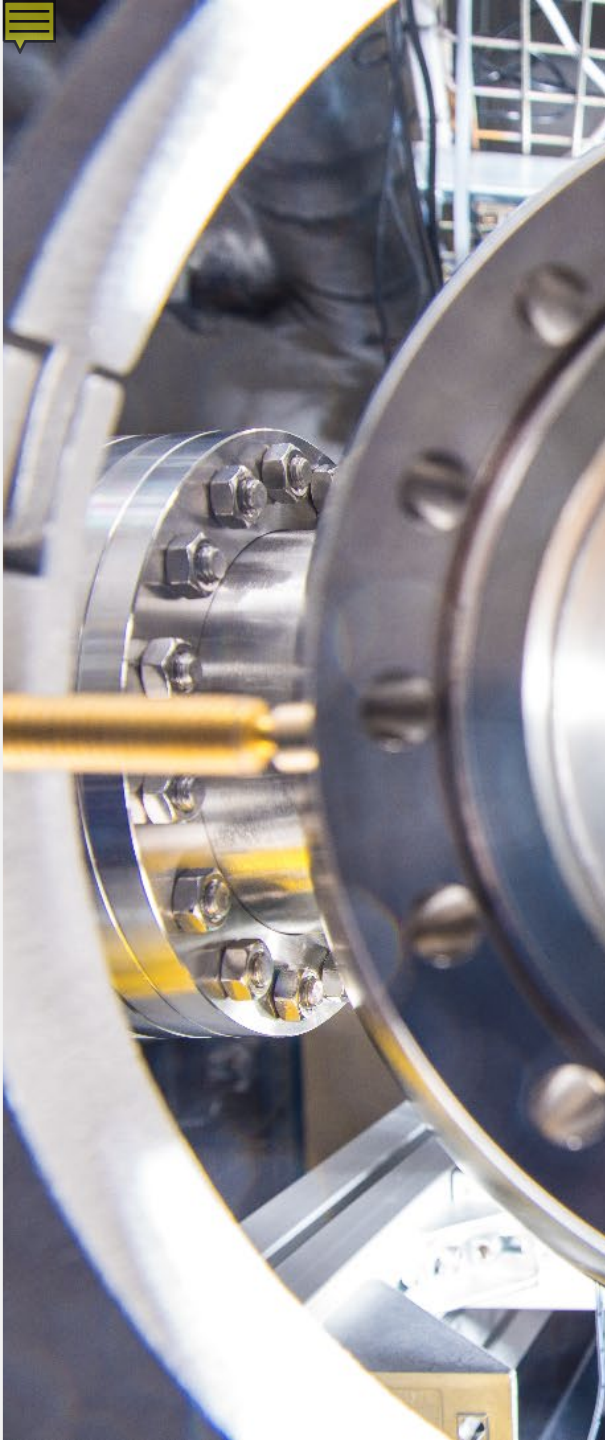

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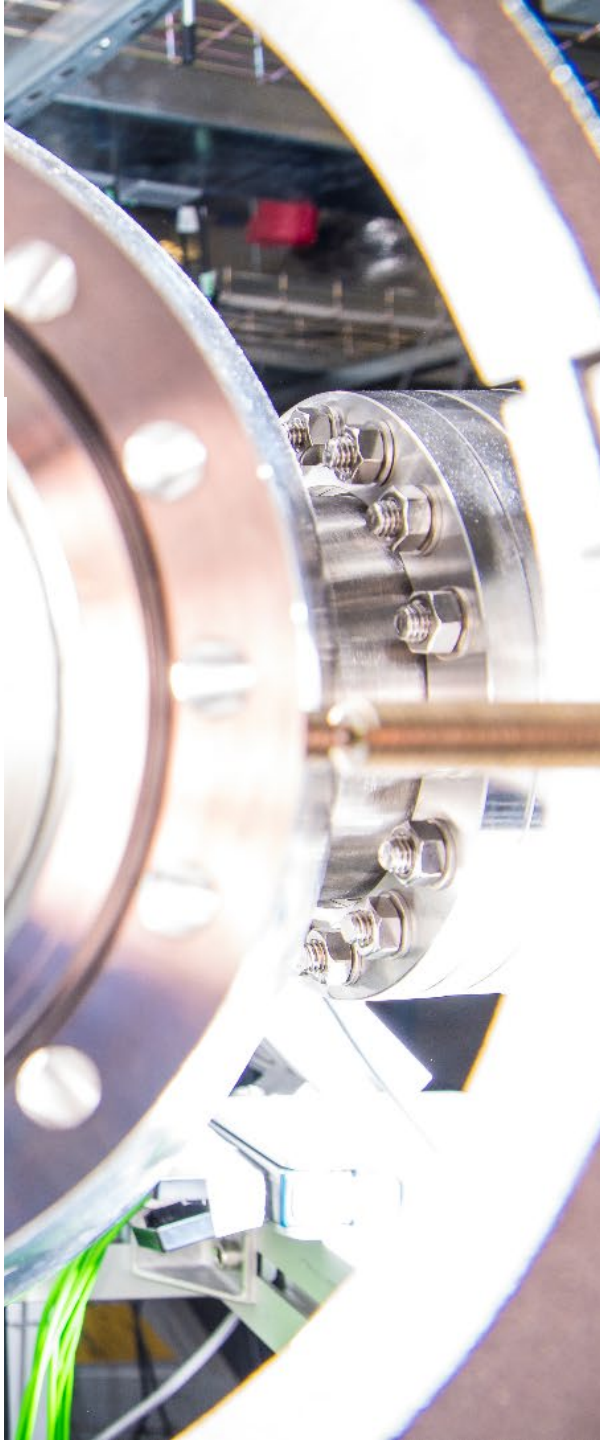
Fred Currell
Director
8 September 2021



WHO WE ARE:

The University of Manchester's Dalton Cumbrian Facility (DCF) is the UK's largest academic research facility dedicated to the area of radiation science.

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"The DCF boasts unique features that are unrivalled in the UK and among the best world-wide."

Nuclear Decommissioning Authority, 2017,
Dalton Cumbrian Facility: celebrating a 10-year journey to success.

The growth of the Dalton Cumbrian Facility

Growth of DCF	2011	2017	2021
Businesses using DCF	0	15	35
Universities using DCF	0	19	35
Associated industrial/academic staff	0	120	200

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OUR LOCATION:

1. Dalton Cumbrian Facility

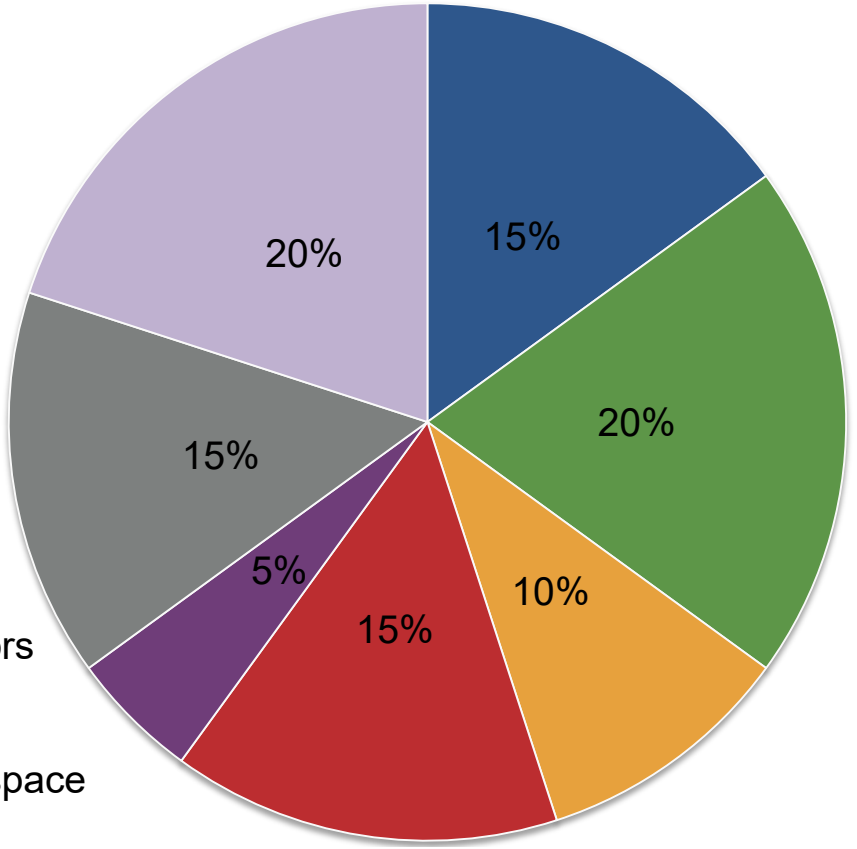
KEY SITES:

2. University of Manchester

The University of Manchester
Dalton Nuclear Institute

Dalton Cumbrian Facility
Centre of Radiation Science Excellence

A diverse and growing research community



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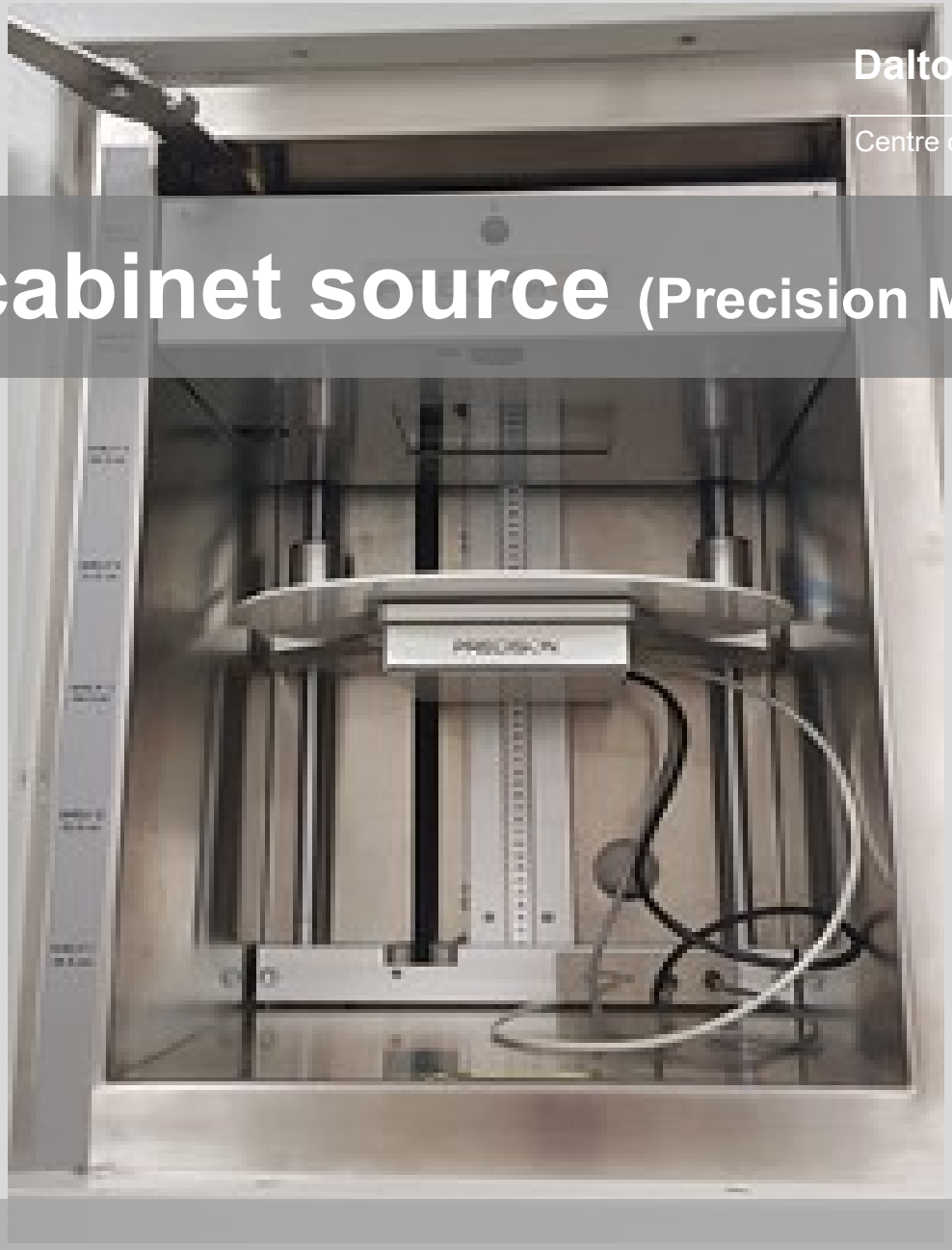
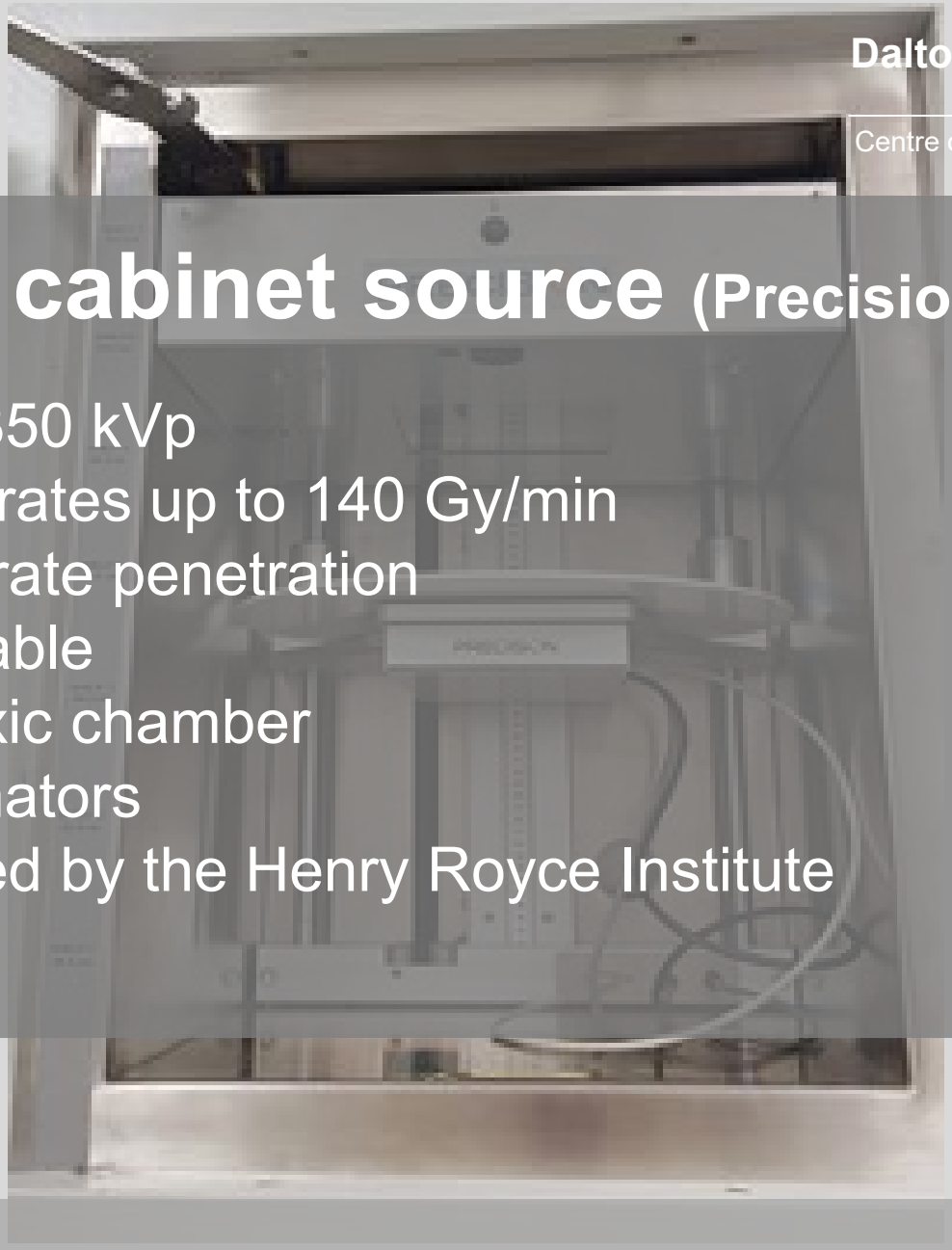
Our facilities

X-ray cabinet source (Precision MultiRad350)



X-ray cabinet source (Precision MultiRad350)



- 30 – 350 kVp
- Dose rates up to 140 Gy/min
- Moderate penetration
- Turntable
- Hypoxic chamber
- Collimators
- Funded by the Henry Royce Institute

FTS Model 812 Gamma Irradiator

FTS Model 812 Gamma Irradiator

- 1MeV
- 330 Gy/min – 30 Gy/hr
- Higher penetration
- 2 access ports (top and side) - allows flowing liquid samples in and out
- Turntables and various sample holders available

Ion Beam Accelerators

Ion Beam Accelerators

5MV tandem ion accelerator:

- 10 MeV $^{1}H^{+}$ up to 100 μA, ~0.5 DPA/day
- 15 MeV $^{4}He^{2+}$ up to 15 μA
- 25 MeV $^{12}C^{4+}$ up to 1 μA
- Heavy ions, e.g. Au^{2-4+} 10s MeV ~5 DPA/hour

[Highly sample dependent - please ask]

2.5MV single ended ion accelerator:

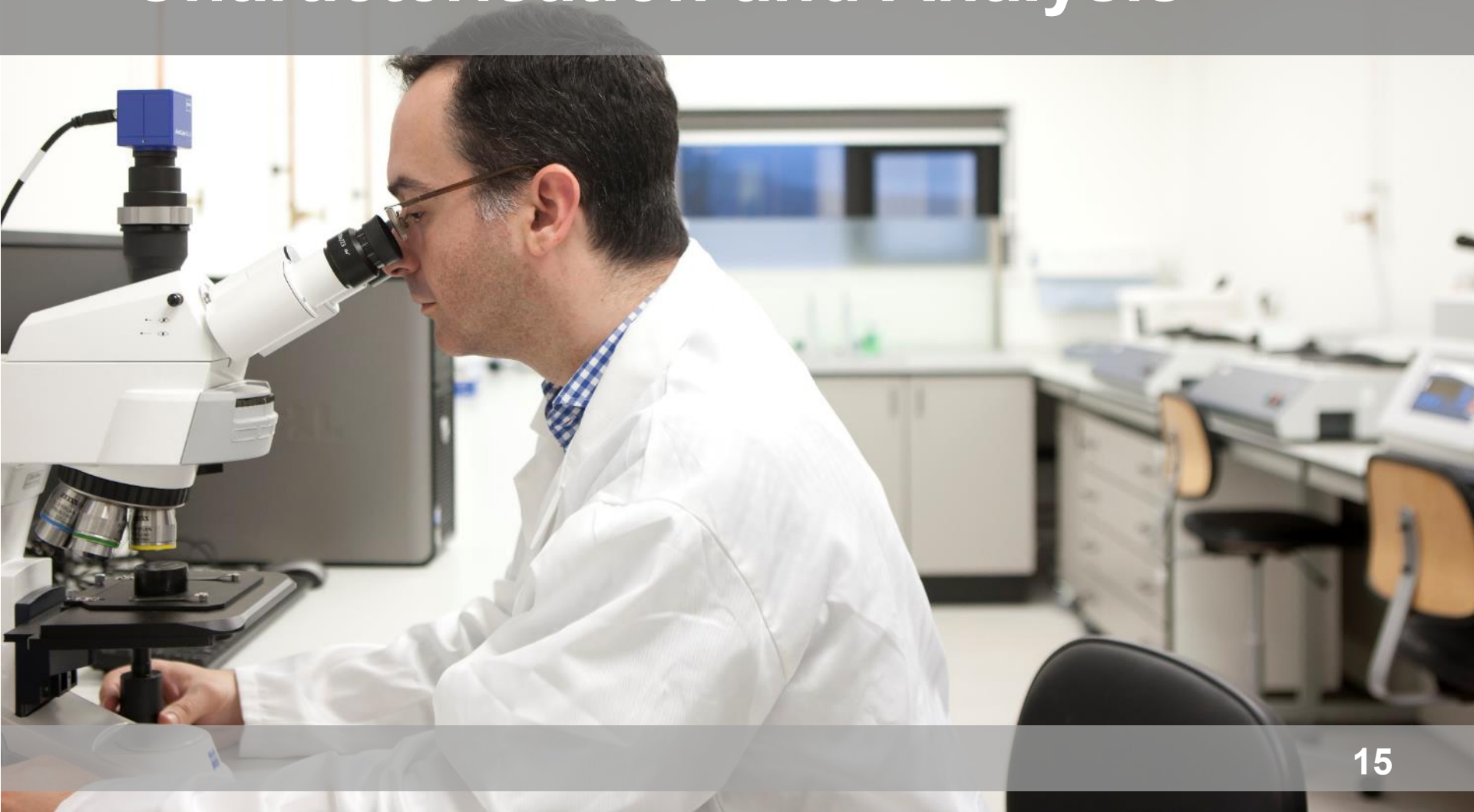
- Light ion accelerator (e.g. $^{1}H^{+}$ and $^{4}He^{2+}$)

Beam lines

Beam lines

- High beam energy/high beam current experiments
- Beam line “hot cell” to allow higher penetration & higher damage rate studies
- Equipment for the handling, storage & onward transport to CCFE & NNL CL of activated samples
- In-situ experimental equipment: Ion beam analysis (PIXE, RBS, NRA & ERDA), high temperature/high pressure autoclave and loop

Characterisation and Analysis



Characterisation and Analysis

Scanning Electron Microscope
Electron Backscatter Diffraction,
Wavelength Dispersive Spectroscopy
Energy Dispersive Spectroscopy,
Heating/cooling & tensile stage.
2D-XRD.

Time-domain thermoreflectance;
Optical microscopes;
Micro hardness testing,
FT-IR Spectrometer/FT-Raman Spectrometer/Raman Microscopy,
3D printing (plastics and stainless steel)

Differential Centrifuge (nanosizing)
HPLC,
Ion Chromatography;
Gas Chromatography;
Surface Area & Porosity Analyser;
Fluorescence Spectrophotometer;
UV-Vis Spectrometer;
Total Organic Carbon & Nitrogen Analyser,
EPR, etc…

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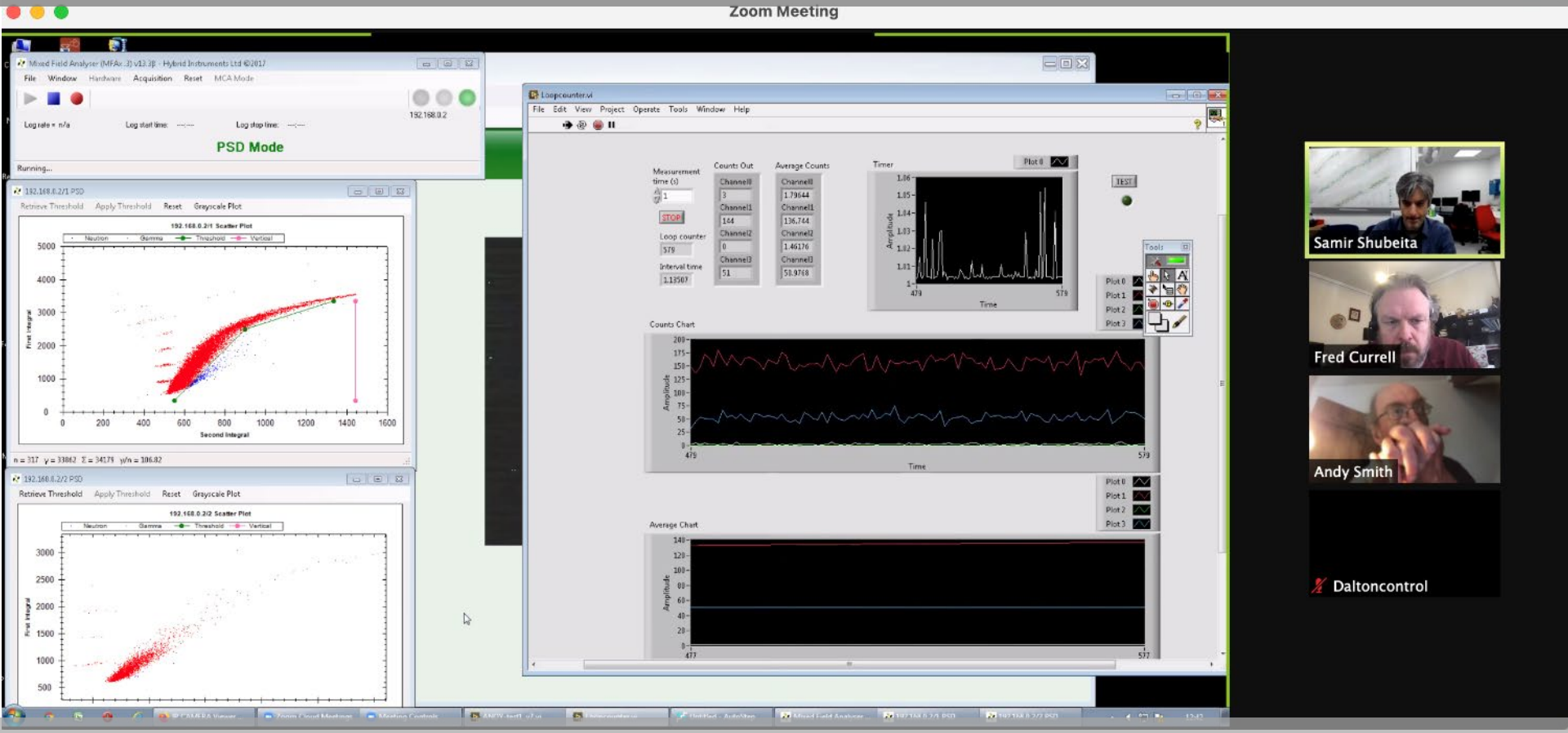
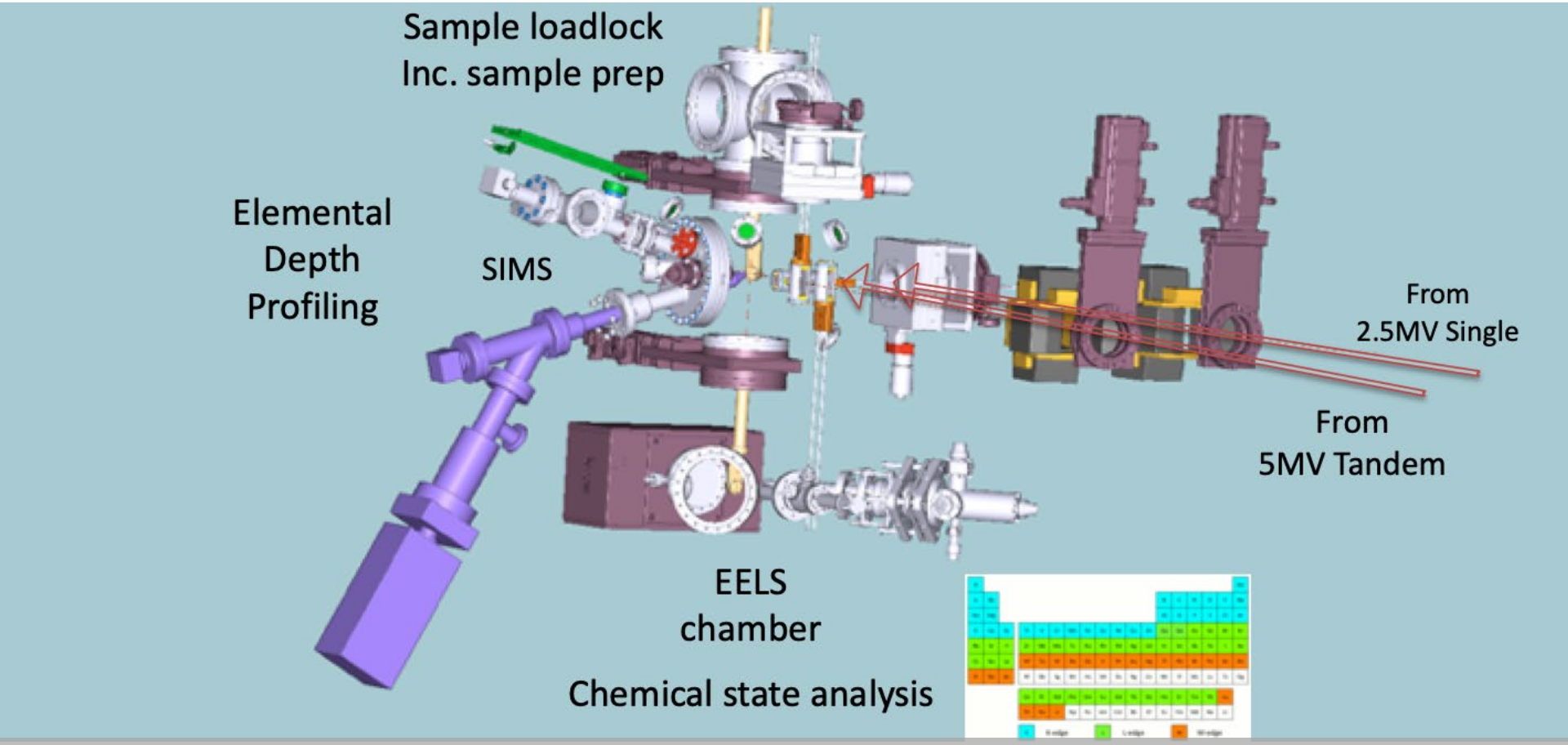
Remote access available



Projects under development

New end station. Secondary Ion Mass Spec (SIMS) + Electron Energy Loss Spectroscopy (EELS)



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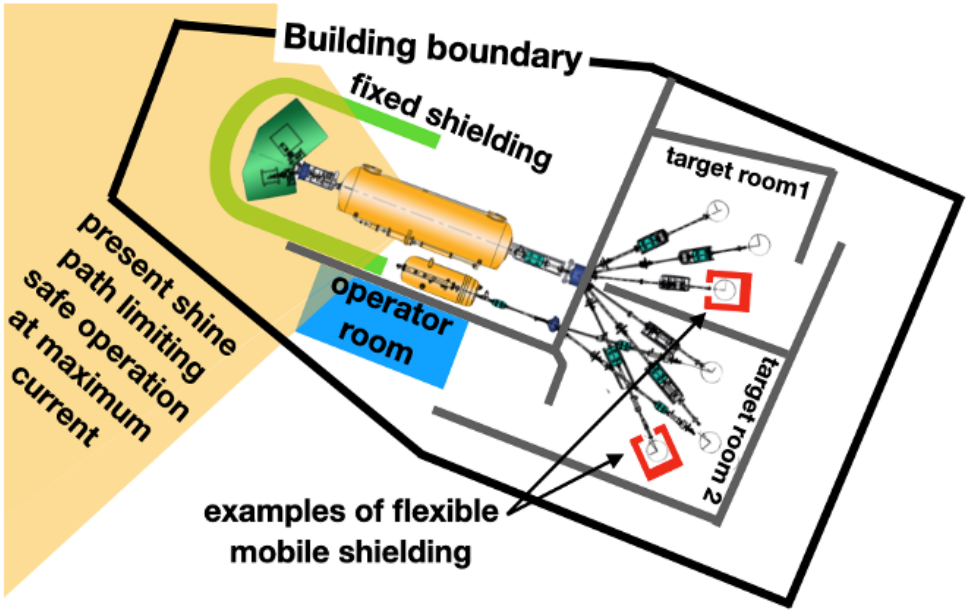
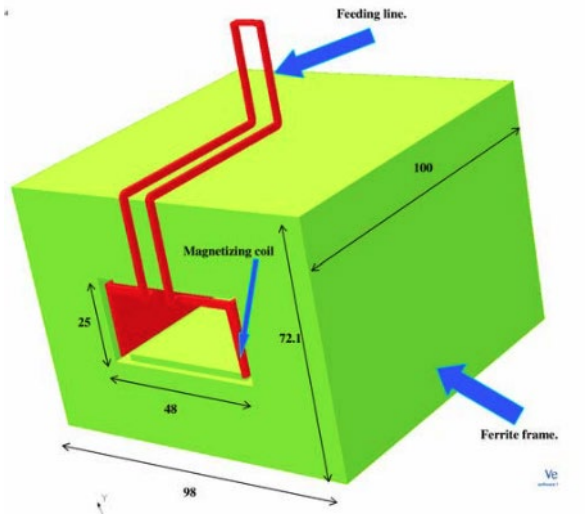
Beamline upgrades (planned for next summer)





EPSRC NUUF funded:
Highest proton currents at our
Maximum energy

Daresbury Labs STFC donation:
70 ns pulses of light ions

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THE TEAM:

Ion beam team:
- Andy Smith
- Samir de Moraes Shubeita
- Nick Mason
- Carl Andrews

Gamma team:
- Ruth Edge
- Kevin Warren

Analytical team:
- Gyorgyi Glodan
- Chetna Tyagi
- Claire Trevaskis
- Sally Wilson

Administrative team:
- Rebecca Shepherd
- Lian Murdoch
- Morven Wilson
- Amy Johnson

COVID-19 RESTRICTIONS

TARGET MET:
150 days of ion beam usage over the past 12 months

SAFE WORKING ENVIRONMENT:

- Rigorous cleaning schedule
- Clearly defined room capacity and scheduled visits
- Remote access available
- Flexible response to changing restrictions

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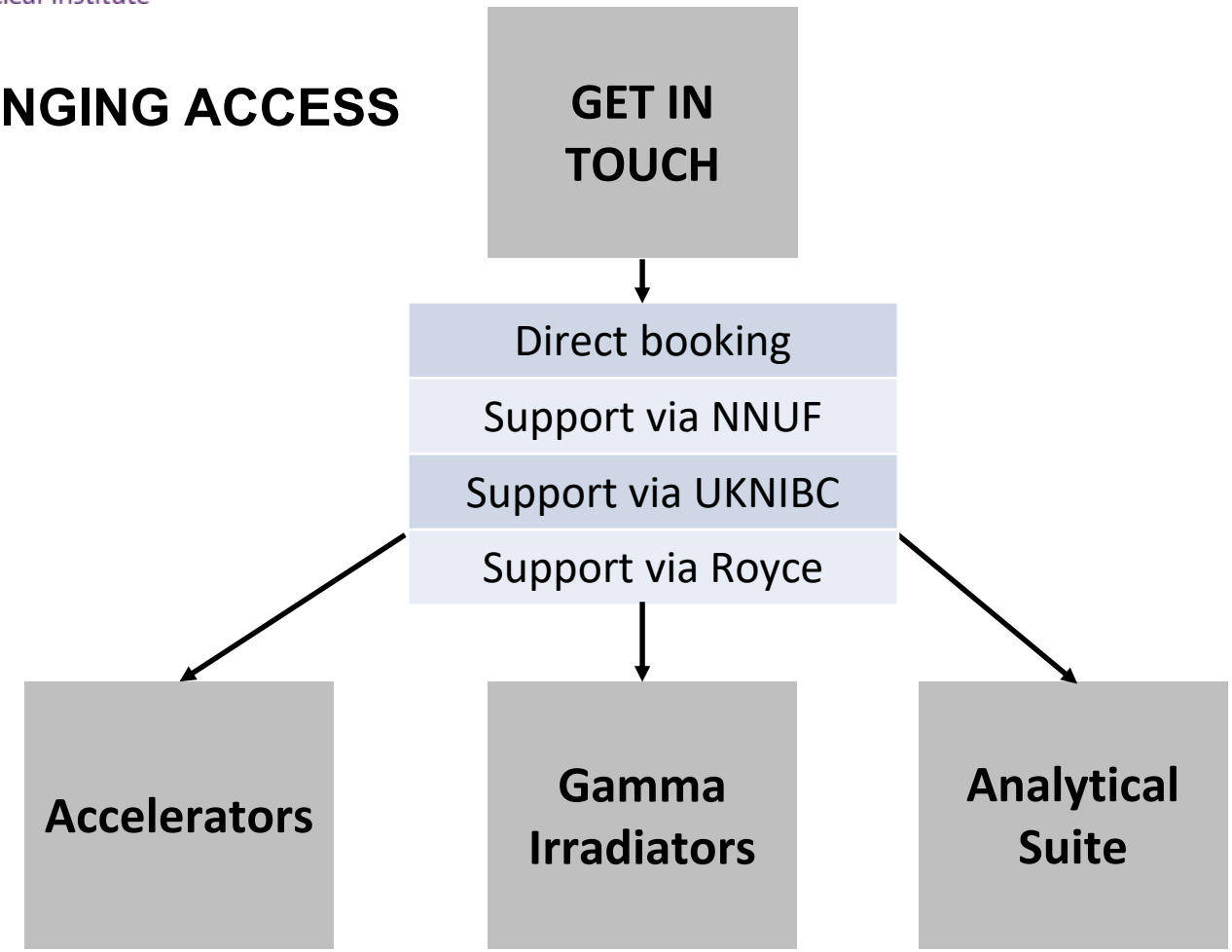
ARRANGING ACCESS



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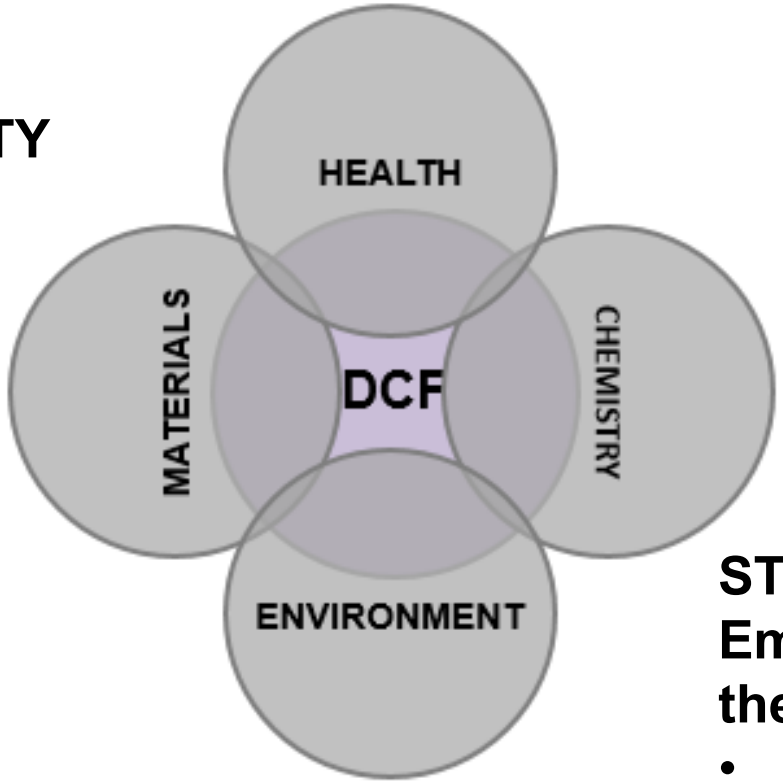
OUR COMMUNITY



STAY IN TOUCH
Email us to subscribe to the following lists:

- Health
- Materials
- Chemistry
- Environment

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Get in touch

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Research Programmes Administrator

dcf.experiments@manchester.ac.uk