Overview of C3 marker PFUs and sample distribution

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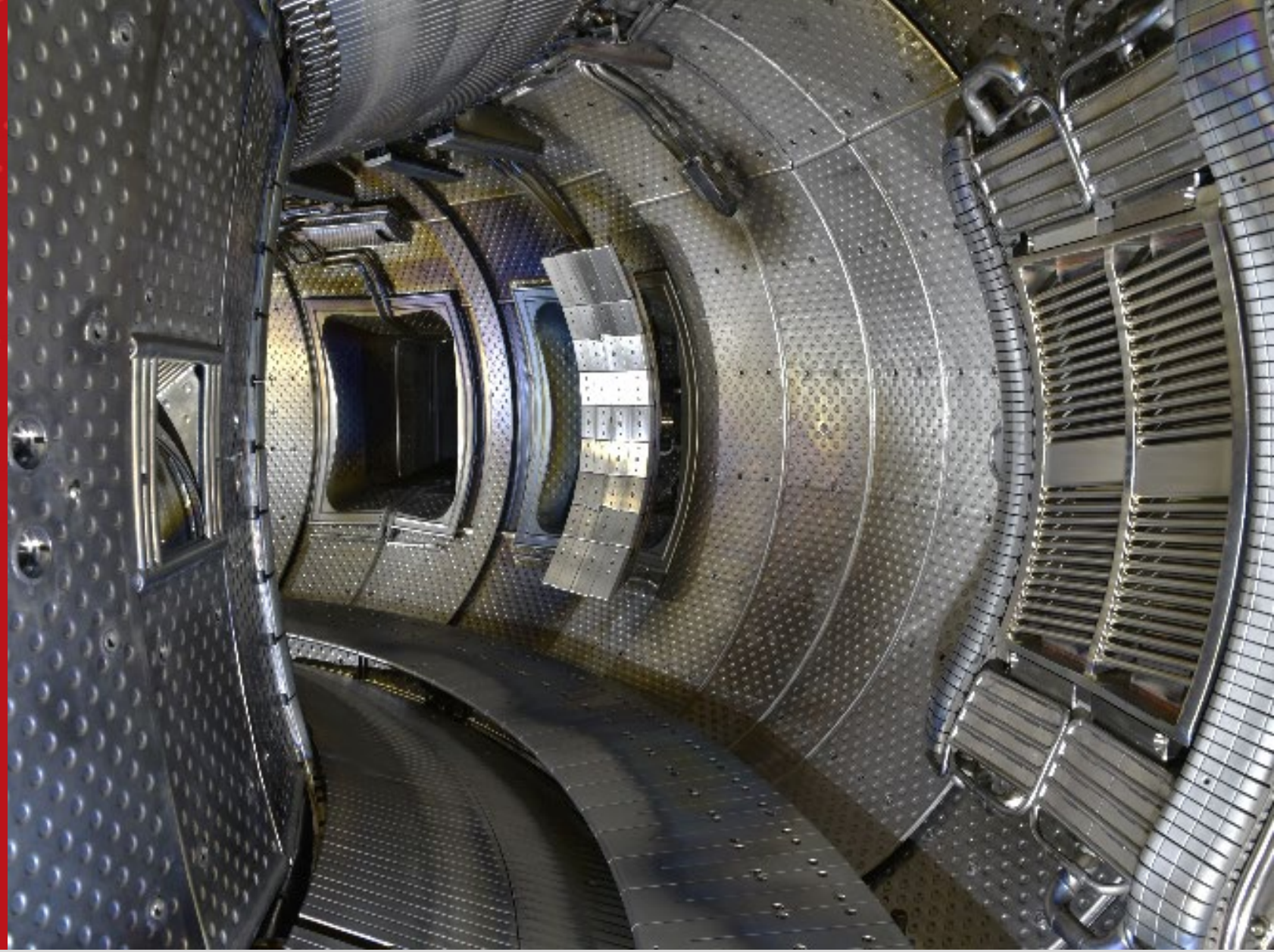
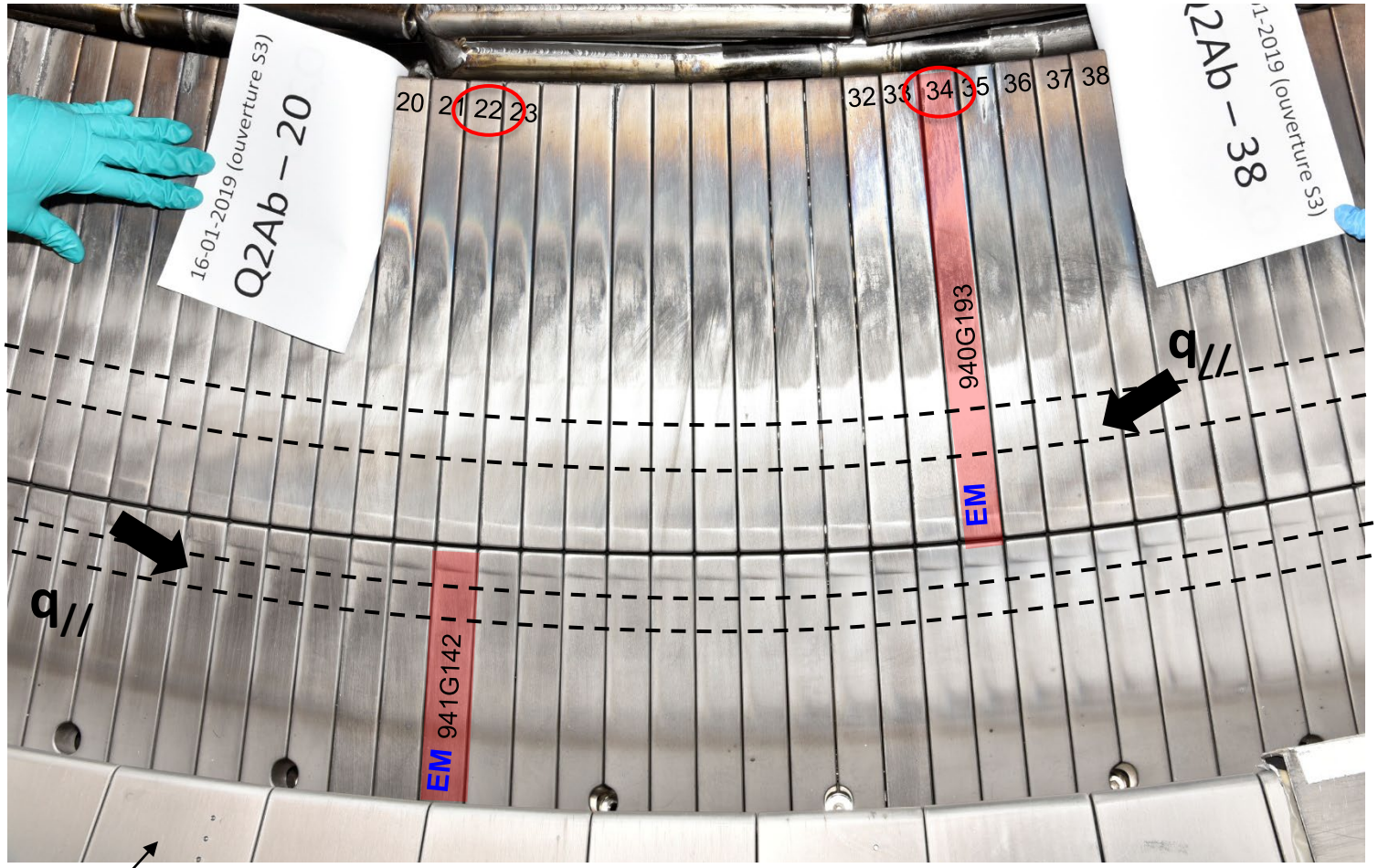


Configuration of the C3 erosion marker tiles in WEST

Photograph of the lower divertor taken after C3

Inner divertor tiles

Outer divertor tiles



baffles

EM:erosion marker tiles

C1+C2+C3

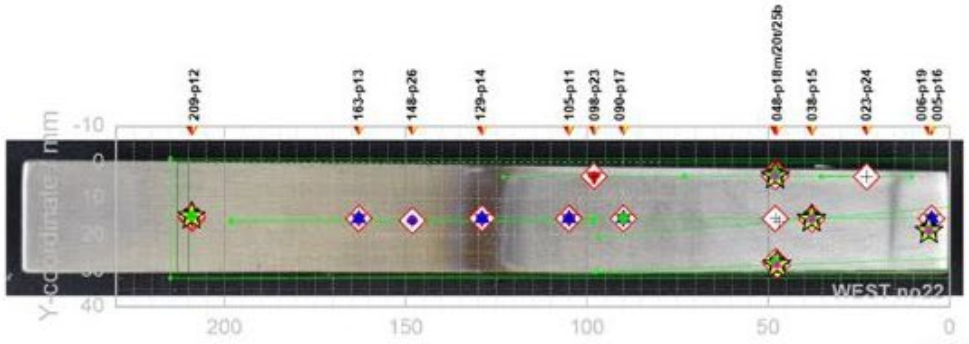
- **8 erosion marker tiles installed in WEST during phase I**
- **2 tiles retrieved after C3**
  - Inner 34
  - Outer 22

Identification of areas of interest on C3 erosion marker tiles

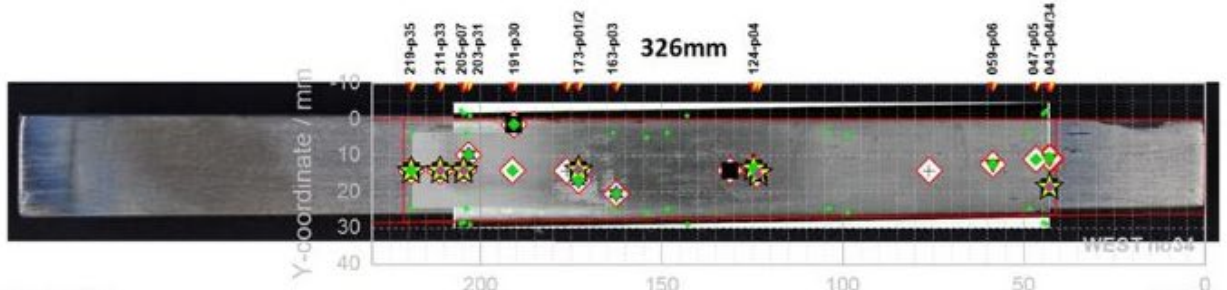
- **Characterization of the full tiles in AURIGA and through IBA analysis to identify erosion/re-deposition patterns**
  → M. Balden, M. Mayer IPP Garching

- **ATLAS images of the complete tiles available if needed !**

Outer tiles (C3-22o)



Inner tiles (C3-34i)

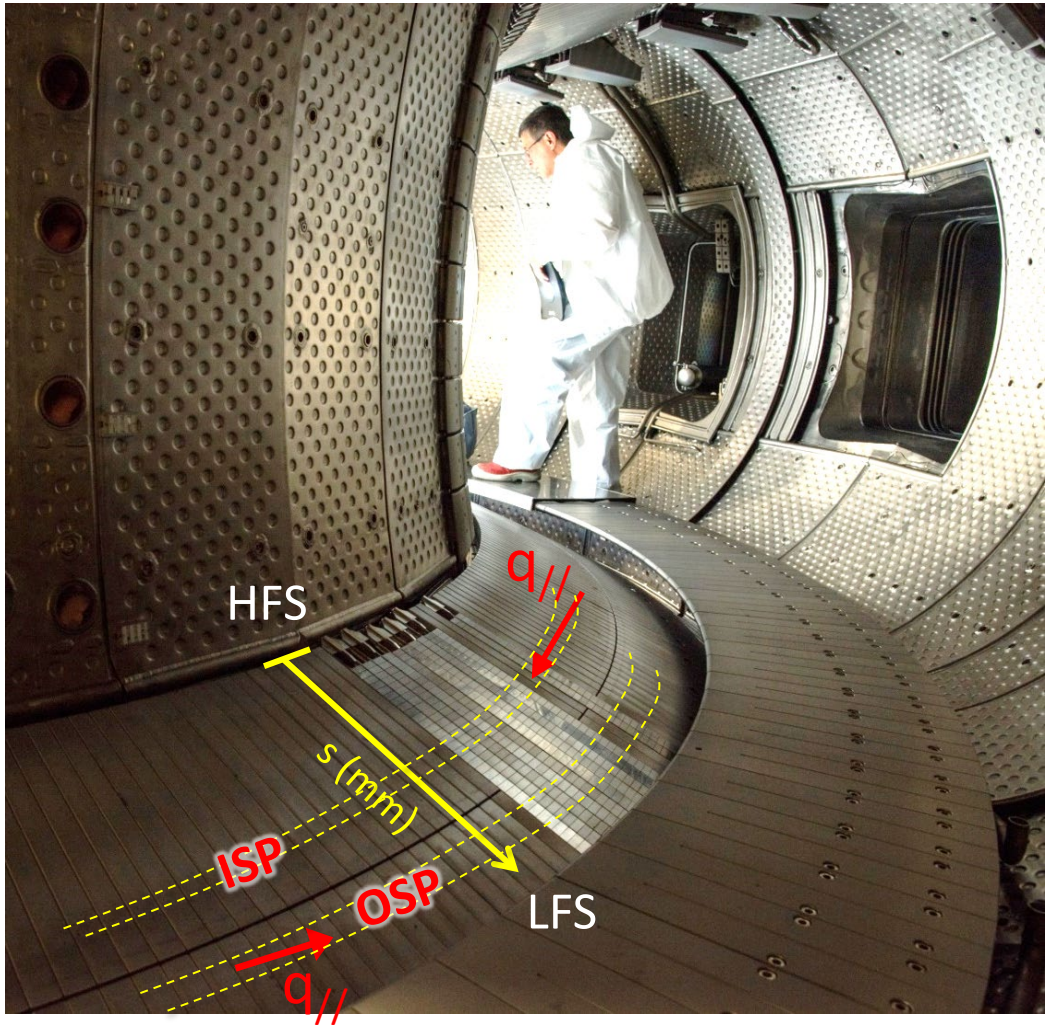


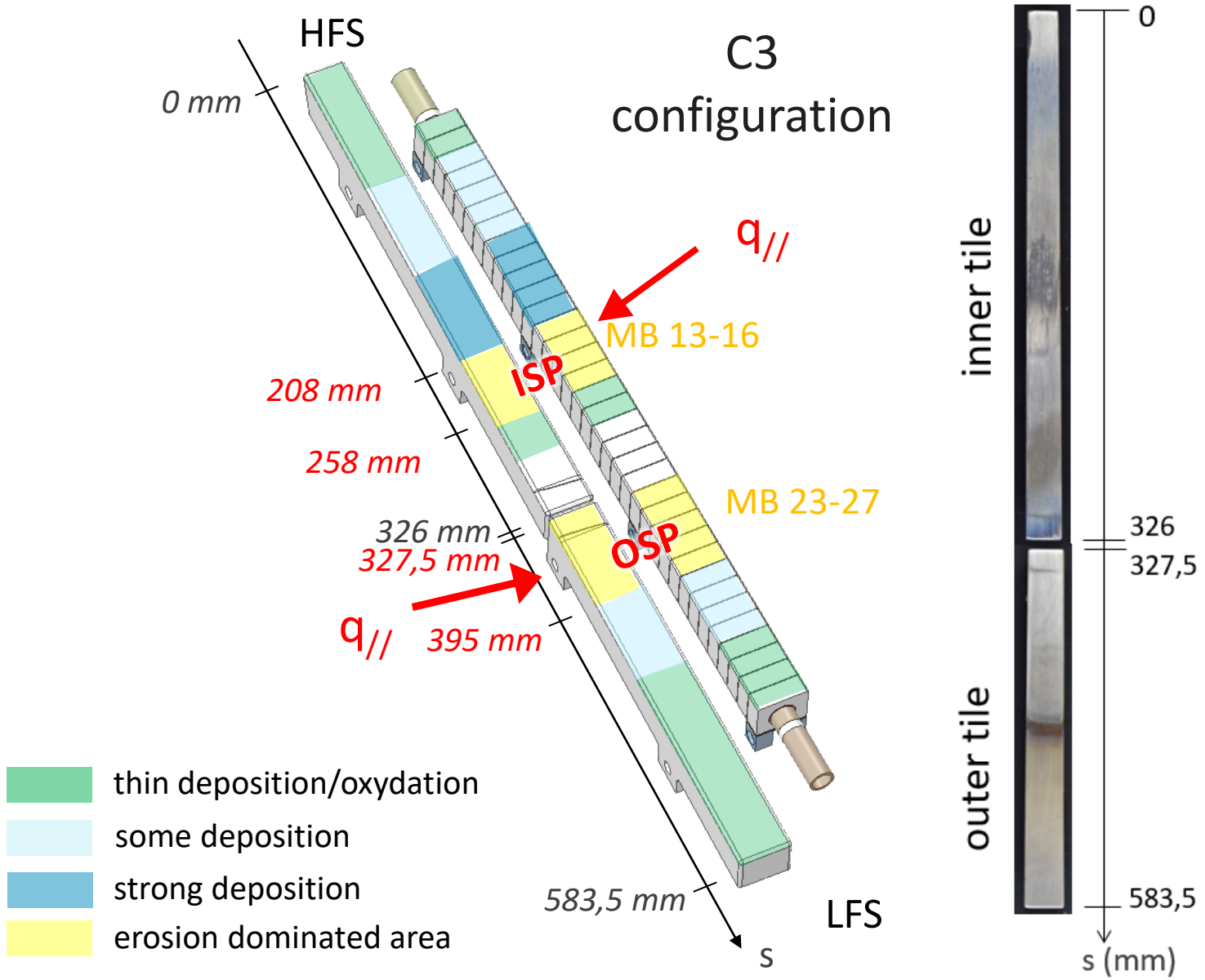
LFS Private area HFS

Thin/no deposition | Some deposition | Strong erosion | Thin/no deposition | Strong erosion | Thick deposition | Some deposition | Thin/no deposition

M.Balden et al. 2021 Phys. Scr. 96 124020

Erosion/re-deposition areas and s-coordinate

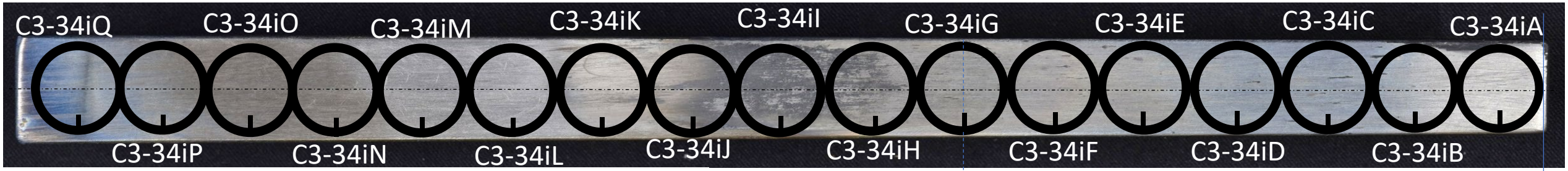




Extraction of 17 core samples from the inner tile 940G193_EM (Gi193EM)

Private Flux Region (PFR)

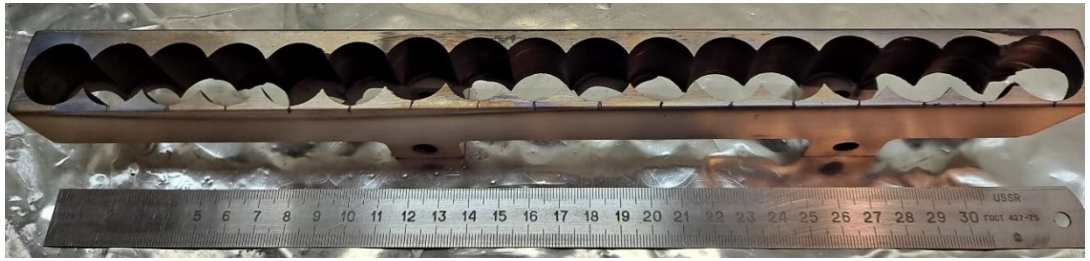
High Field Side (HFS)



S (mm)

	Sample name	s (mm) from HFS
Some deposition	C3-34iA	12,5
	C3-34iB	32,5
	C3-34iC	50,5
	C3-34iD	68,5
	C3-34iE	86,5
	C3-34iF	104,5
	C3-34iG	124,5
	C3-34iH	143,5
Strong deposition	C3-34iI	162,5
	C3-34iJ	180,5
	C3-34iK	199

	Sample name	s (mm) from HFS
EROSION dominated	C3-34iL	218
	C3-34iM	236,5
	C3-34iN	255,5
Thin deposition	C3-34iO	273,5
	C3-34iP	292,5
	C3-34iQ	312

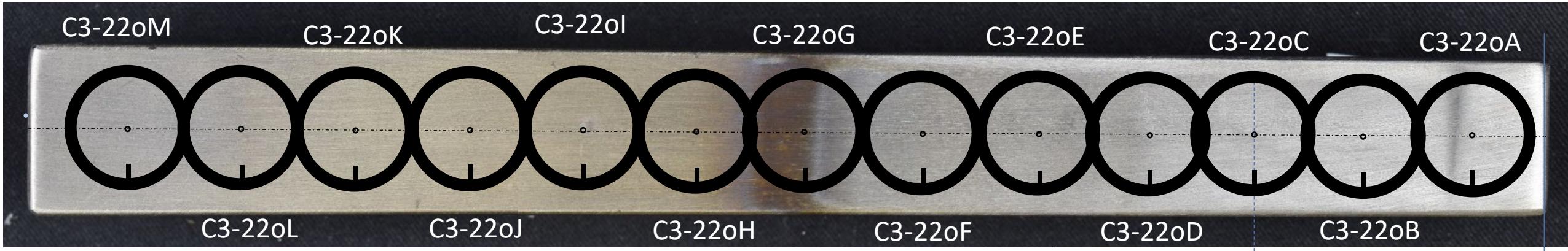


Outer diameter of the sample = 21mm
Inner diameter of the sample = 17mm

Extraction of 13 core samples from outer tile 941G142_EM (Go142EM)

Low Field Side (LFS)

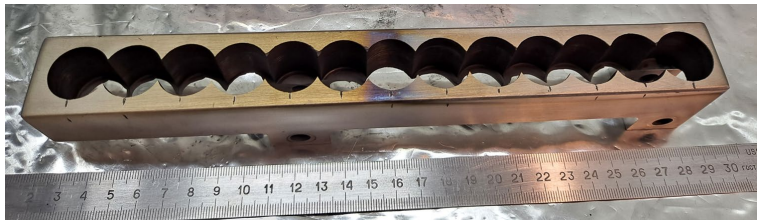
Private Flux Region (PFR)



s (mm)

	Sample name	s (mm) from PFR	s (mm) from HFS
EROSION dominated	C3-22oA	13	340,5
	C3-22oB	31,5	359
	C3-22oC	48	375,5
	C3-22oD	67,5	395
Some deposition	C3-22oE	86,5	414
	C3-22oF	105,5	433
	C3-22oG	124,5	452

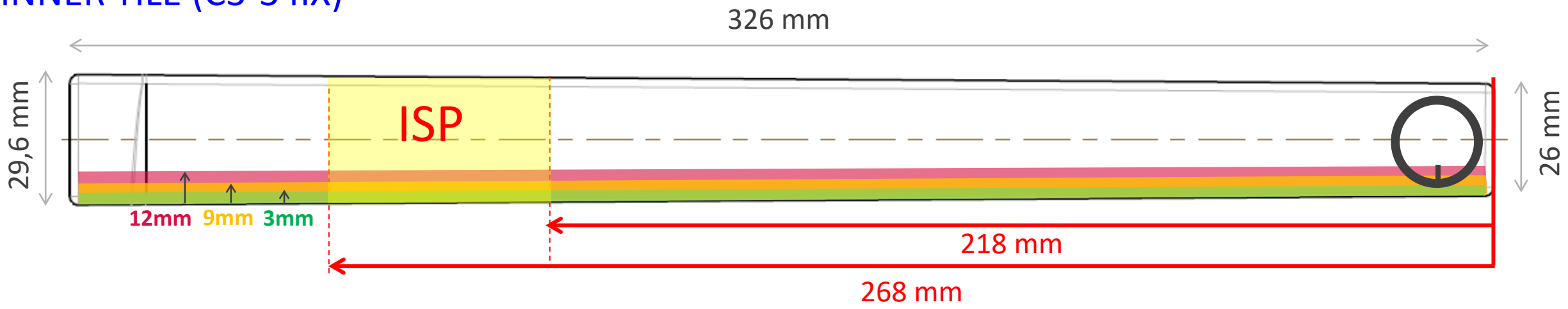
	Sample name	s (mm) from PFR	s (mm) from HFS
Some deposition	C3-22oH	142,5	470
	C3-22oI	161,5	489
	C3-22oJ	178	505,5
Thin deposition	C3-22oK	199,5	527
	C3-22oL	218,5	546
	C3-22oM	238,5	566



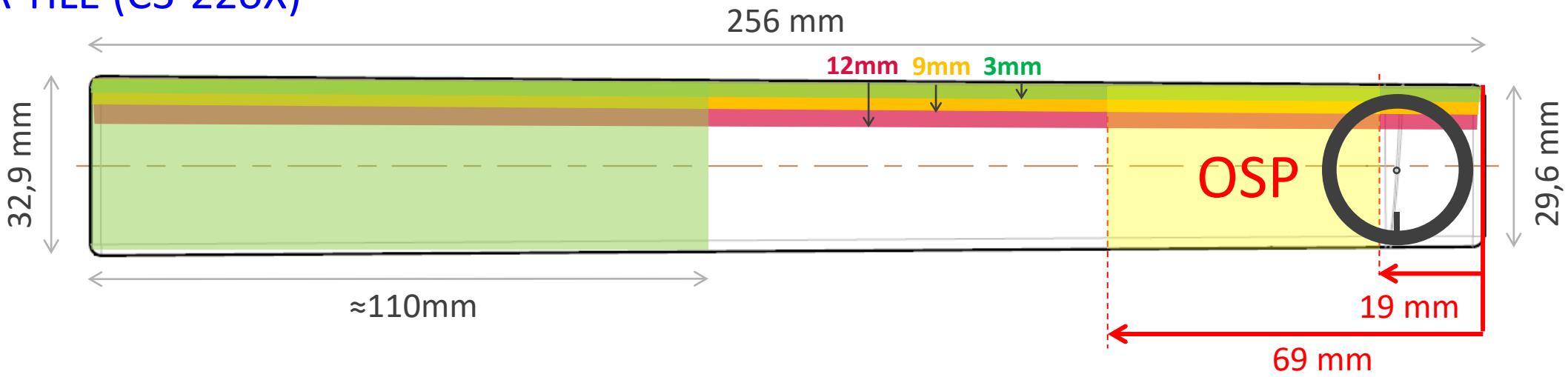
Outer diameter of the sample = 21mm
Inner diameter of the sample = 17mm

Shadowed area
Most likely shadowed area
Possible shadowed area

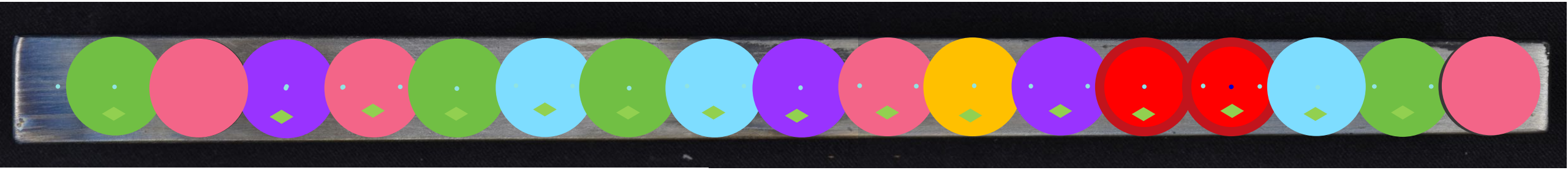
INNER TILE (C3-34iX)

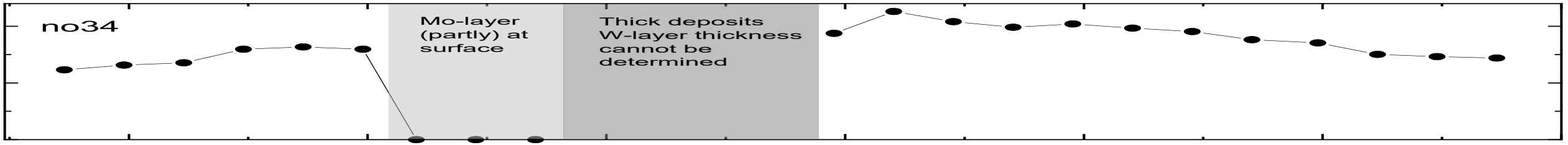


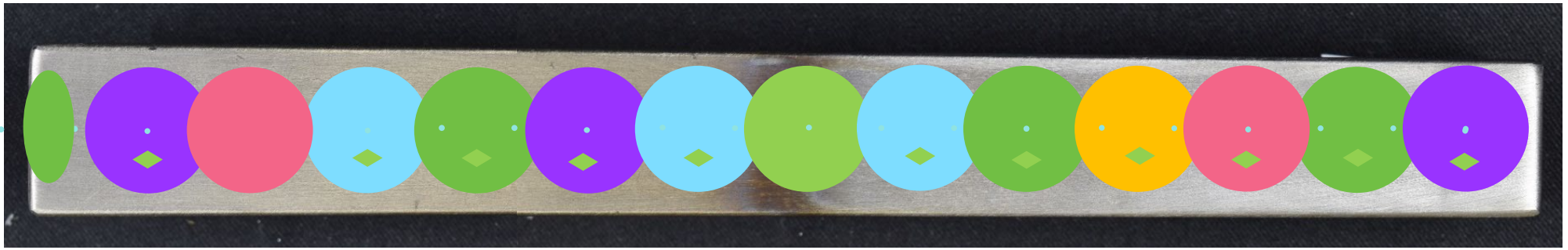
OUTER TILE (C3-22oX)

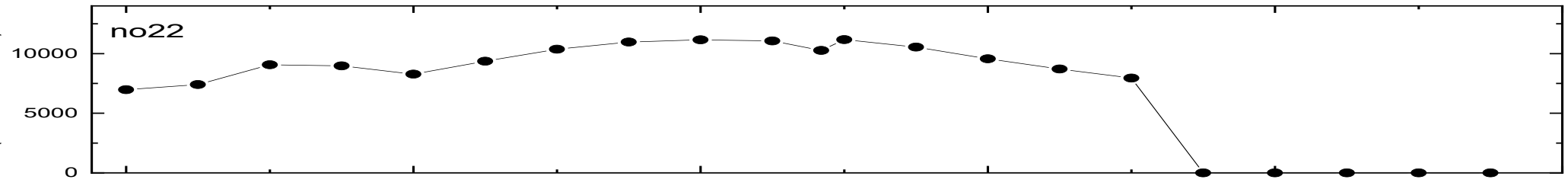


Analysis coupling: samples repartition









VR (NRA,PIXE,ERDA)
+ IPPLM (SEM, TEM)
VTT (SIMS)
+IST (PIXE/NRA/RBS) or
NCSRD (NRA)
RBI (RBS, tofERDA)
JSI (PIXE/NRA/RBS)
+ UT (LIBS)
IAP (GDOES/XPS)

Scientific goals and coordination method

1- Material migration

> **W erosion and deposition on the divertor**: net erosion/deposition pattern on the divertor, strike point erosion (top surface + leading edge) ?
Comparison for C3 / C4 net erosion/deposition rate How do WEST deposits compare with other metallic devices (AUG) ?

> **Fuel retention in W**: D content in the divertor (at strike points, deposits, gaps), impact O, comparison C3/C4
Retention mechanisms : is D content dominated by implantation in W or codep with B/C ?

> **He content in W** : How much He retained in W after C4 ? Where (strike point, deposits, gaps) ?

> **Impurities**: impurity content (O, B, C, Fe, Ni, Cr, Ag, Cu …) in deposits / strike points / gaps, boronizations (B, O),GDC (Fe …), W oxyde layers
Comparison C3 / C4

2 - Surface characterization

> Evolution of surface microstructure (grain size), roughness…
How does it correlate with erosion / deposition pattern ?

> Comparison between C3 and C4 microstructure

> He nanostructure formation (C4)

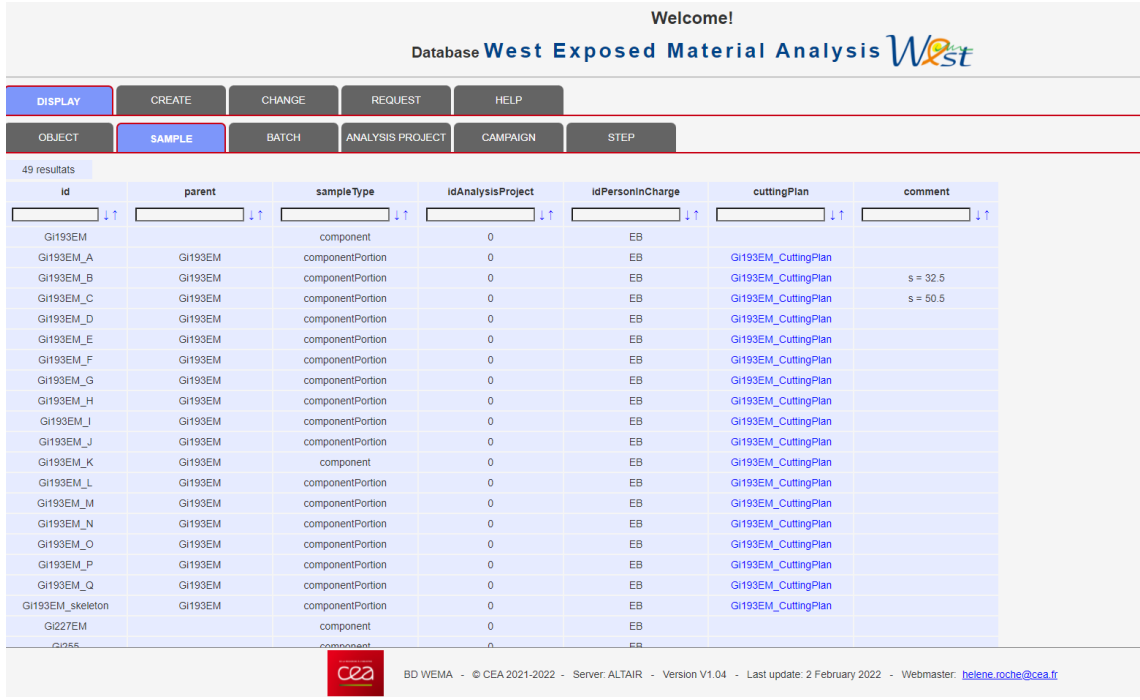
3- Arcing

> Location / characteristics (depth, width …) of arcing traces

> Evolution between C3 and C4

+ Follow up of location/history of samples (safety requirement)

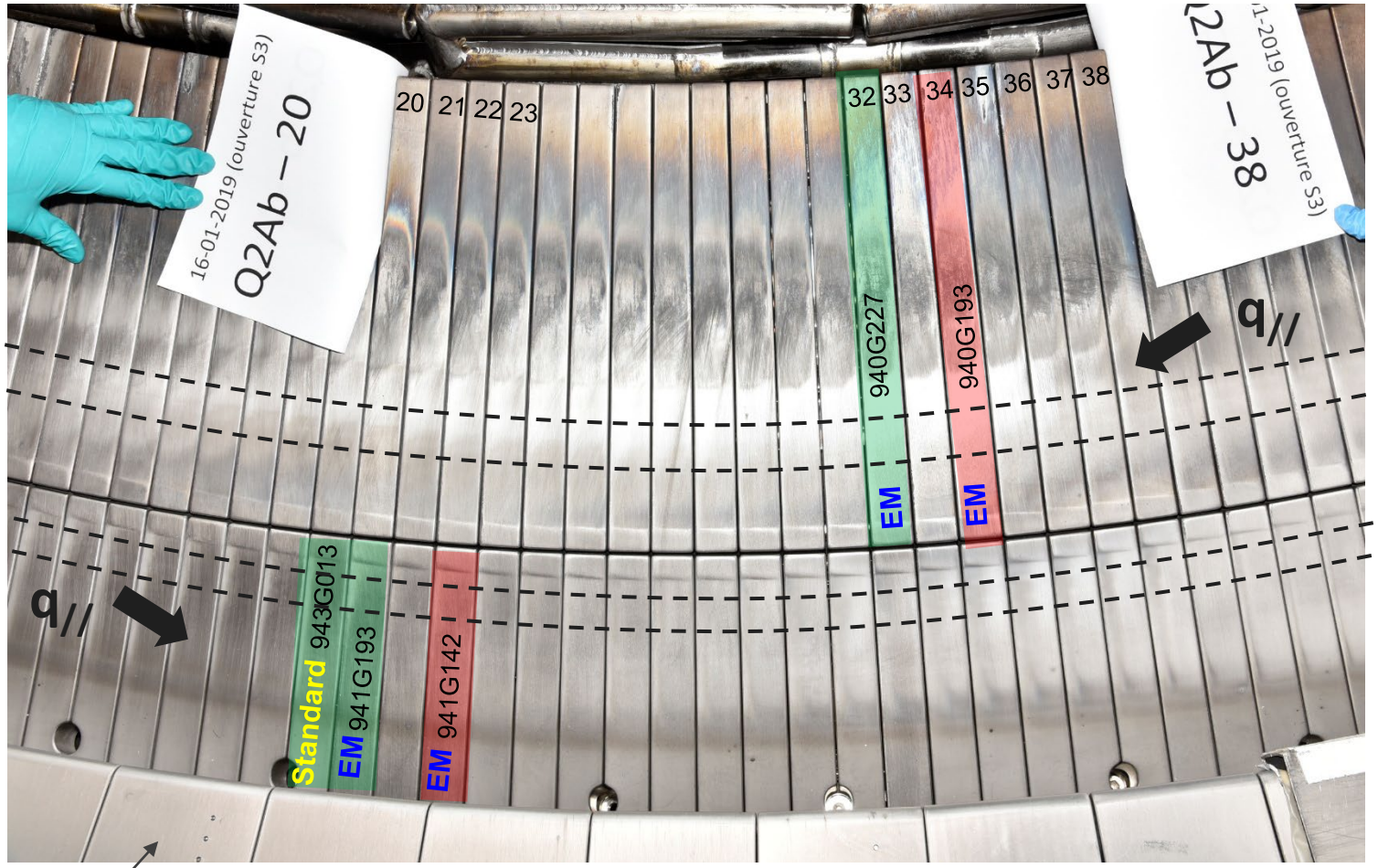
- technical passport attached to the samples
- near-future: WEMA database



Thank you for your attention

Inner tiles

Outer tiles



baffles

EM:erosion marker tiles

C1+C2+C3

C1+C2+C3+C4