EUROfusion Work Package **PWIE**

Subproject E: PWI with Be, T and neutrons focus on JET post-mortem analysis and its interpretation

Kickoff Meeting : IST activities for 2022

Norberto Catarino
Rui Silva
Eduardo Alves

ipfn
INSTITUTO DE PLASMAS
E FUSÃO NUCLEAR

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The views and opinions expressed herein do not necessarily reflect those of the European Commission.

PWIE; SP E: IST Deliverables

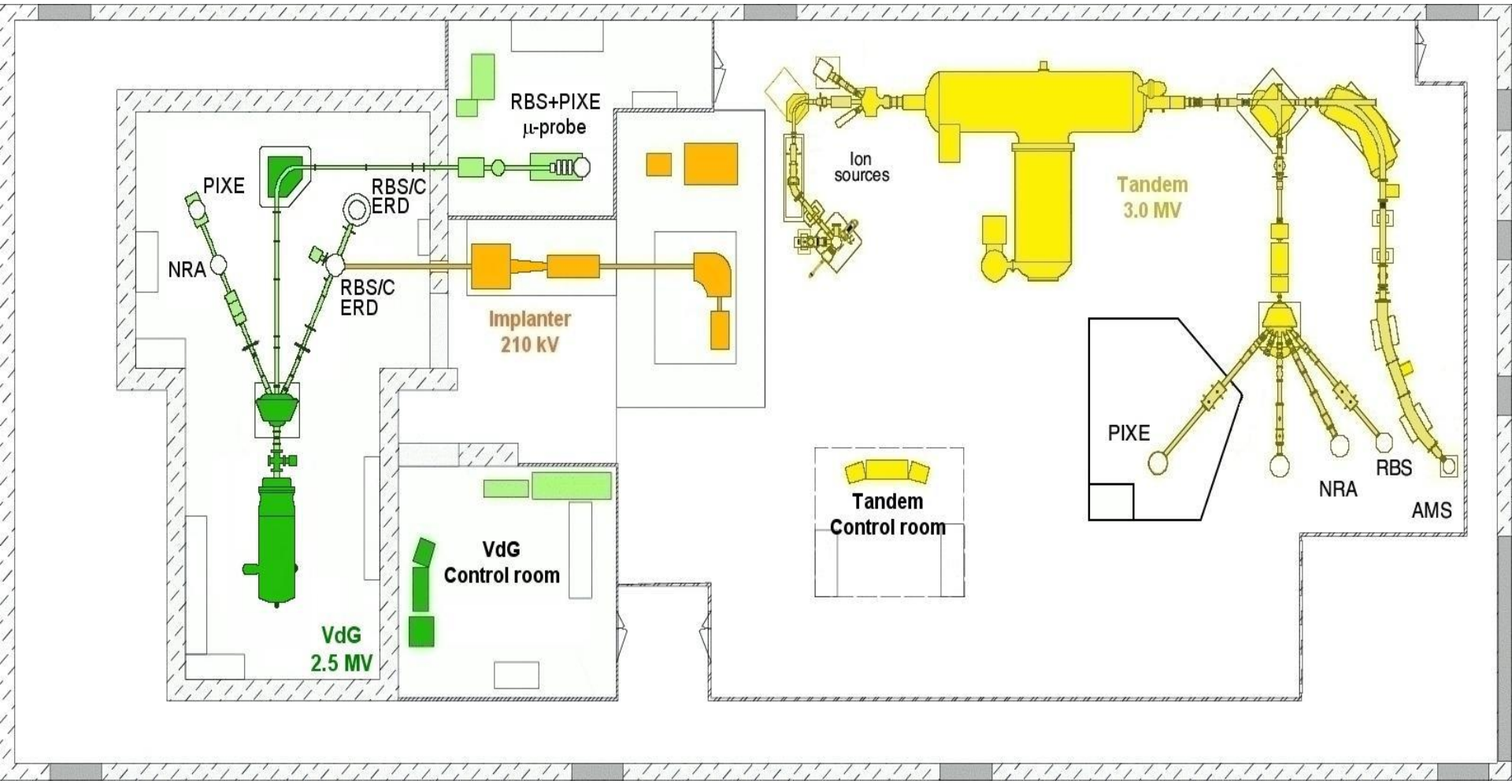
SP E.2 Comparison of hydrogenic retention quantification by diferent techniques and fuel removal assessment

Del 5: Characterization of JET divertor tiles 0 and 1 using ion beam analysis (RBS, NRA).

SP E.3 Post-mortem analysis of PFC and other objects in JET

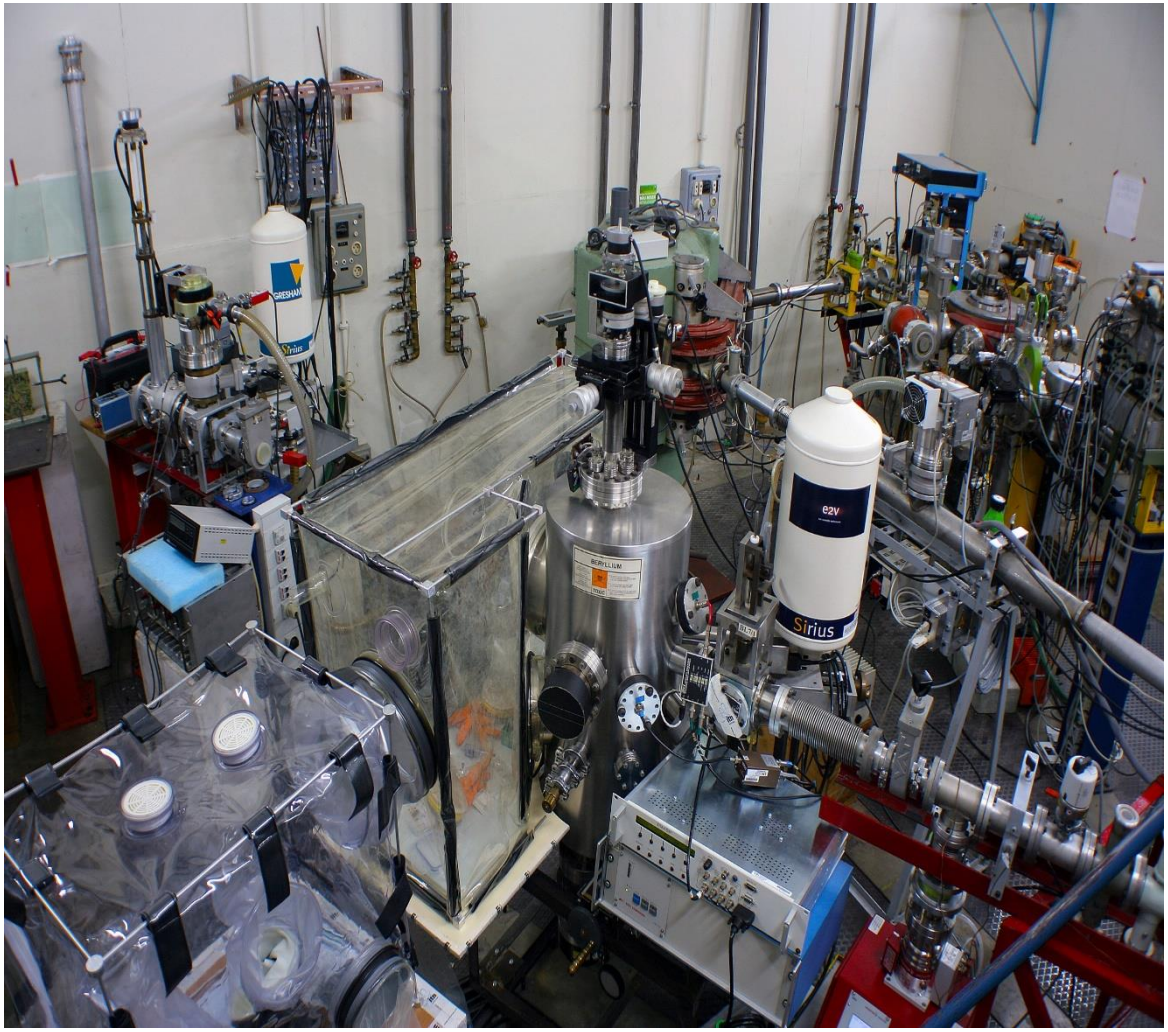
Del 6: Characterization of JET plasma facing and diagnostics components **using ion beam analysis** (RBS, NRA)

1. Laboratory Layout

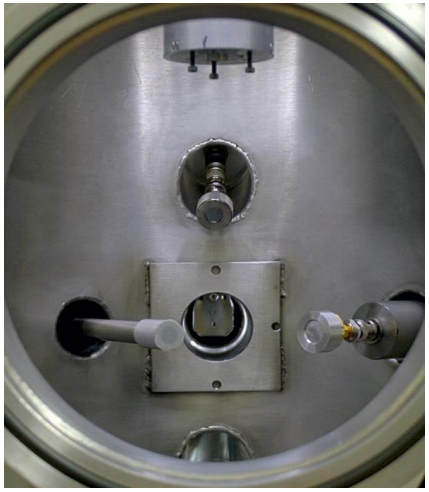


Experimental Setup

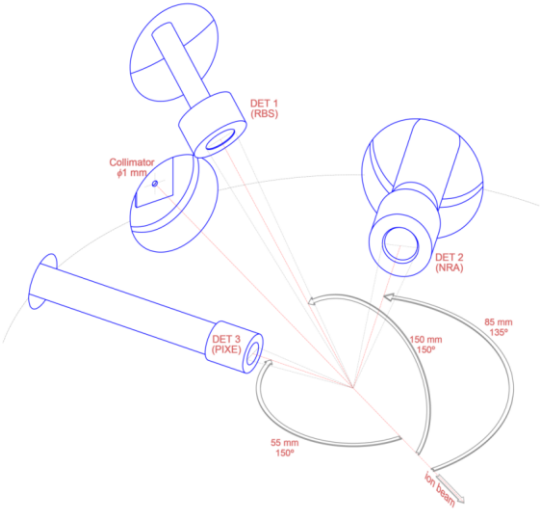
JET line



Experimental chamber



Detector geometry



Ion Beam Analysis (IBA)

- **D profiling NRA**

Nuclear Reaction Analysis - **D**(^{3}He,p)^{4}He

- **Be and C Profiling**

Nuclear Reaction Analysis - **^{9}Be**(^{3}He,p)^{11}B **^{12}C**(^{3}He,p)^{14}N

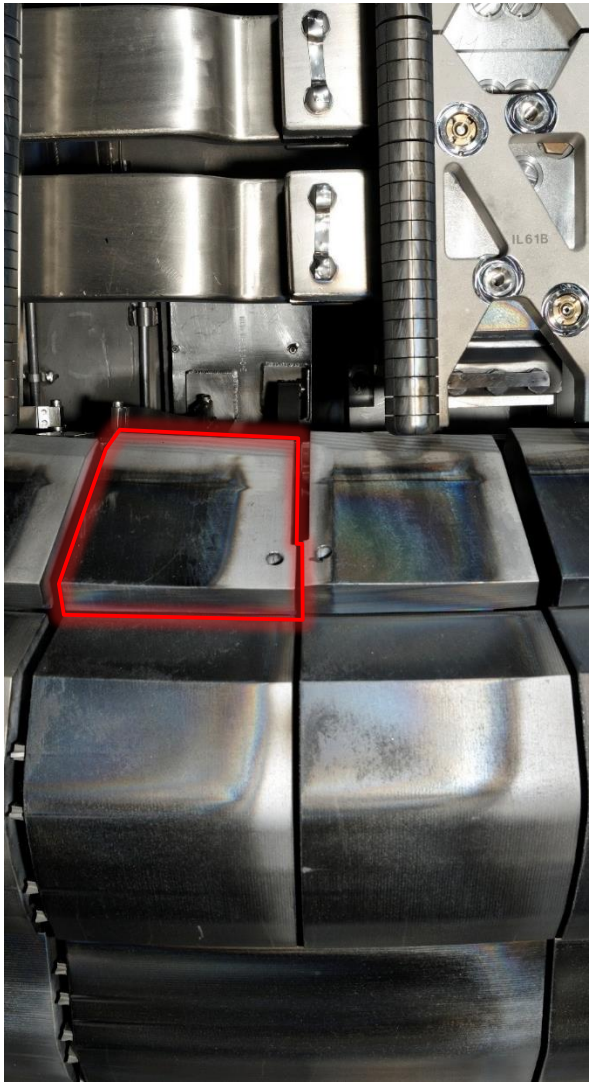
Elemental Profiling: Rutherford Backscattering Spectrometry (RBS) and Elastic Backscattering Spectrometry (EBS)

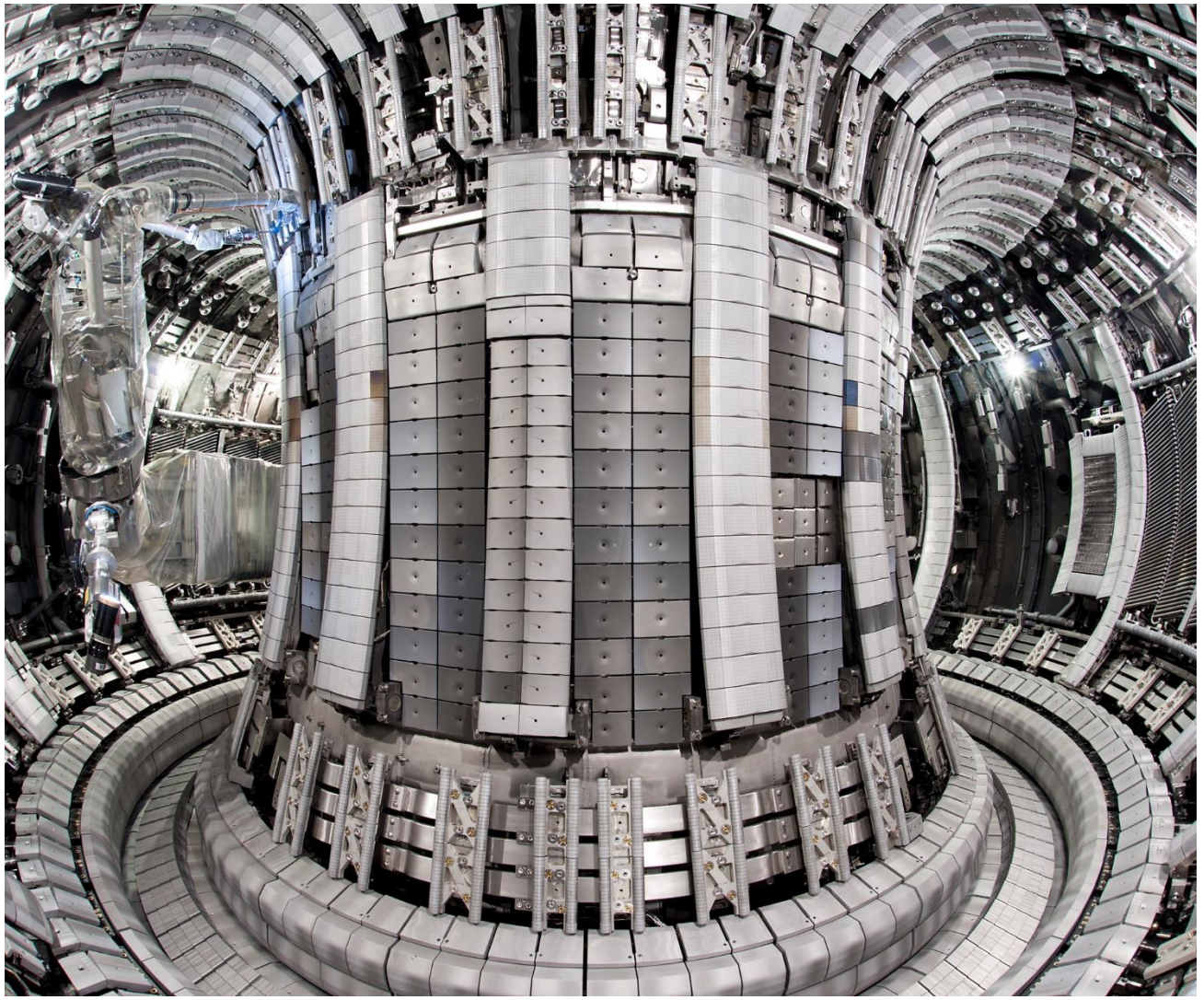
- **Trace impurities (metals)**

PIXE (X-ray emission)

- Computational analysis: **WiNDF**

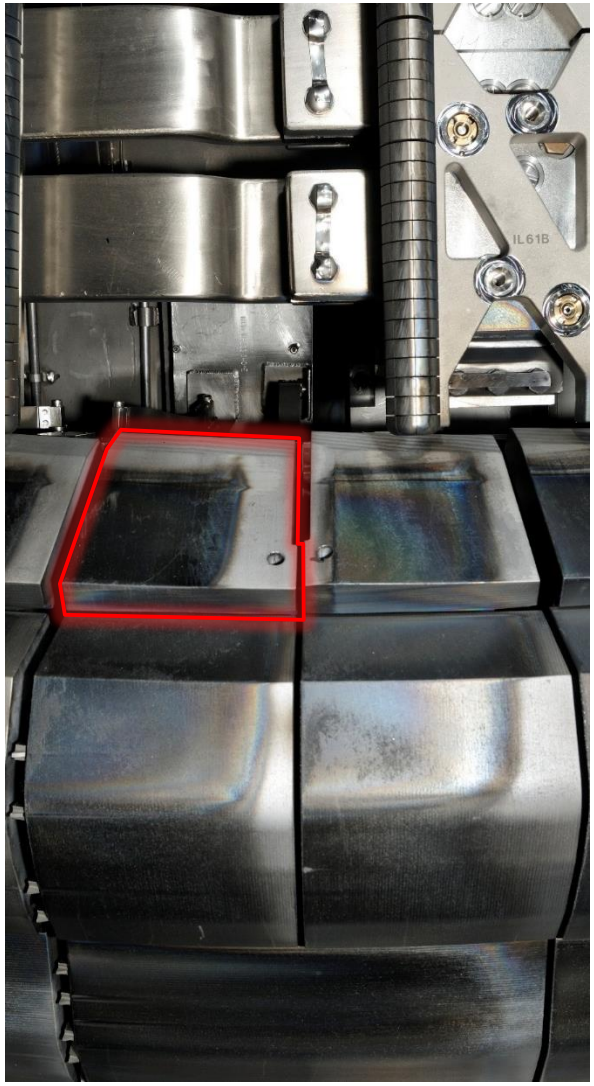
Case studies: JET results



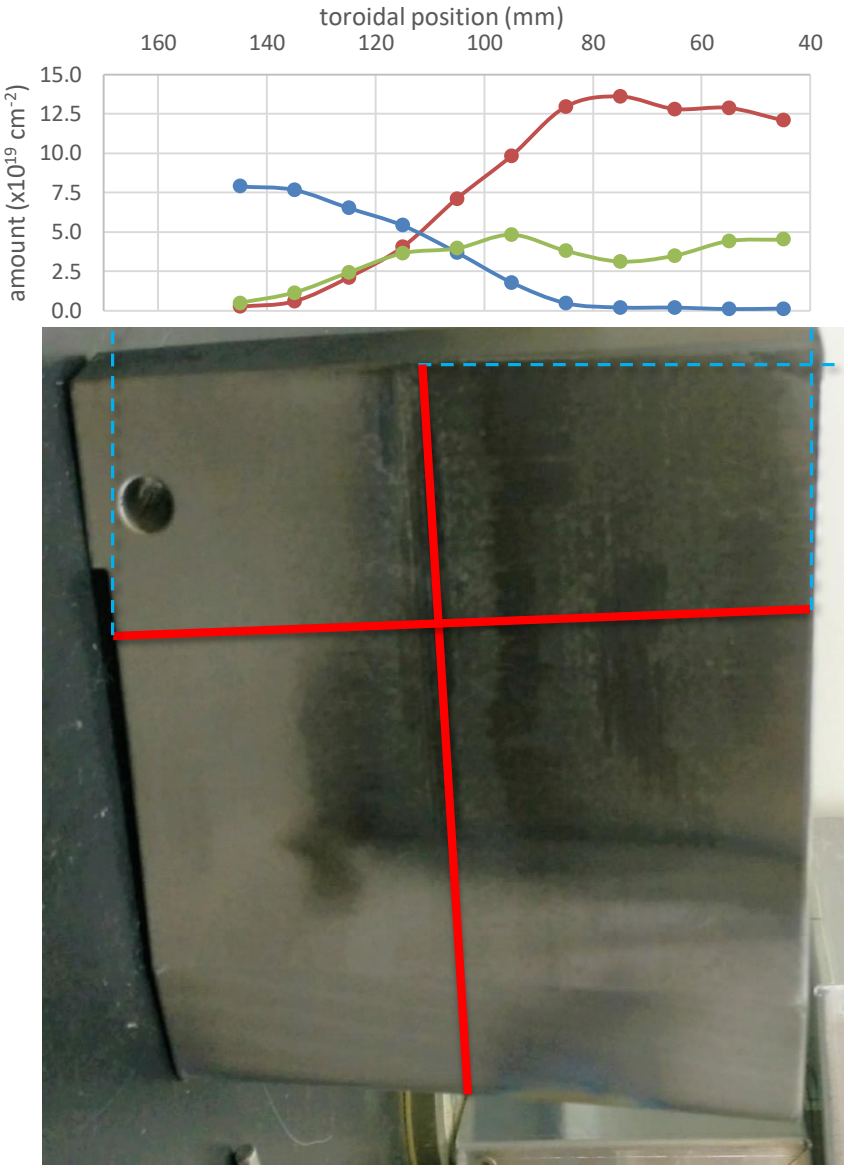


(foto during 2014 shutdown)

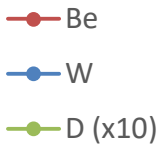
Case studies: JET results (Tile 0)



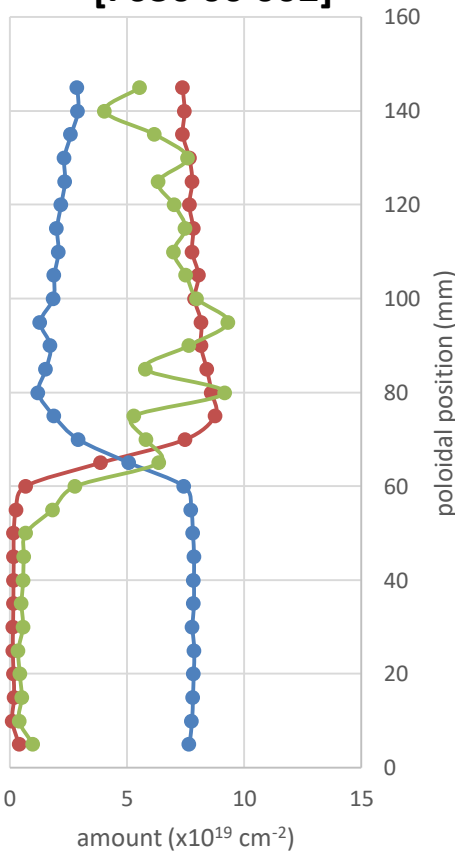
(foto during 2014 shutdown)



14N HFGC LH
ILW-3



14N HFGC LH
[F630 00 002]

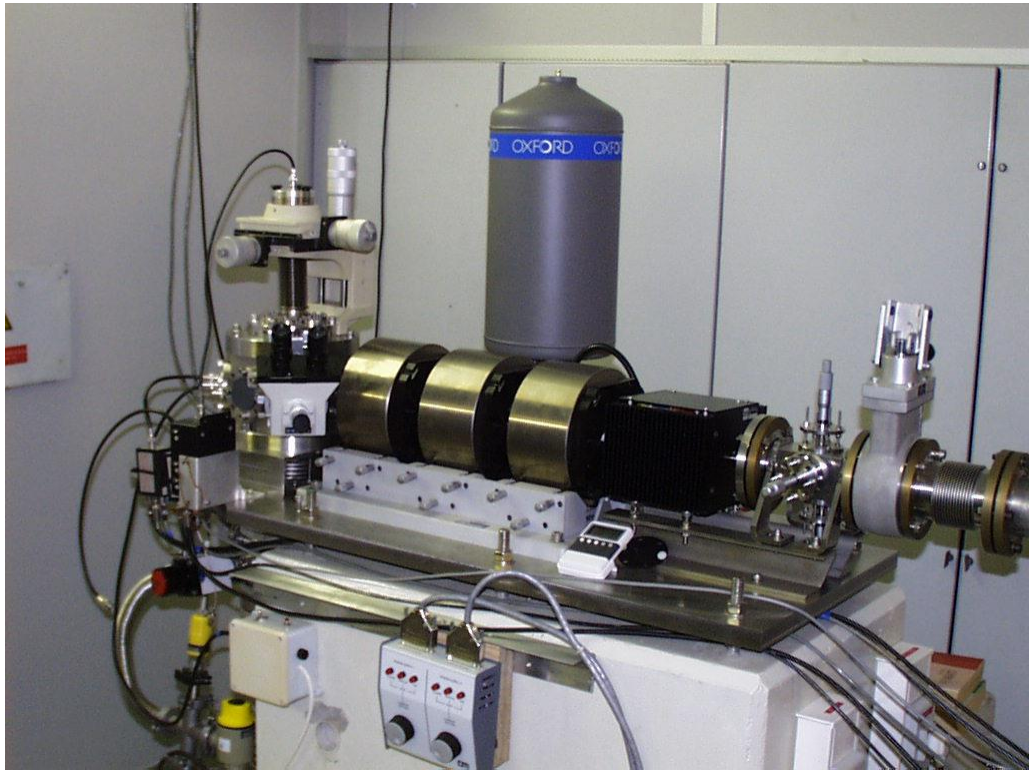


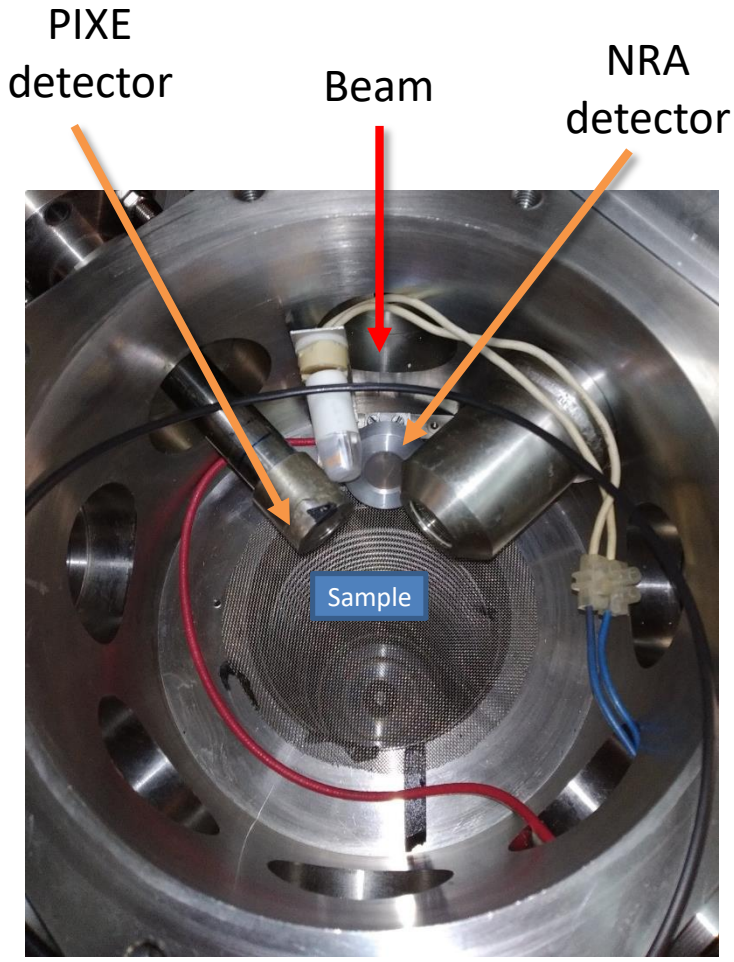
A. Lahtinen, et al., Fusion Engineering and Design 146 (2019) 1979–1982

Case studies: Microbeam analysis

Resolution 3×4 μm²
Scan amplitude 2.6×2.6 mm²

Operation modes: scan, raster, point

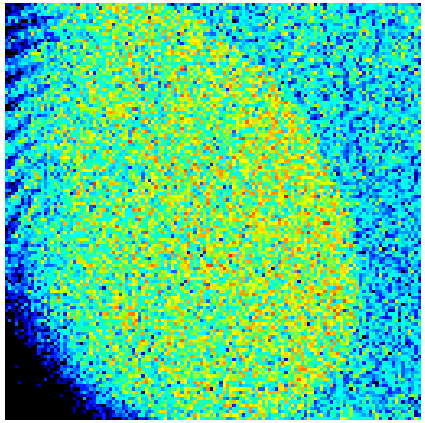




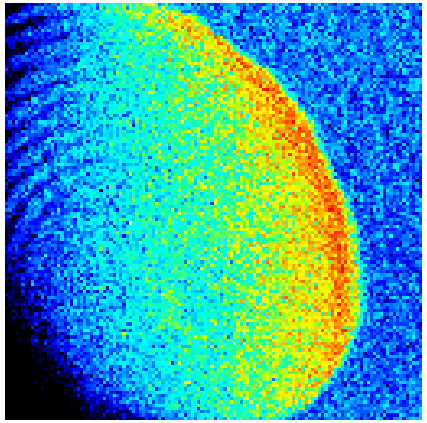
Detector configuration

Case studies: Microbeam analysis

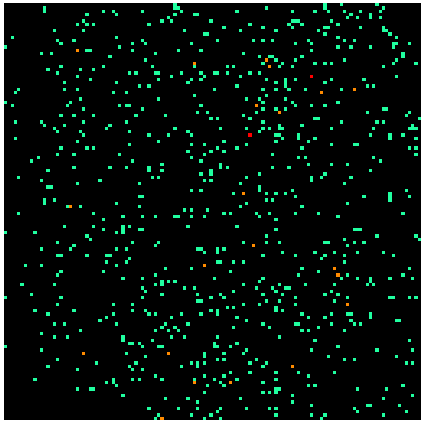
W (M_α)

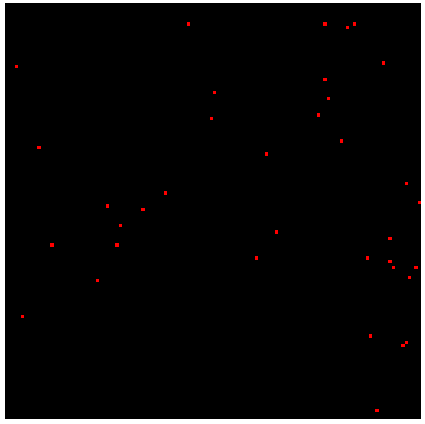


W (L_α)

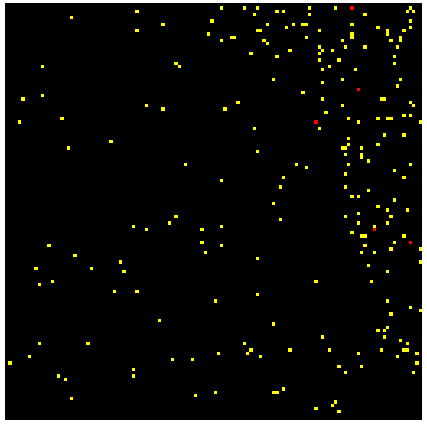


Fe (K_α)





$D(^3He,p_0)^4He$



$^9Be(^3He,p_n)^{11}B$

LP 26-15BN

W sphere

PIXE ~30min

NRA ~3h