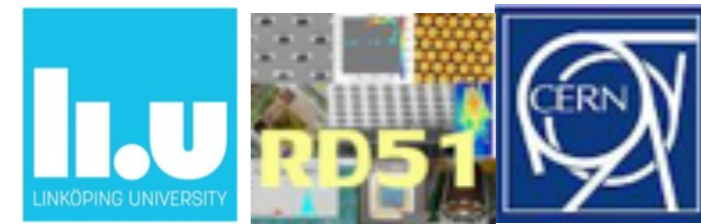
Dorothea Pfeiffer, Martin Shetty



- Position resolution $\sigma < 300 \mu\text{m}$ reached with Triple GEM, APV-25
- Due to scattering, detection efficiency $< 12 \%$ at normal incidence of thermal neutrons

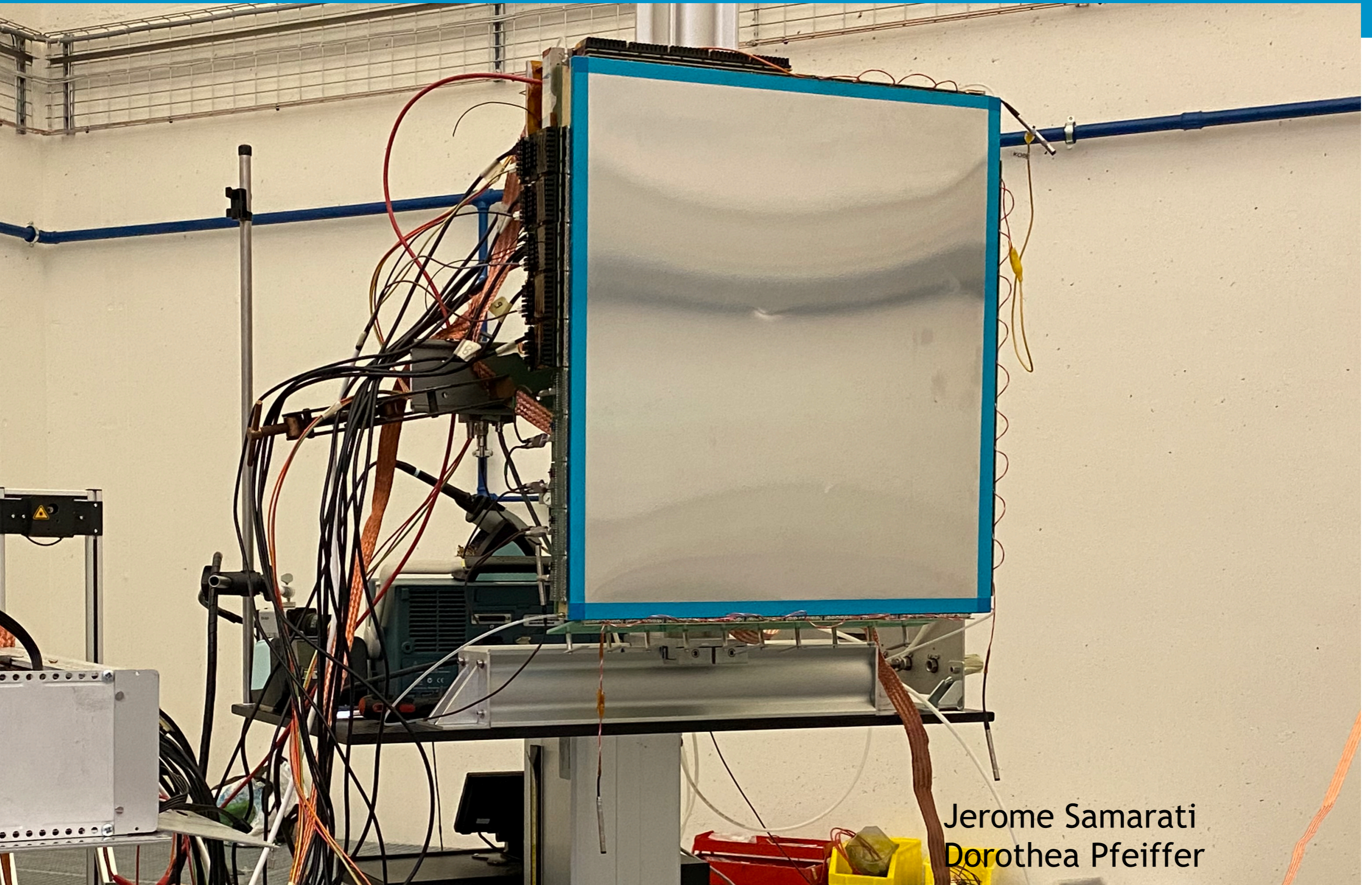
- GdGEM principle proven – effective ‘pixel size’ 400 μm
- Mechanical design of detector unit complete, protective box ongoing
- Readout chain established, but no fully tested with final hardware (lack of components)
- Scope transferred to detector group, delivery expected Q2 2024

brightness



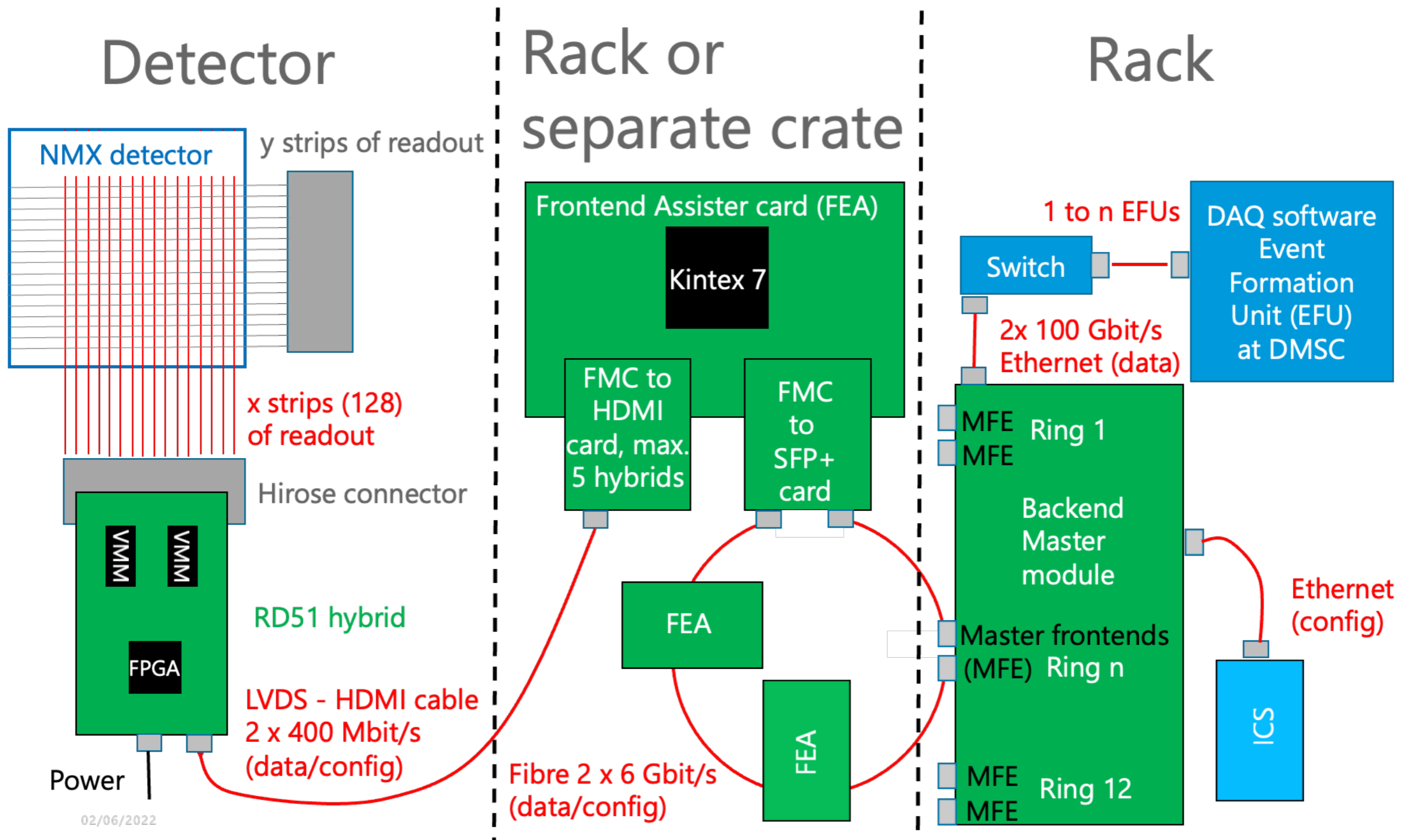
Jerome Samarati
Dorothea Pfeiffer

Detectors



Jerome Samarati
Dorothea Pfeiffer

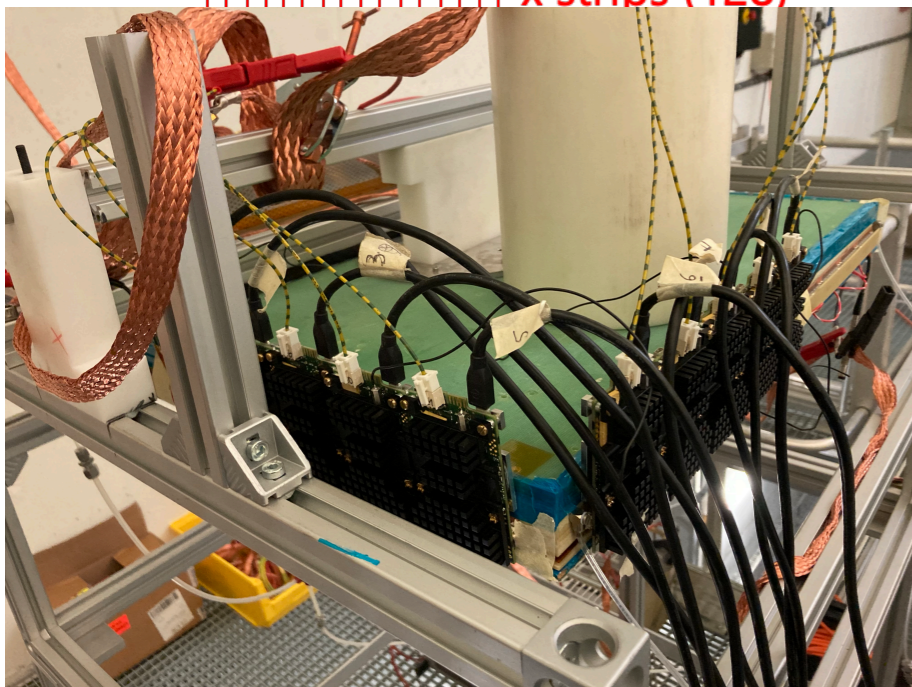
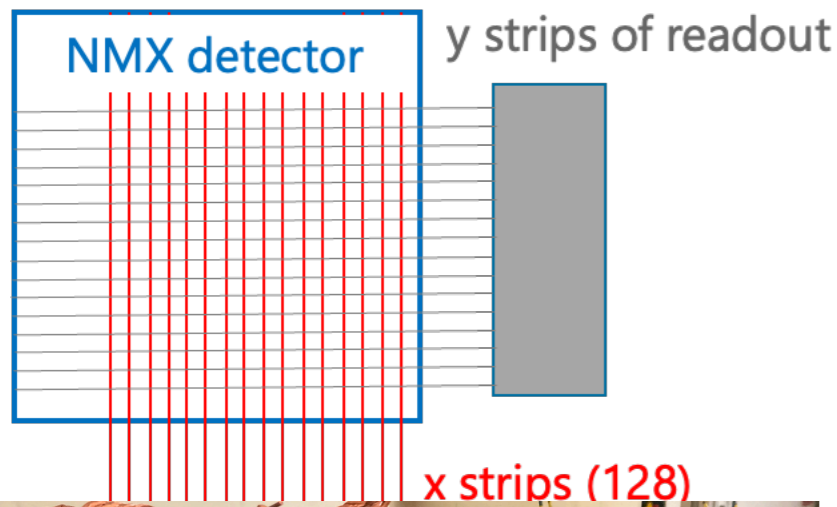
Detector readout architecture



02/06/2022

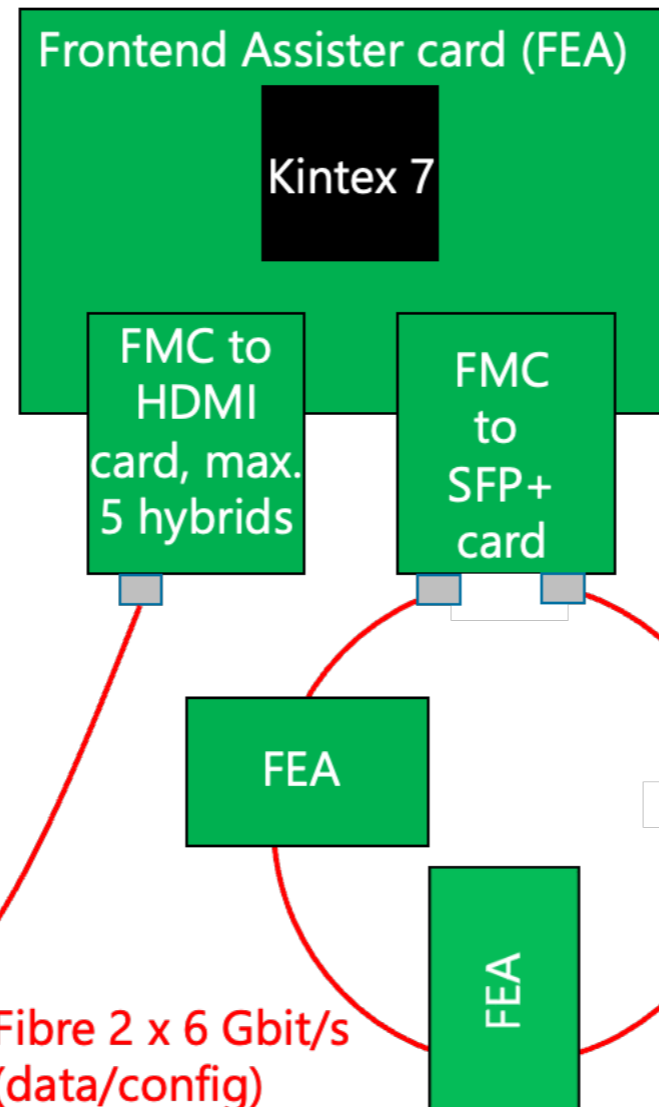
Detector readout architecture

Detector

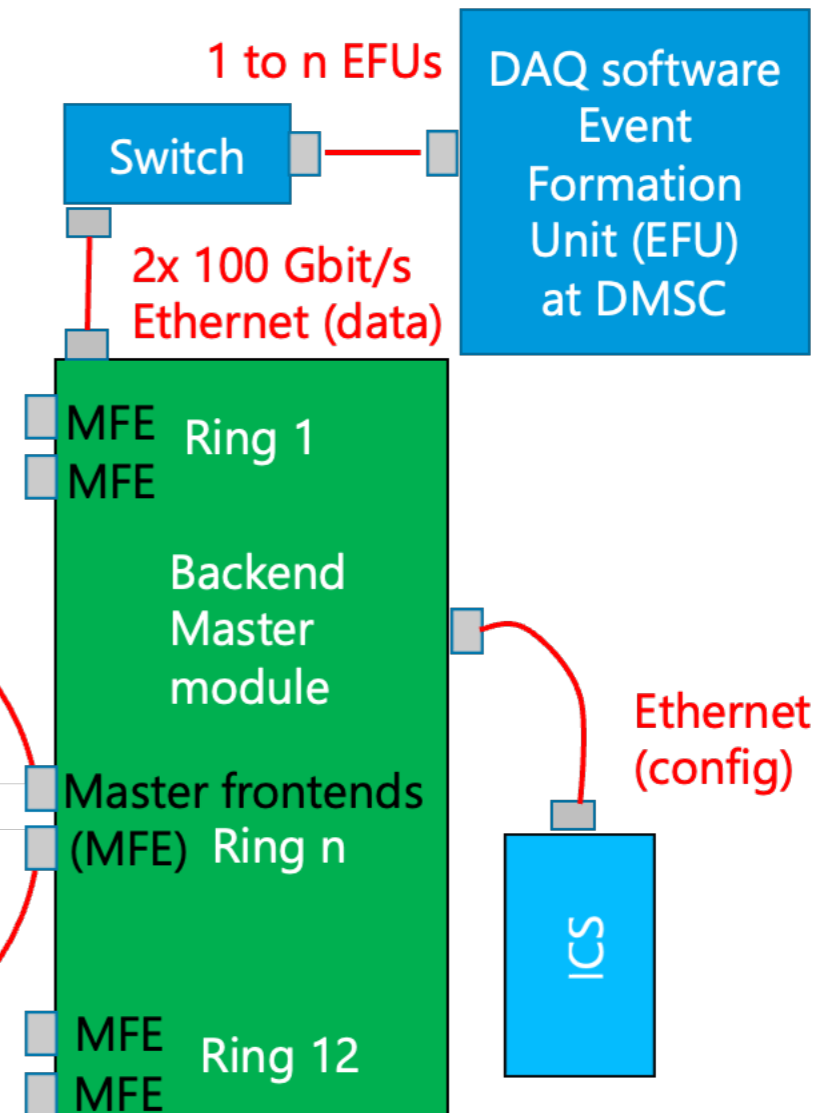


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Rack or separate crate

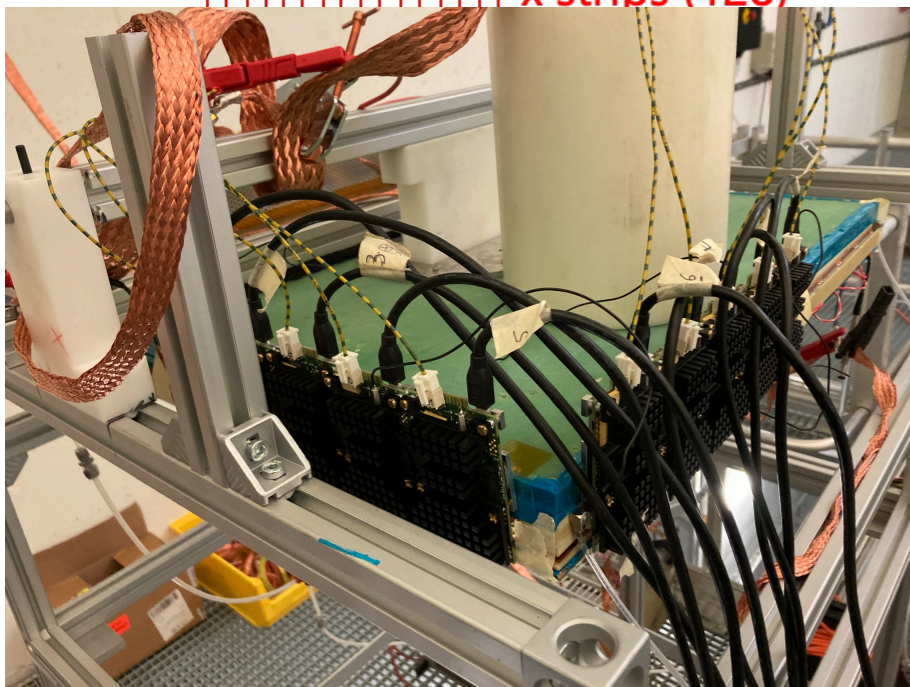
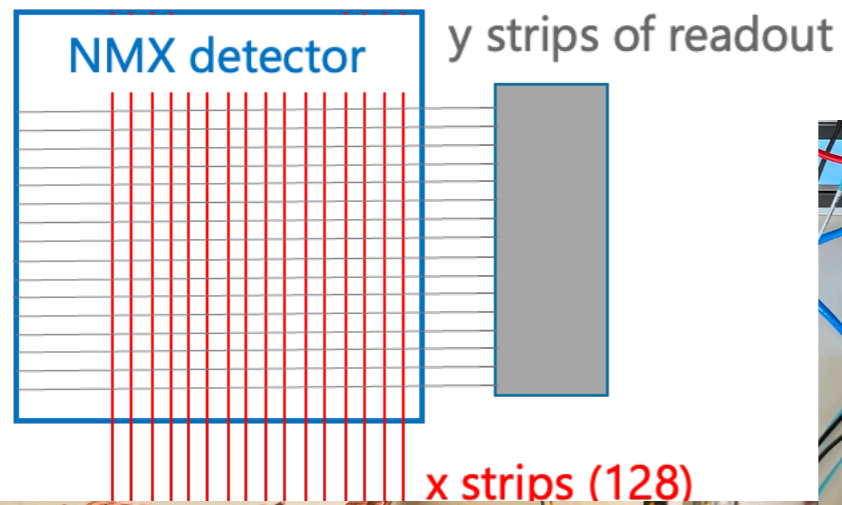


Rack



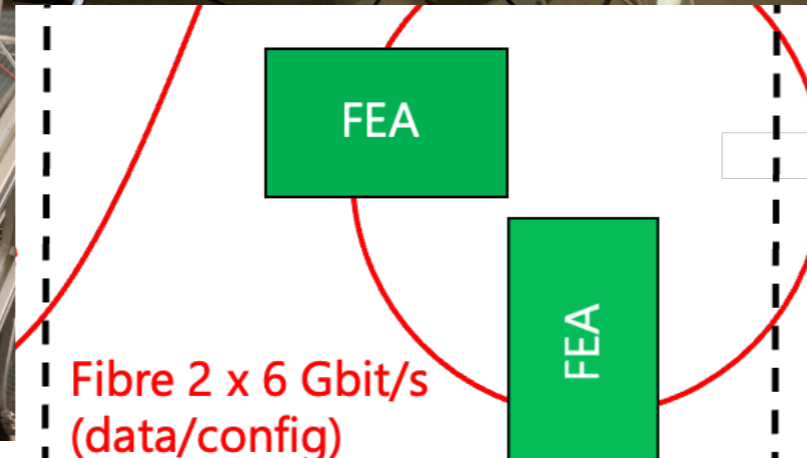
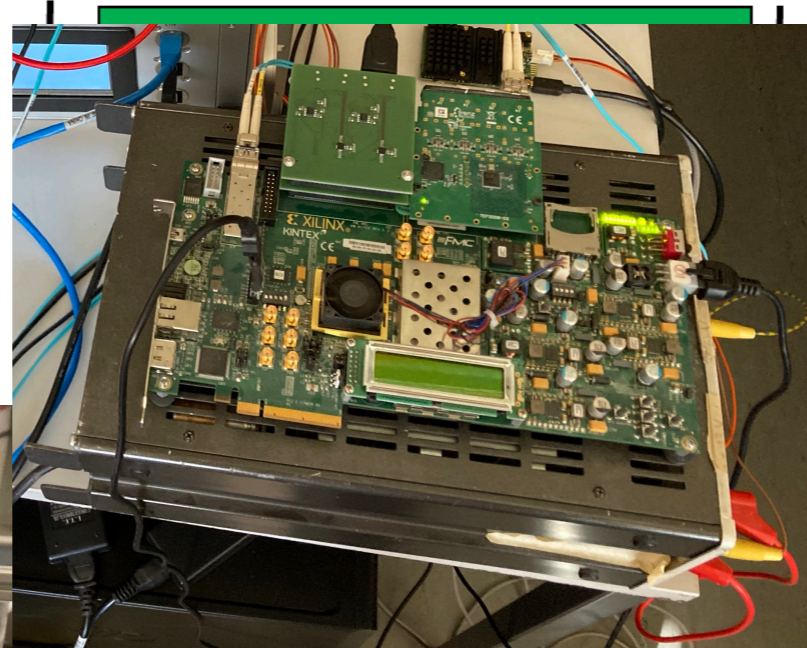
Detector readout architecture

Detector

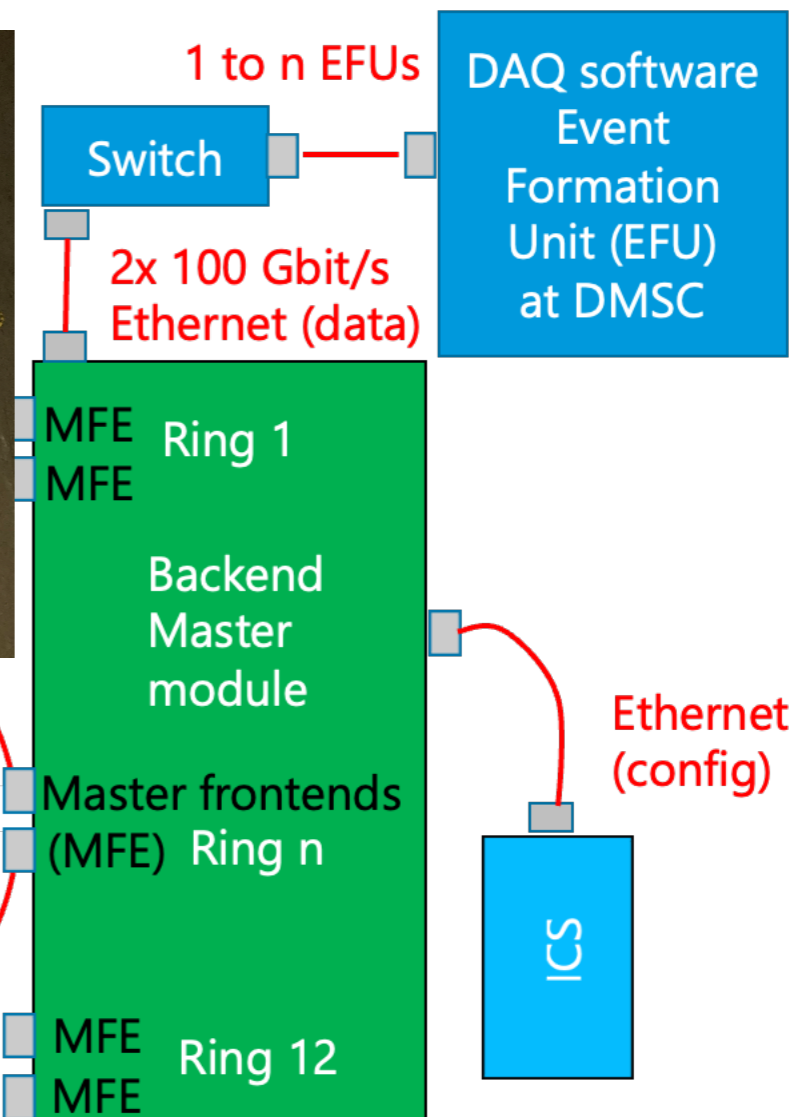


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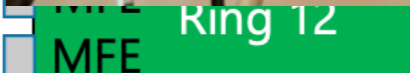
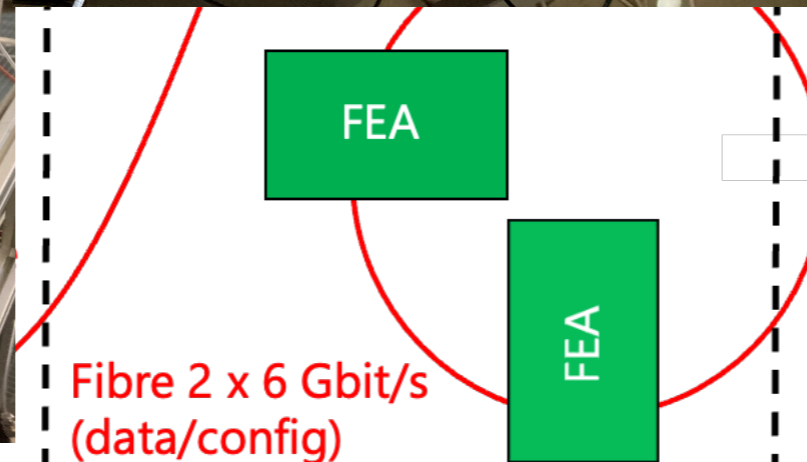
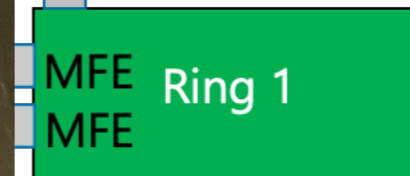
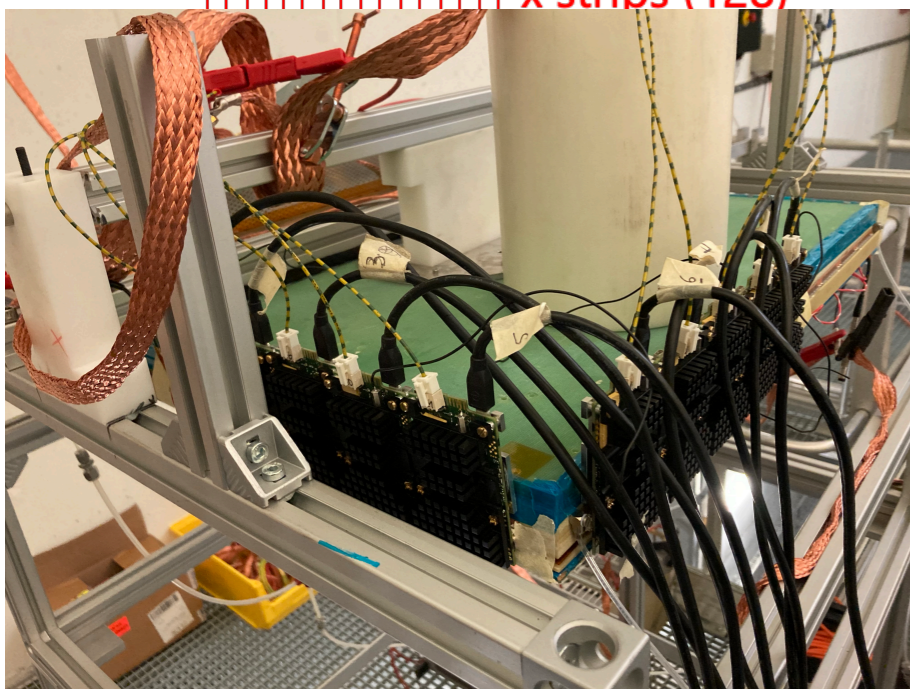
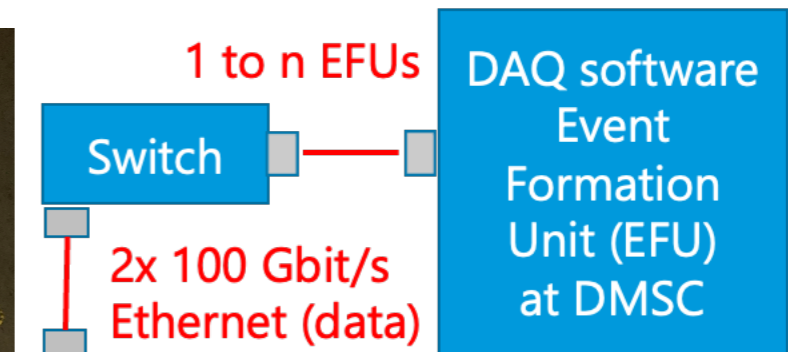
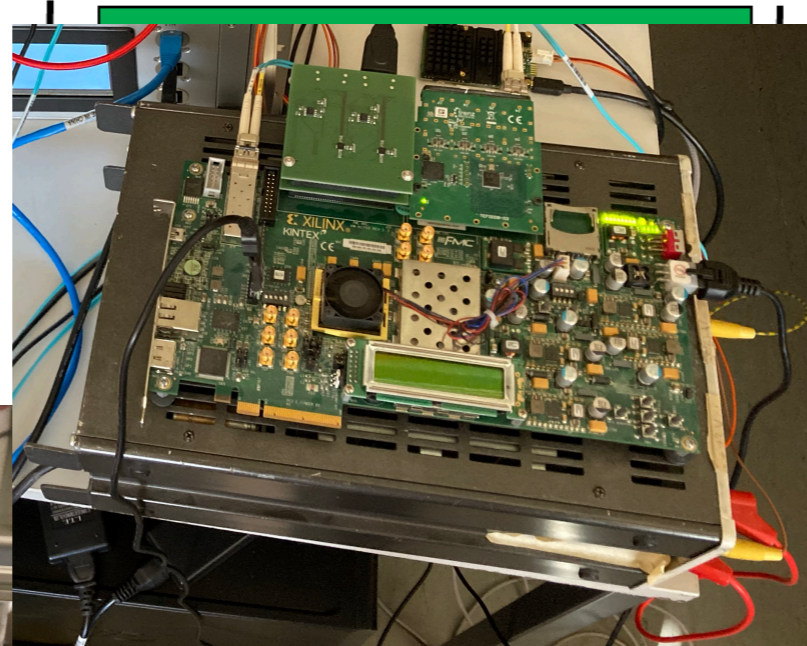
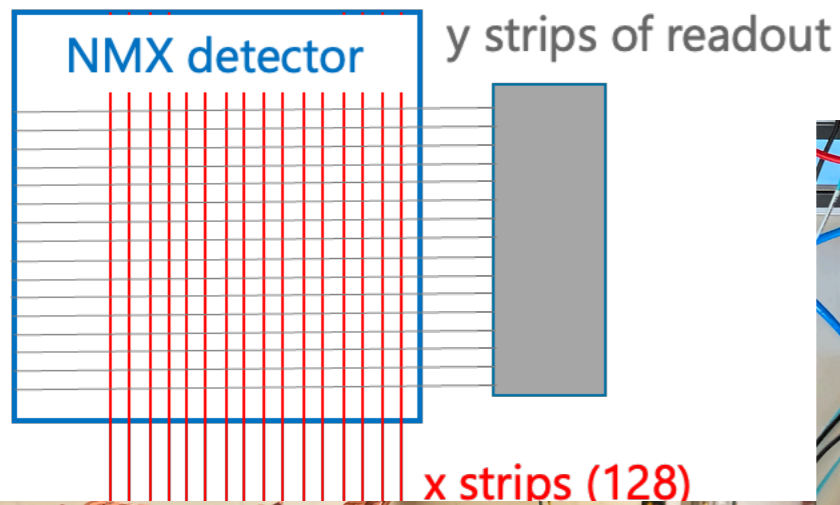


Detector readout architecture

Detector

Rack or separate crate

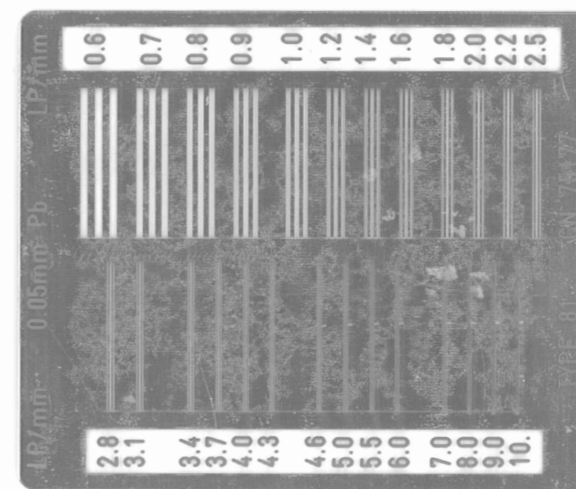
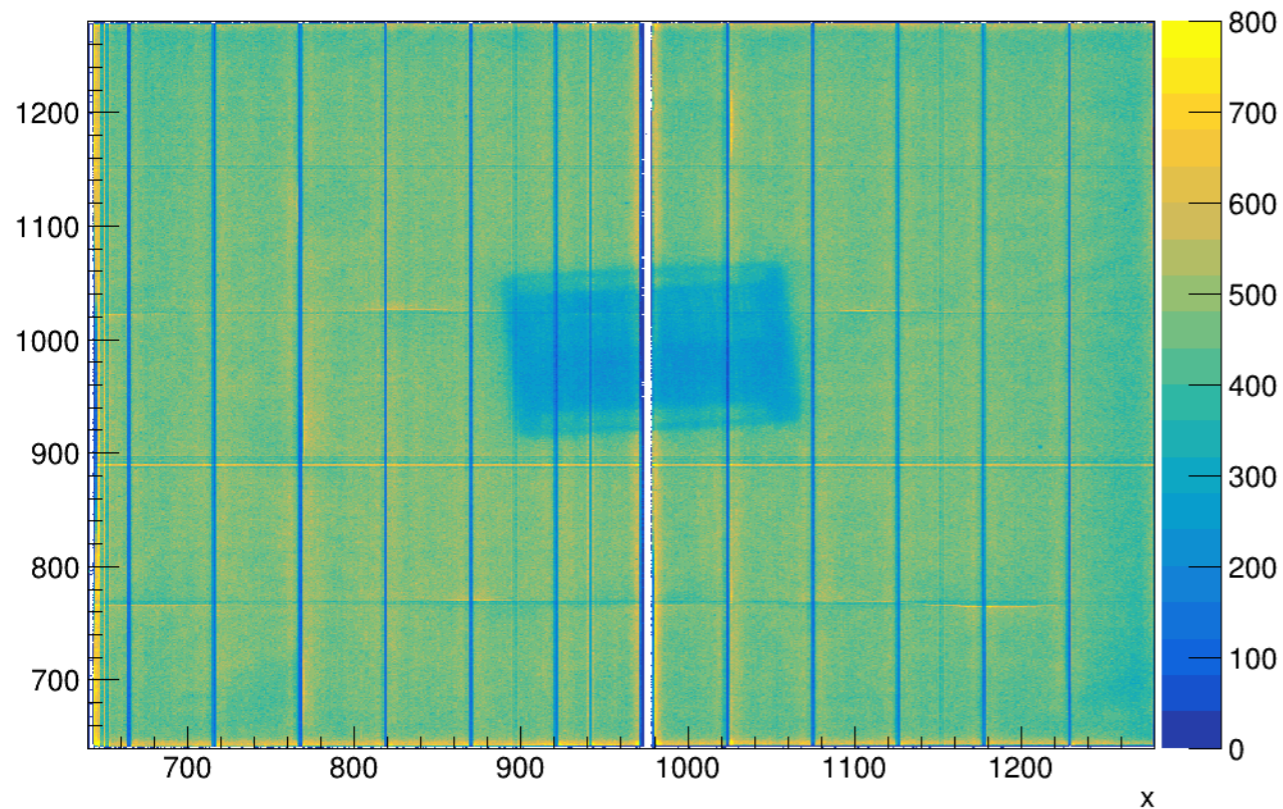
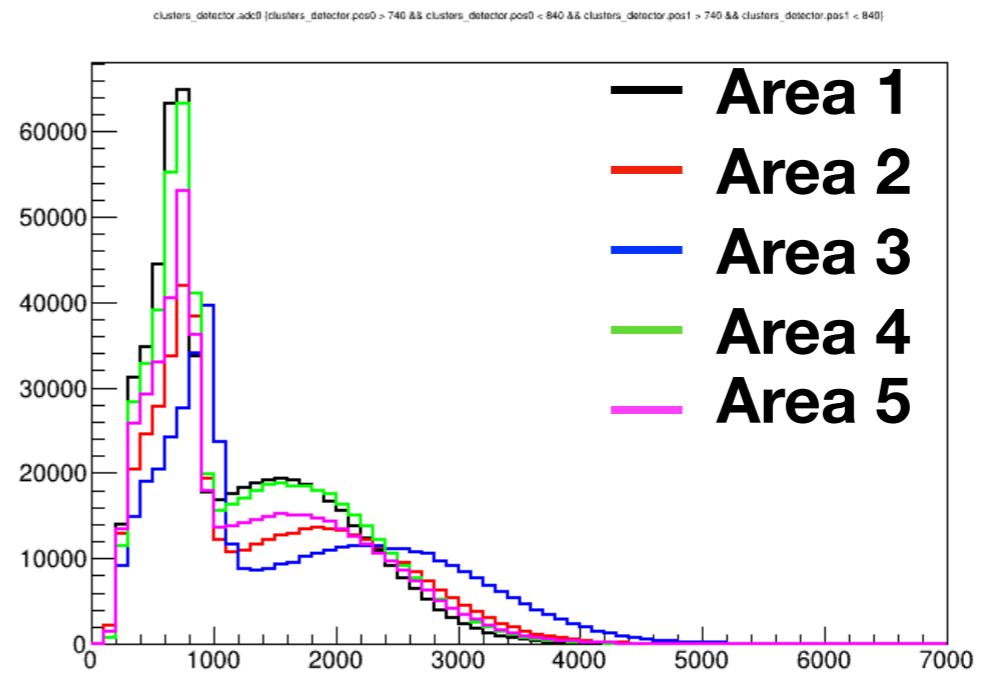
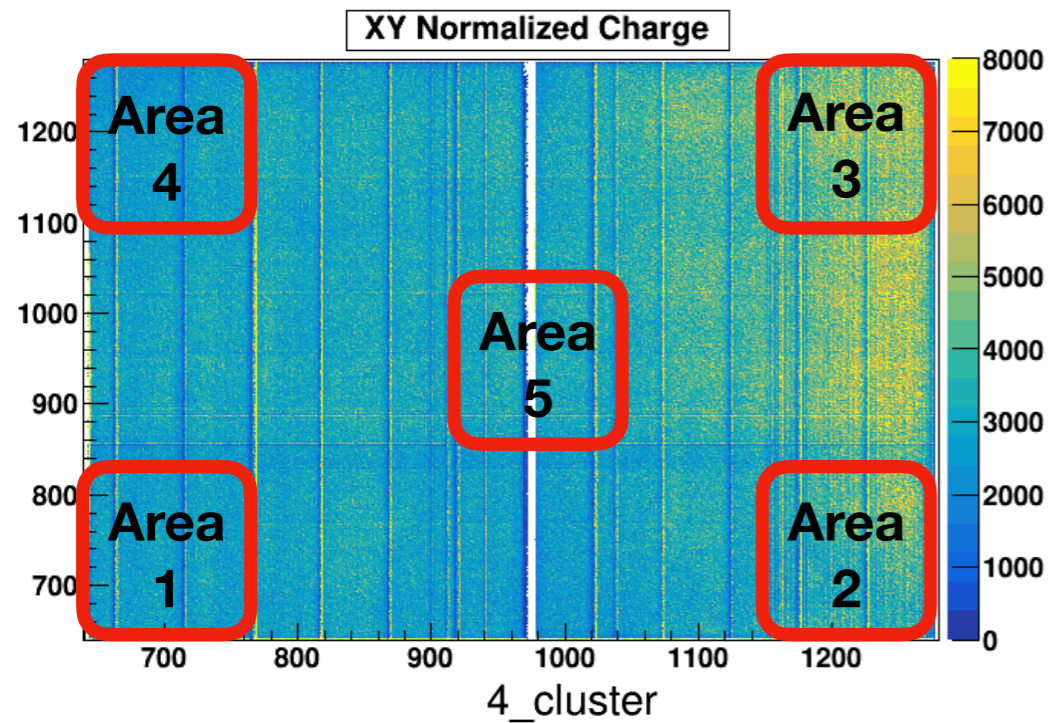
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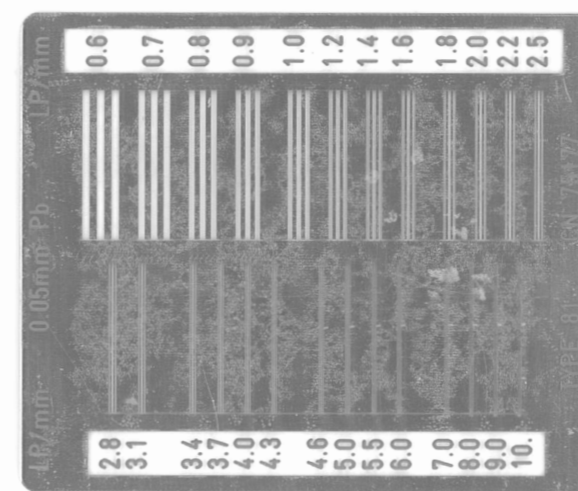
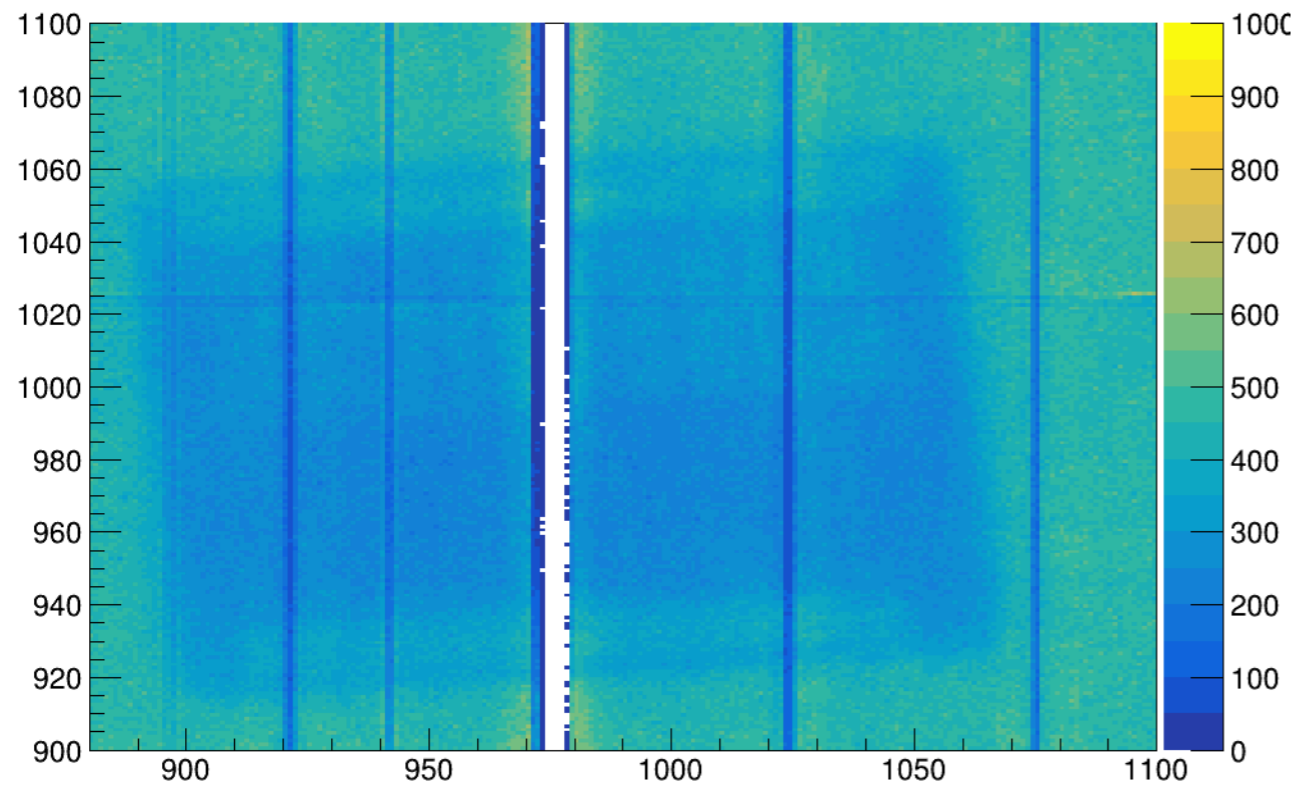
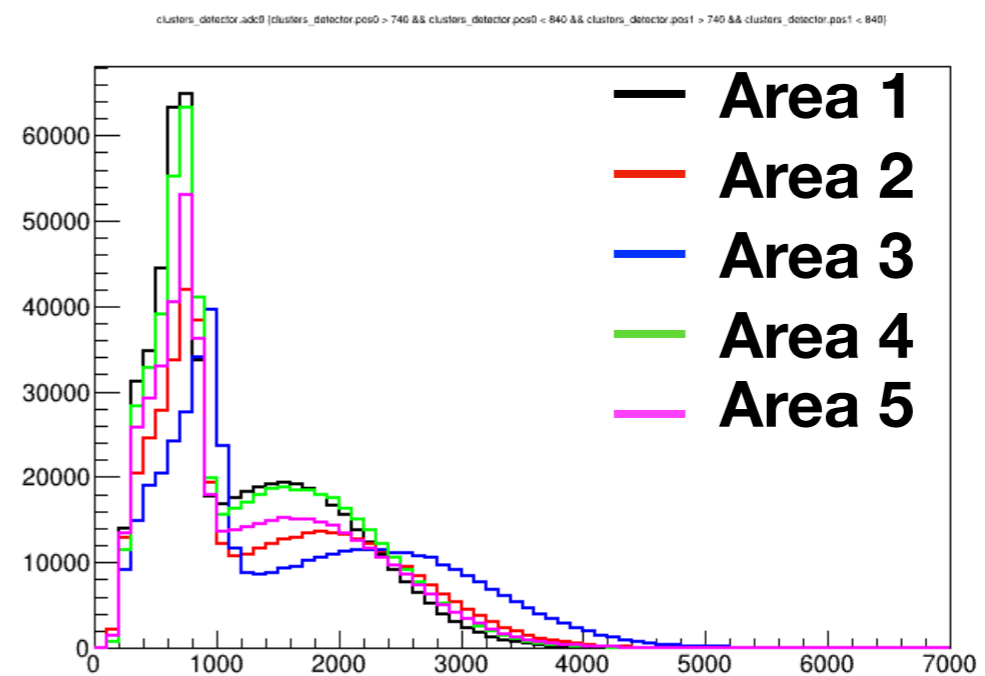
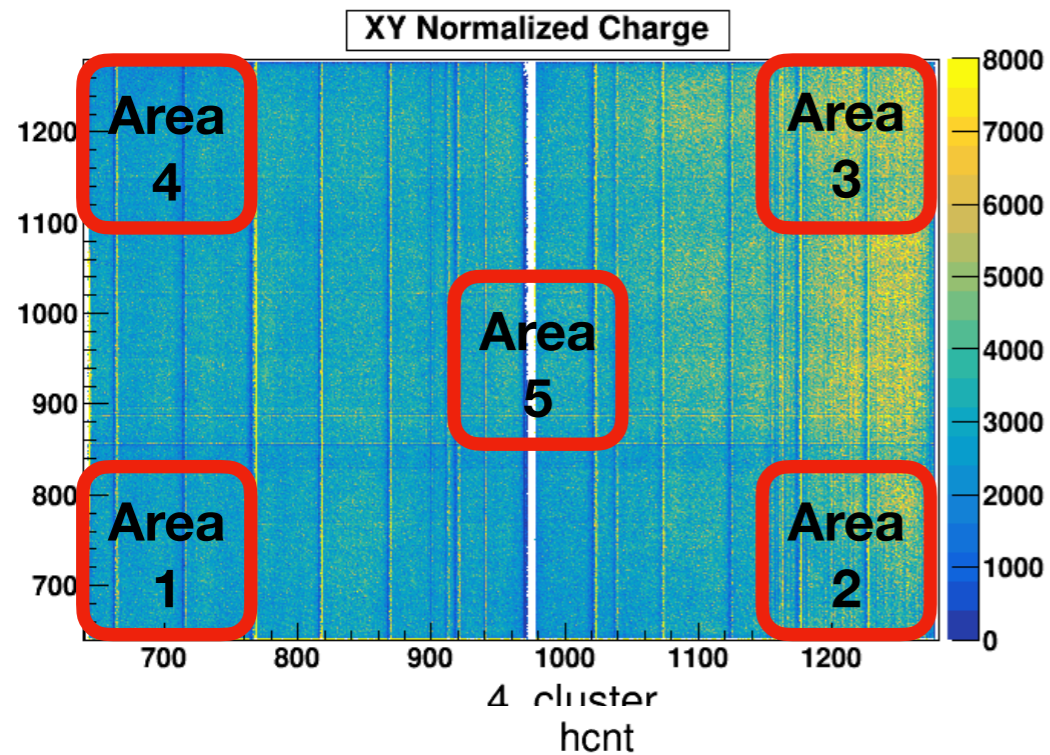
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nfig)

02/06/2022

Detector response uniformity with X-rays



Detector response uniformity with X-rays



Challenges



- **Electrical design & installation**
- Detector electronics & testing
- Motion control resources
- Instrument control software

Questions?

esko.oksanen@ess.eu