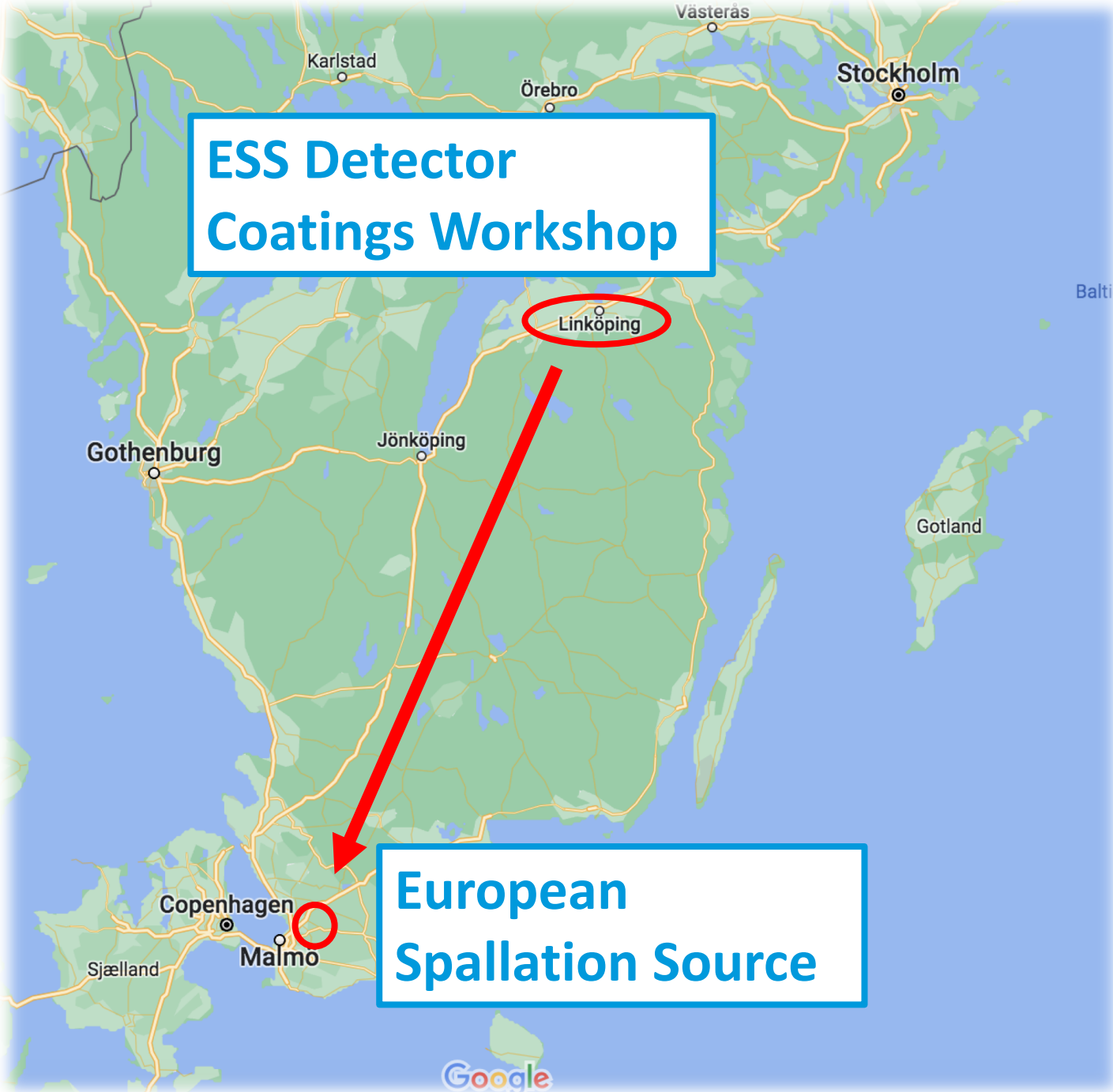




Detector Coatings Workshop of European Spallation Source ERIC (ESS)

CHUNG-CHUAN LAI
THE DETECTOR GROUP, ESS

2023-06-21



**ESS Detector
Coatings Workshop**

**European
Spallation Source**

li.u LINKÖPING
UNIVERSITY



©Sveriges Radio



Prof. Jens Birch Dr. Carina Höglund Prof. Richard Hall-Wilton

Move to ESS Site in 2023

**We will keep open for
coating requests!**

Members of the Workshop

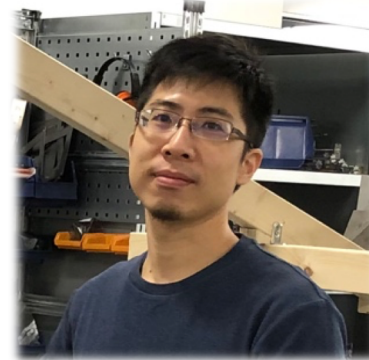


Chewbacca (CemeCon CC800/9 system)

- DC magnetron sputtering, 4 cathodes.
- Batch-loading sample table.



Per-Olof Svensson,
Production Technician



Chung-Chuan Lai,
Coatings Scientist
(chung-chuan.lai@ess.eu)

ESS Instruments

POWTEX technology: MAGIC & DREAM

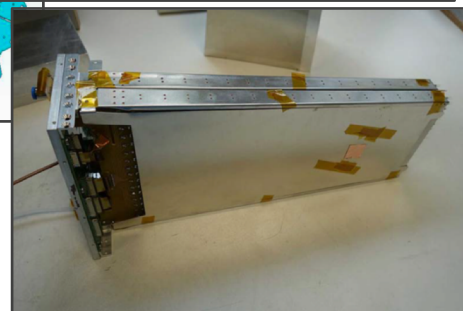
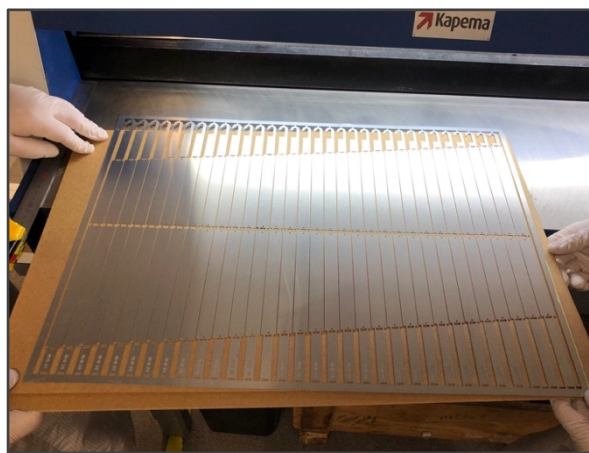
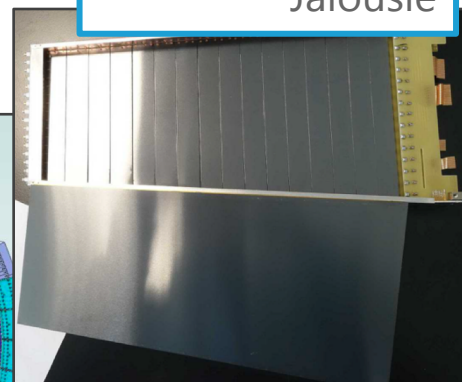
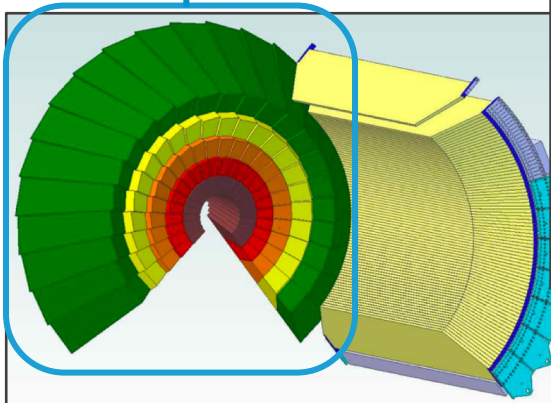


2021: ESS Instr.
DREAM Endcap
(70 runs)

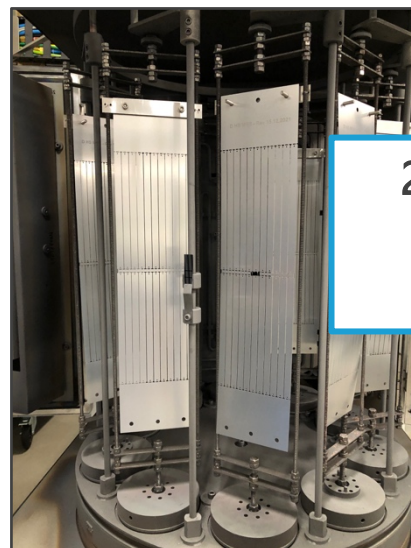
2020: ESS Instr.
MAGIC
(17 runs)

End-cap section:
ESS Workshop

2017: Prototype
Jalousie



2022: ESS Instr.
DREAM-SANS
(85 runs)



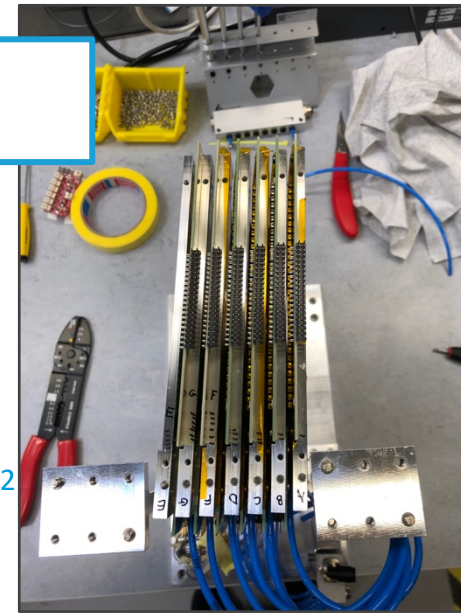
Find out more on: <https://n-cdt.com/>

ESS Instruments

Multi-Blade (MB) technology: ESTIA, FREIA, & TBL

- MB-300L prototype (2020)
- MB-AMOR for PSI (Just finished in 2021)

Assembly of MB300L
Prototype detector

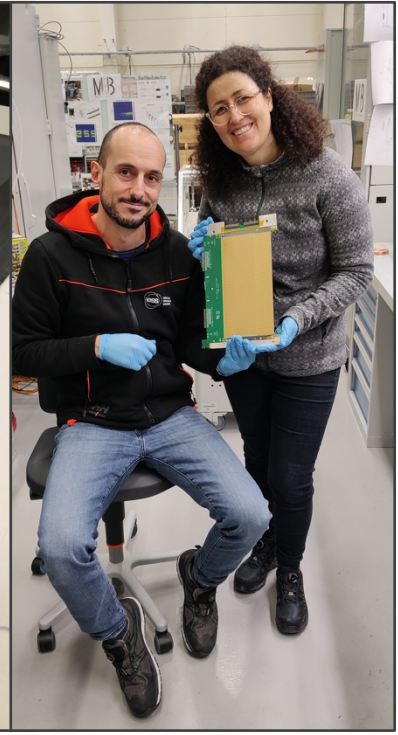
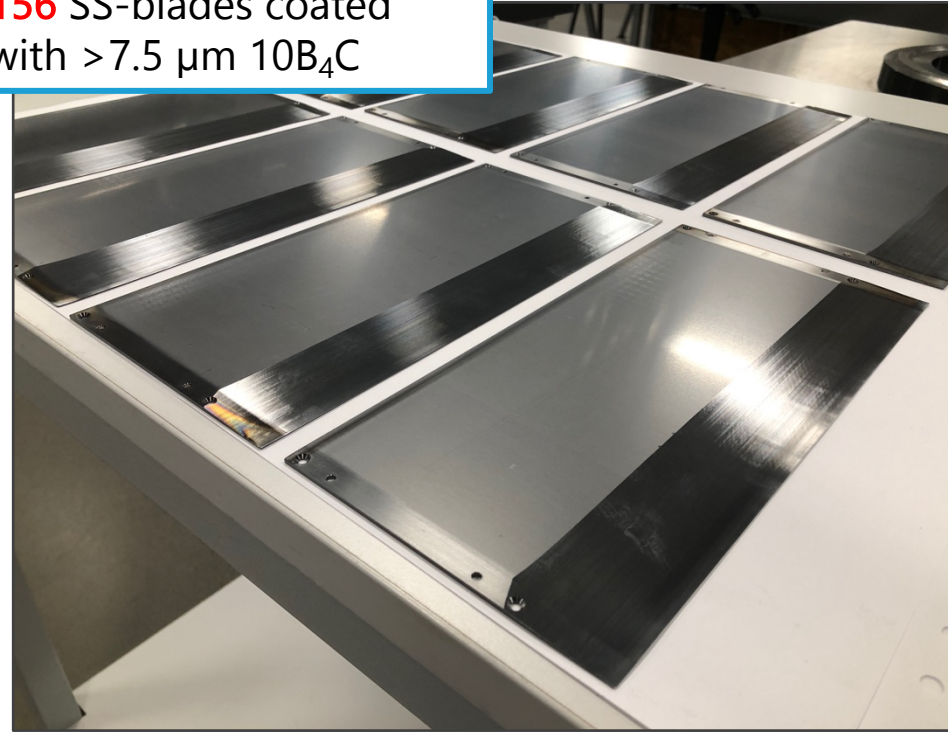


Size ~ 300 × 130 mm²

2021
Ti-blades coated
with >7.5 μm ¹⁰B₄C



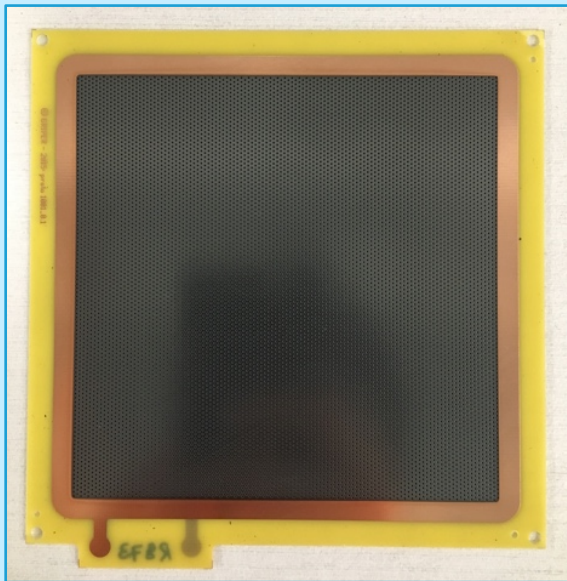
2023
156 SS-blades coated
with >7.5 μm ¹⁰B₄C



B₄C Coating on FR4 and Kapton

Temperature sensitive (<150 °C) substrates:

¹⁰B₄C Coated Multilayer Thick-GEM



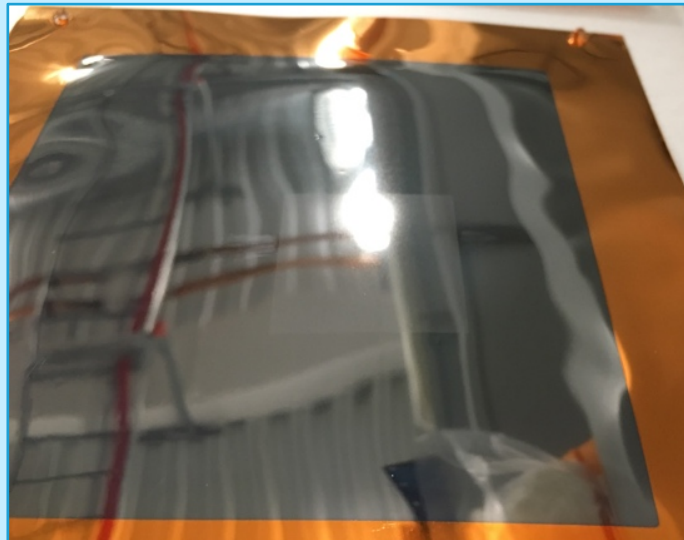
Pre-bored
Cu-plated
FR4 plate

In manuscript




¹⁰B₄C GEMPix Detector

Cu-plated
polyimide foil



*A. Muraro et al. (2021)
Eur. Phys. J. Plus 136*





MBGEM : a stack of Borated GEM detector for high efficiency thermal neutron detection

A.Muraro^{5,6}, G.Claps^{1,4}, G.Croci⁶, L.Chung-Chuan^{8,3}, R.De Oliveira², S.Altieri⁷, S.Cancelli^{5,6}, G.Gorini⁶, R.Hall-Wilton^{8,6}, C.Höglund^{8,9}, E.Perelli Cippo⁵, L.Robinson⁸, P.Svensson⁸, and F.Murtas^{1,2}

¹ Laboratori Nazionali di Frascati-INFN, Italy

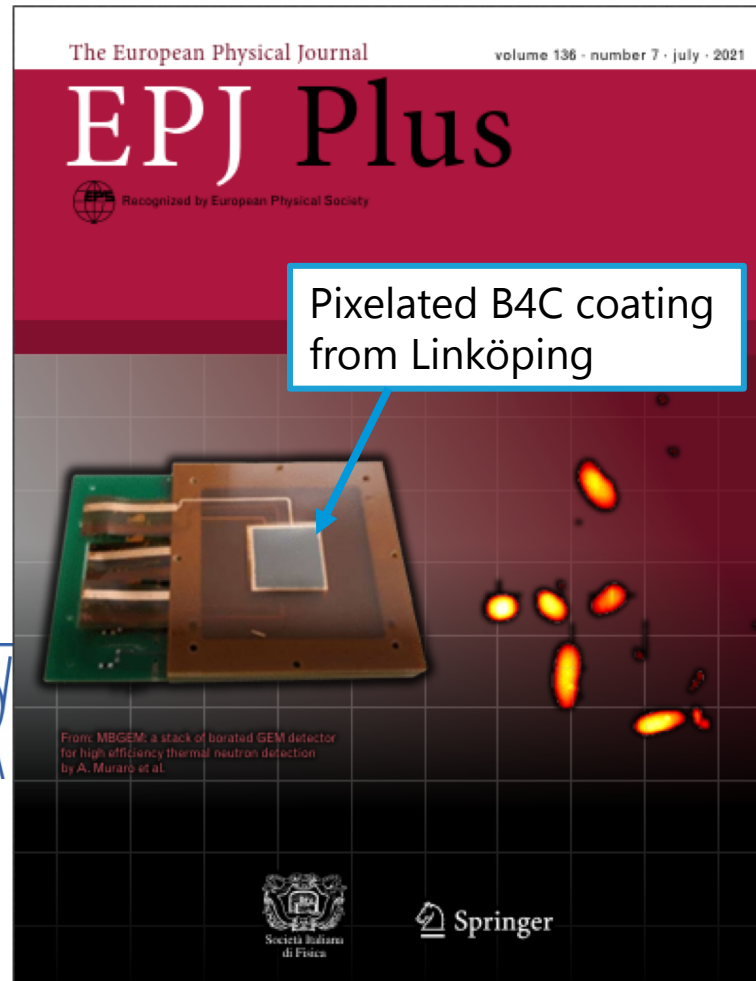
EPJ Plus cover

The European Physical Journal volume 136 - number 7 - july - 2021



EPJ Plus

Recognized by European Physical Society

Pixelated B₄C coating from Linköping



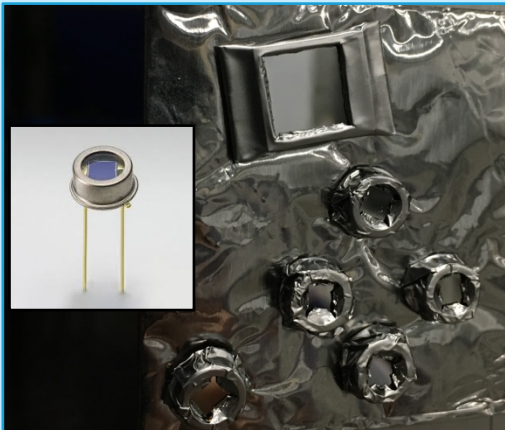
From: MBGEM: a stack of borated GEM detector for high efficiency thermal neutron detection by A. Muraro et al.

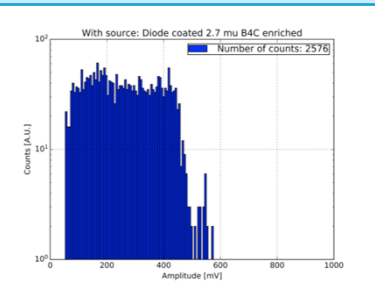
B₄C Coating directly on chips



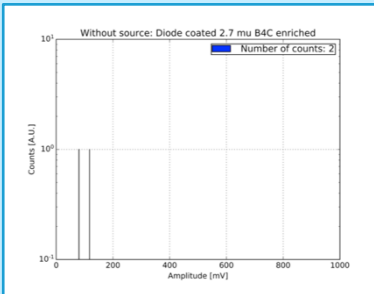
Si PIN Diodes



Direct deposition on photo diodes

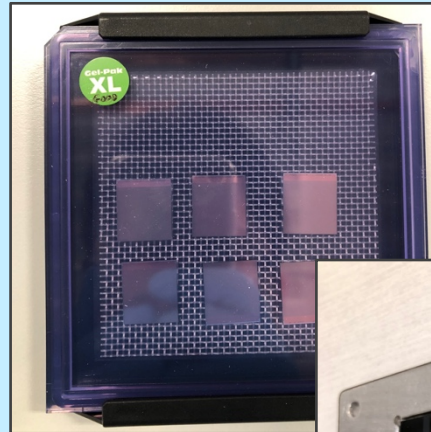


Within *n*-source



Without *n*-source

Timepix Chips



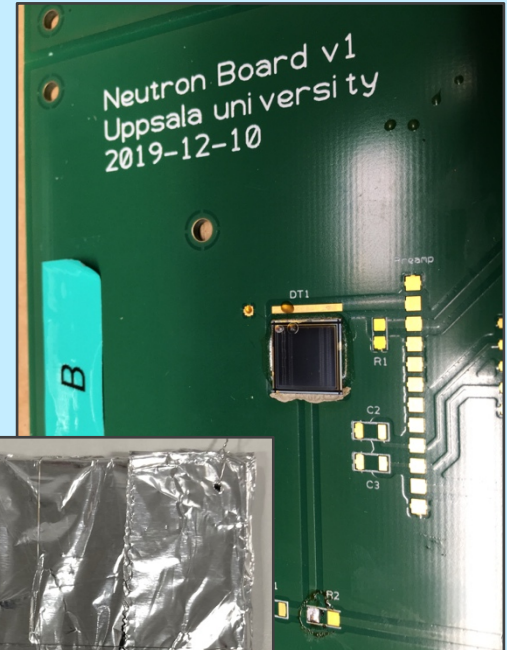
Al-holder for depositions

Fabrizio's project

MAPS



UPPSALA UNIVERSITET



Had to cover with Al-foil to protect

Short summary



DLC

Cu



- Depositing materials mainly B_4C , but also **metals** and **carbon**.
- Visit us in Lund after 2023.
- We will keep open for collaborations.

Questions? Ideas?

Contact chung-chuan.lai@ess.eu