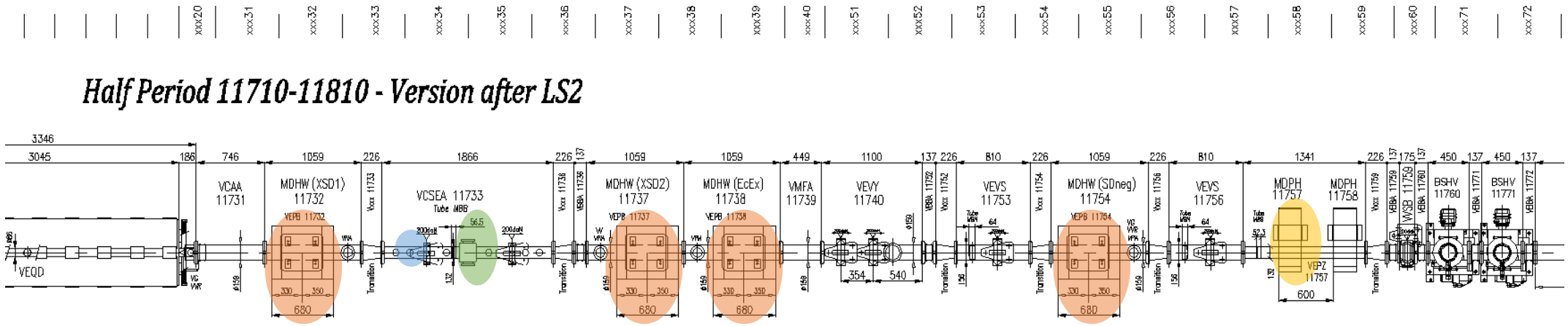
# Data analysis for SPS e-clous monitor scanning B-field

Data from hijacked MD 29.08.2024

Holger Neupert, TE-VSC, In-situ a-C coating and LESS for LHC beam screens
#130, 03.09.2024

# E-cloud monitor layout in SPS-BA1



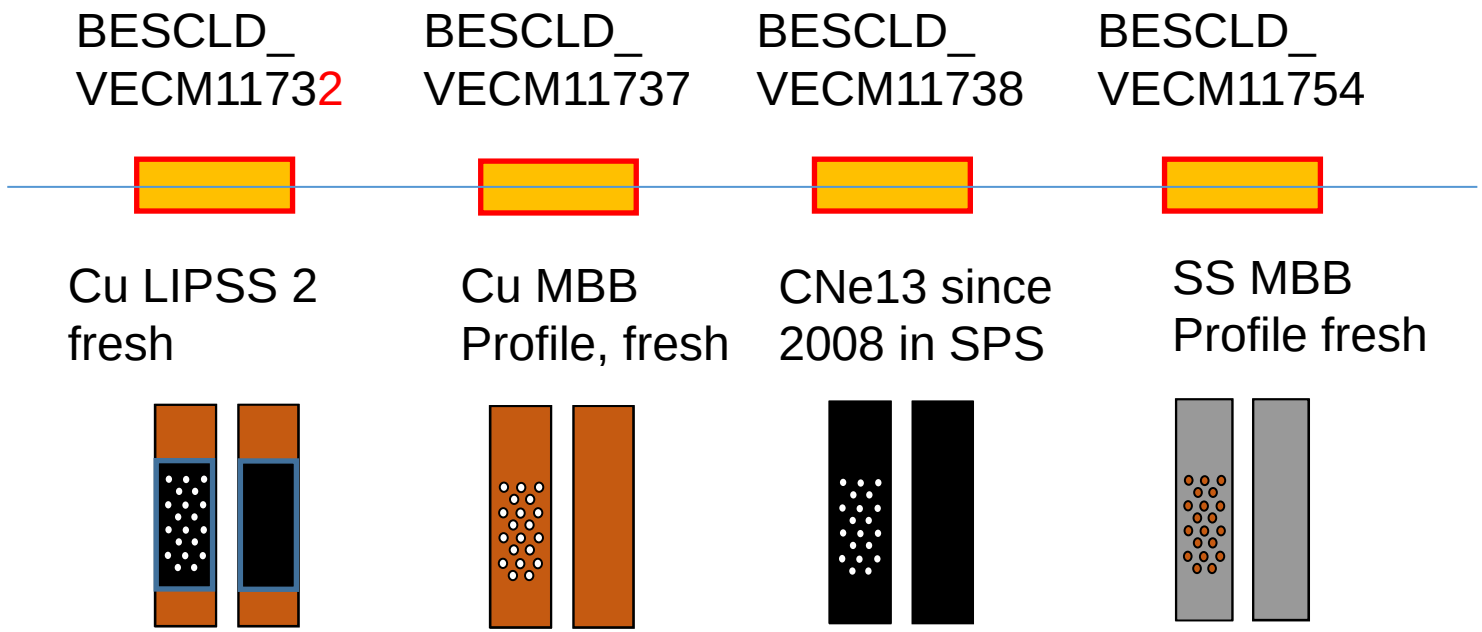

Drawing number: SPSLNINS0142

- E-cloud monitors
- SEY drum
- Mobile sample, can be transferred under vacuum for SEY and surface Analysis (XPS)
- RGA

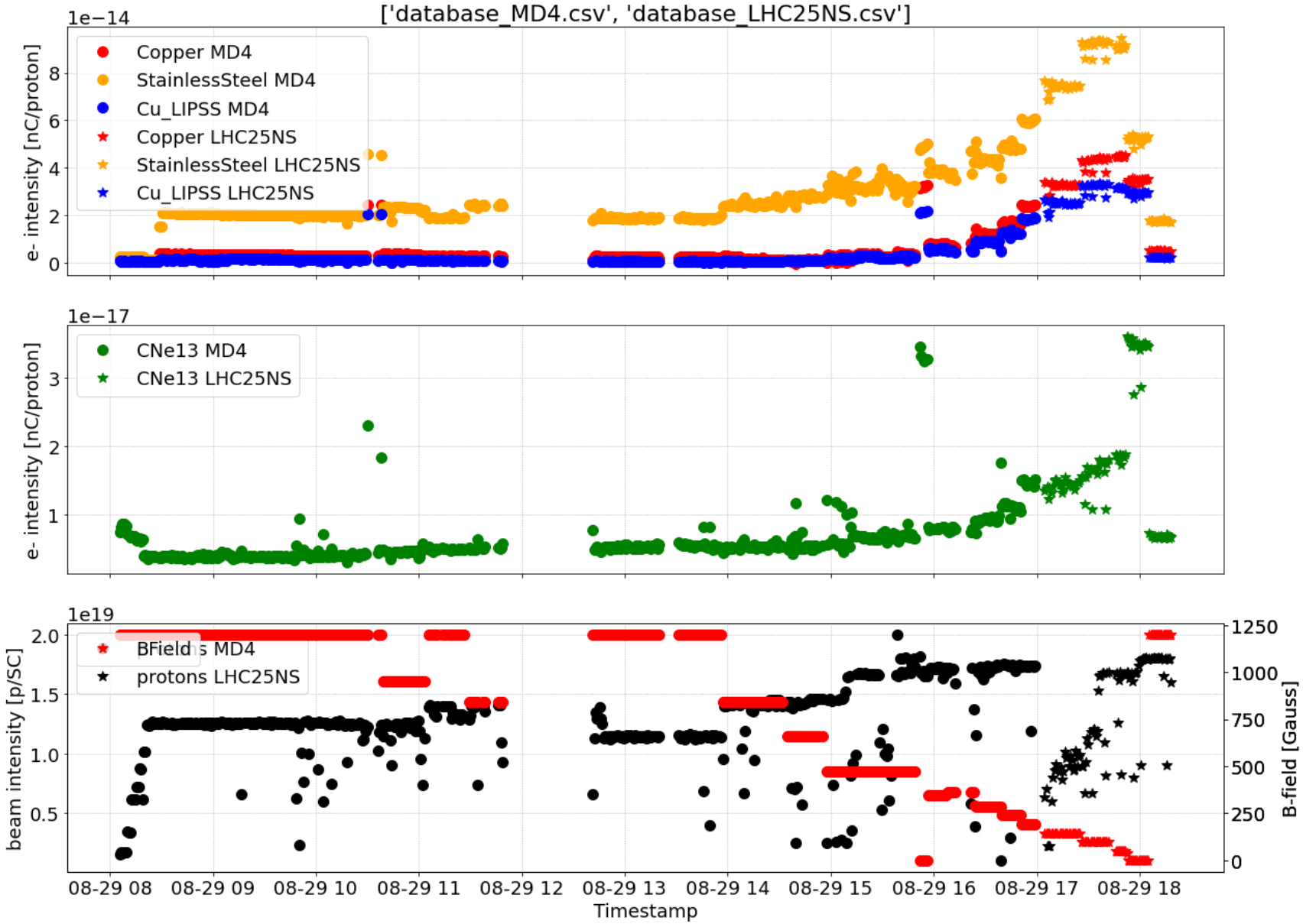
# E-cloud monitors 2024
# Liner configuration with new name

VECM11732 is the new name in NXCALS to unify with the naming of the magnet
Installation 17.01.2024

To be discussed:
VECM11732: second LIPSS on Cu from Leipzig
VECM11737: new copper liner to compare to ECM1
VECM11738: CNe13 long term stability a-C coating
VECM11754: a new Stainless Steel (304) liner to compare to SPS' vacuum chambers

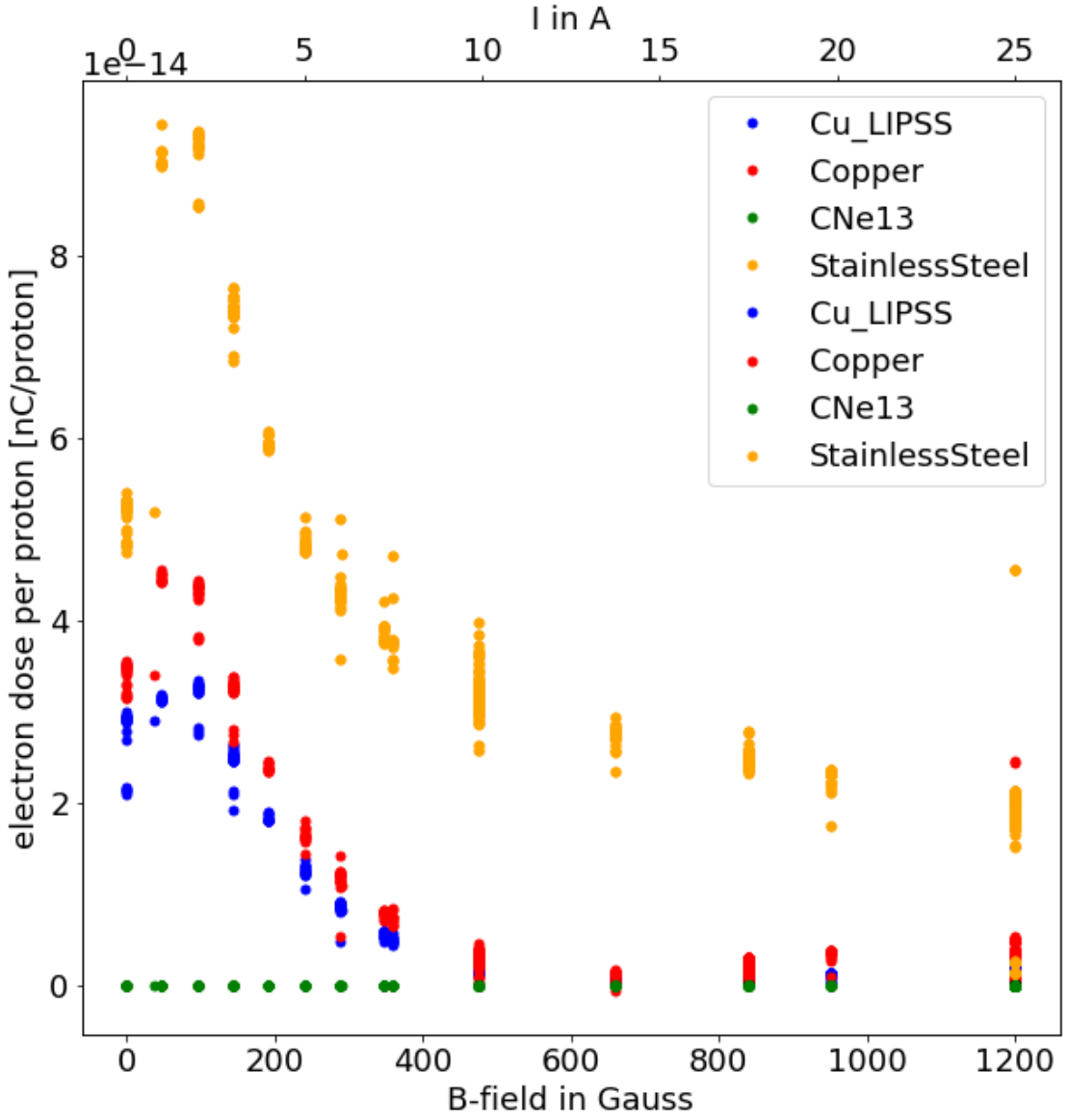


# Scan B field from 0G to 1200G



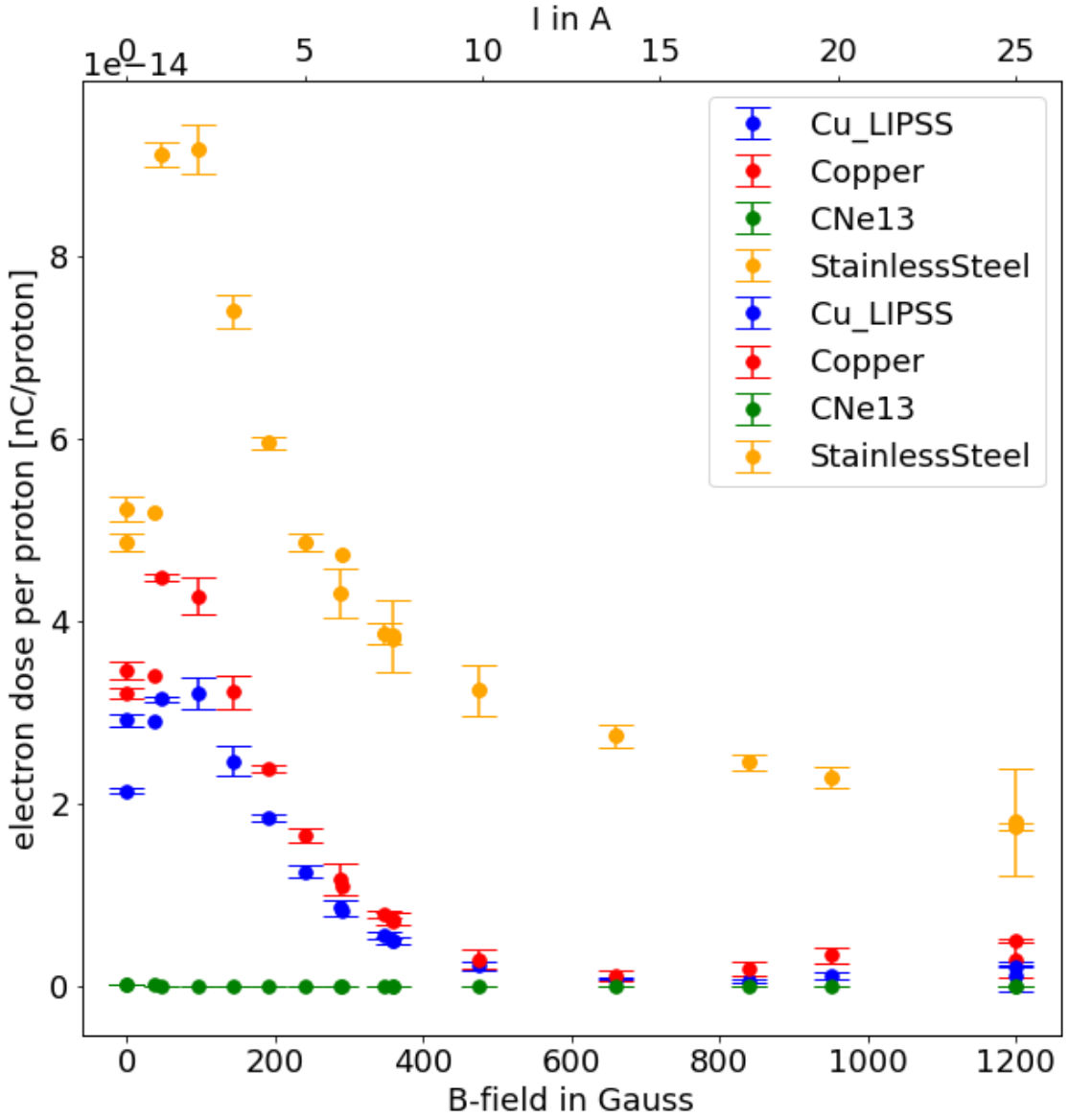

- MD5, scrubbing cycle «flat bottom» without acceleration, 4x72 bunches 25ns bunch spacing
- Differences between MD5 and LHC25NS despite the claim that these are twins with a different name

# Scan B field from 0G to 1200G




- MD5, scrubbing cycle «flat bottom» without acceleration, 4x72 bunches 25ns bunch spacing
- Only secondary user on MD5
- Changes in emittance and intensity for other studies

# Scan B field from 0G to 1200G

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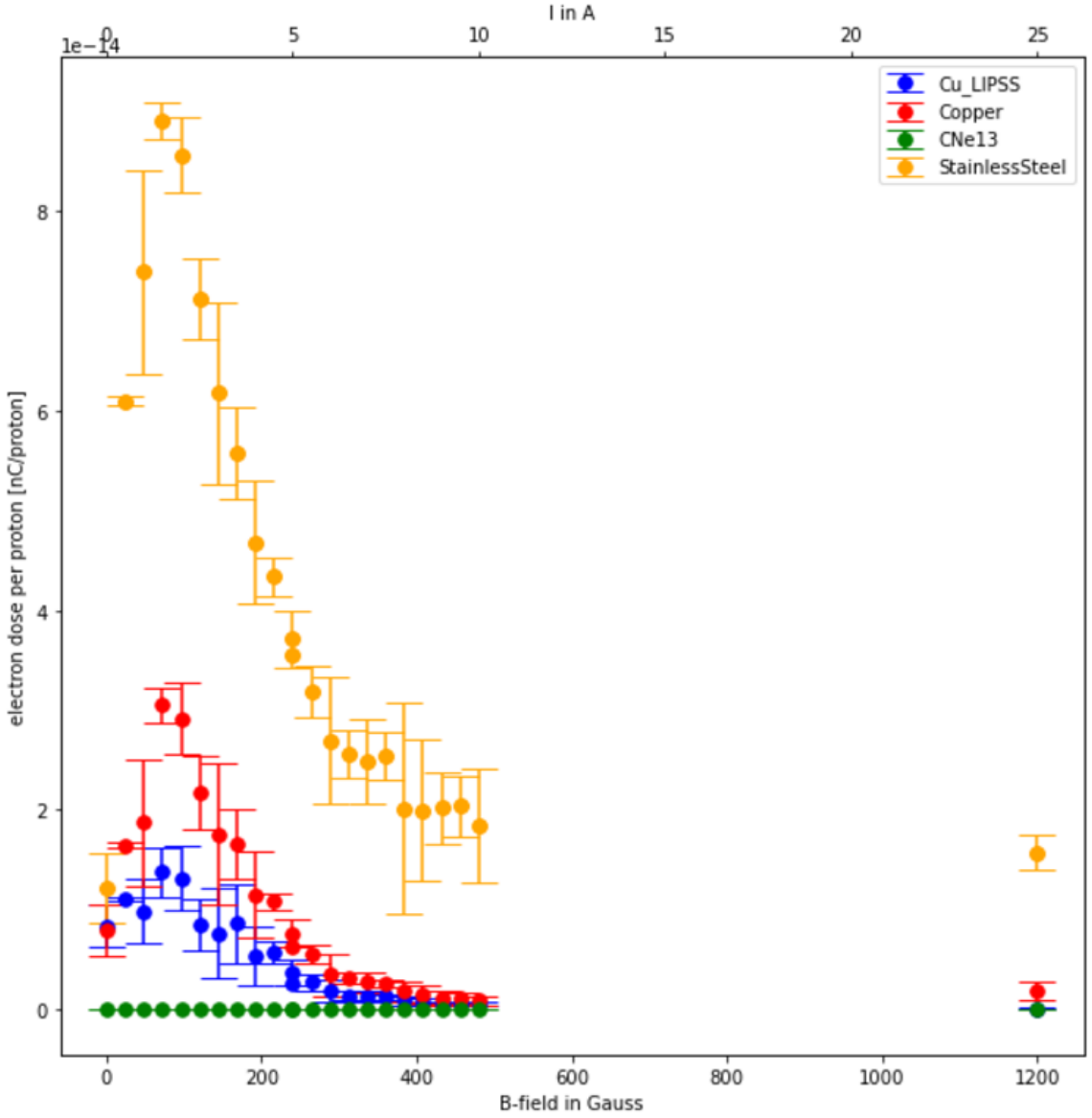
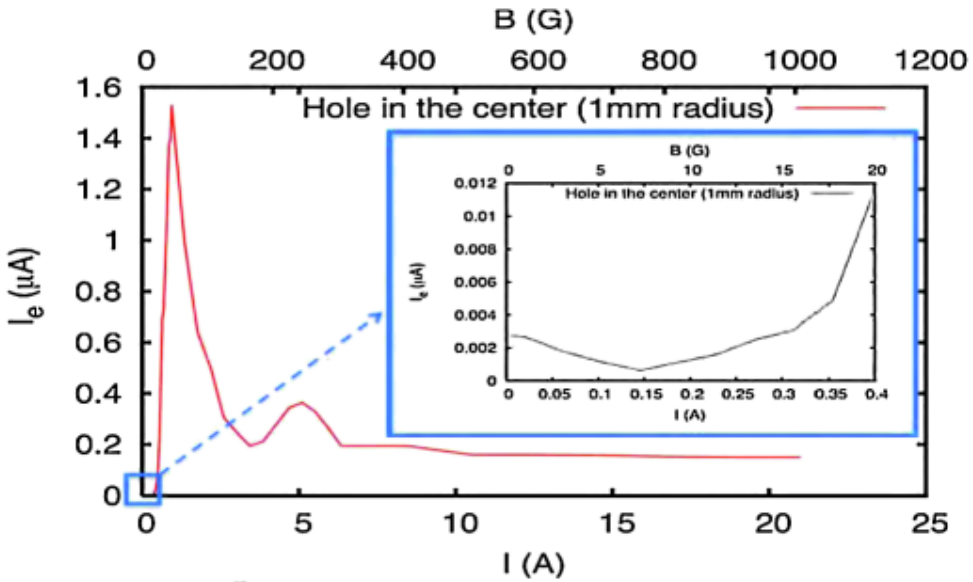
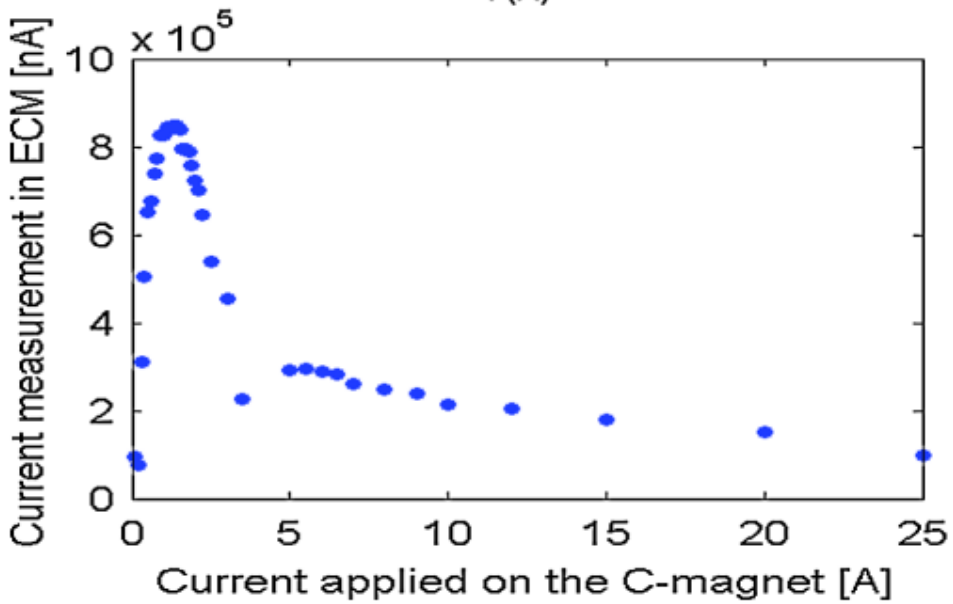



- 29.10.2024 scan b-field to find better resolution around 5A (200G - 400G)
- LHCMD1, with acceleration, 36 bunches in one batch, 25ns bunch spacing, up to 5 batches per injection
- 1.5-1.7*$10^{11}$ protons per bunch
- No way to see the «bump around » 250G (see next slide)

# Old data from 2010/2011




- https://journals.aps.org/prab/pdf/10.1103/PhysRevSTAB.14.071001

# Conclusions

- Scanning the B-field on the MDHW magnets works as 10 years ago
- Need to have a dedicated cycle with stable beams to produce cleaner data

- August 2024 session confirmes e-cloud signal difference between Cu and CuLIPSS but to a lesser extent -> needs some more data analysis, not sure why

# Future

- Scanning the B-field on the MDHW magnets works during filling cycles LHC all along LHC run 2025
- Need to change current in MDHW magnets accumulating data with good statistics for each data point
- Counting on stable conditions for each single injection cycle towards LHC during the whole year
- Goal would be to develop a model to predict SEY from e-cloud data