

Challenges of running at $7 \cdot 10^7$ protons/s

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- **Vertexing**
- **beam quality**
- **“empty events”**
- **MDC load**

Different target segments needs precise vertex determination

- SRC runs parallel to p+Nb
 - two lepton vertex and two fast proton vertex precision has to be known

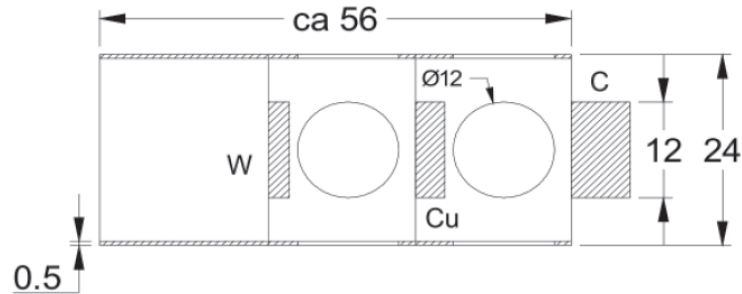


Figure 1.1: Technical drawing of the proposed target ladder with 3 targets which length is chosen such to correspond to 2.5% interaction. Dimension in the figure are in mm.

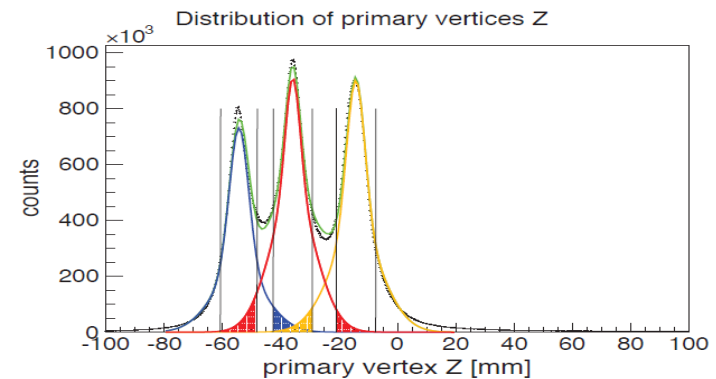
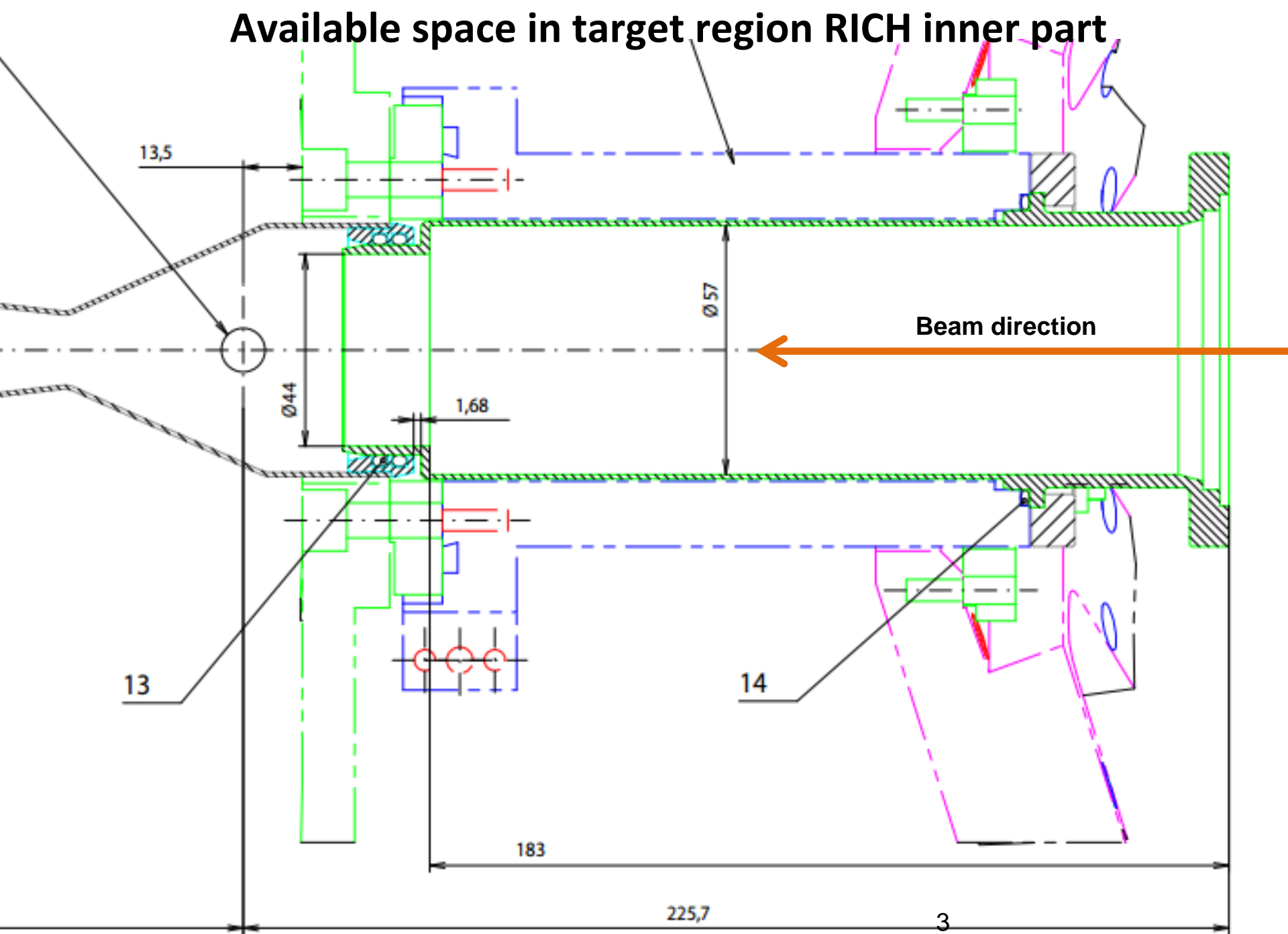


Figure 1.3: Primary target distribution obtained with three targets. The tails of the coloured Gaussian fits show the relative contamination of the different targets to one another.

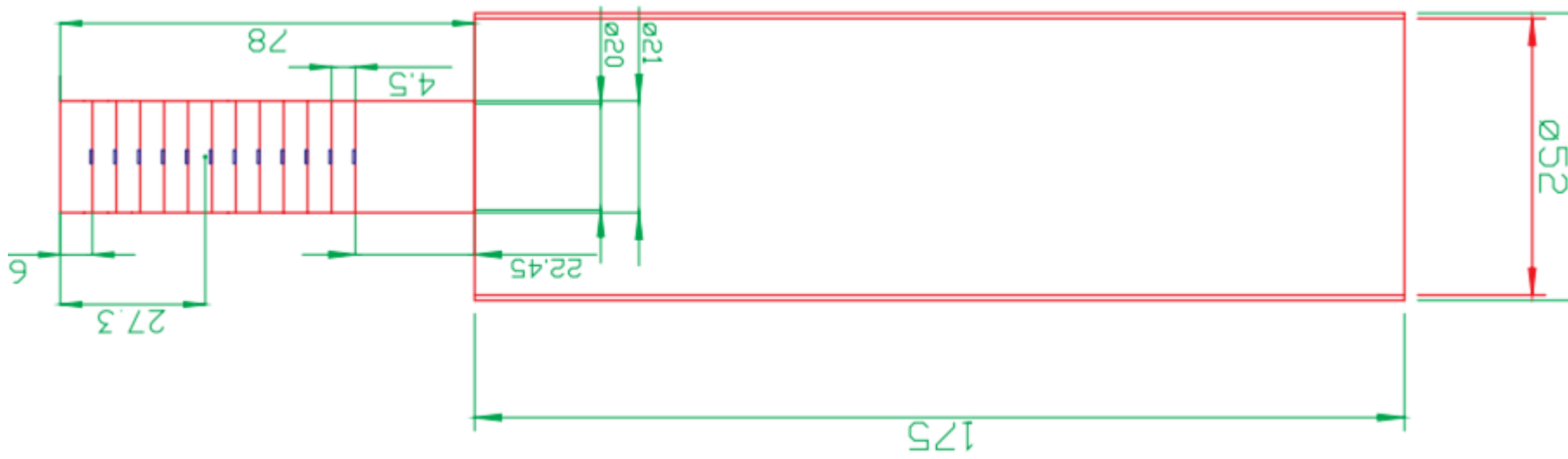
→ Detailed study needed, Genat, p+Nb data

- Target region.

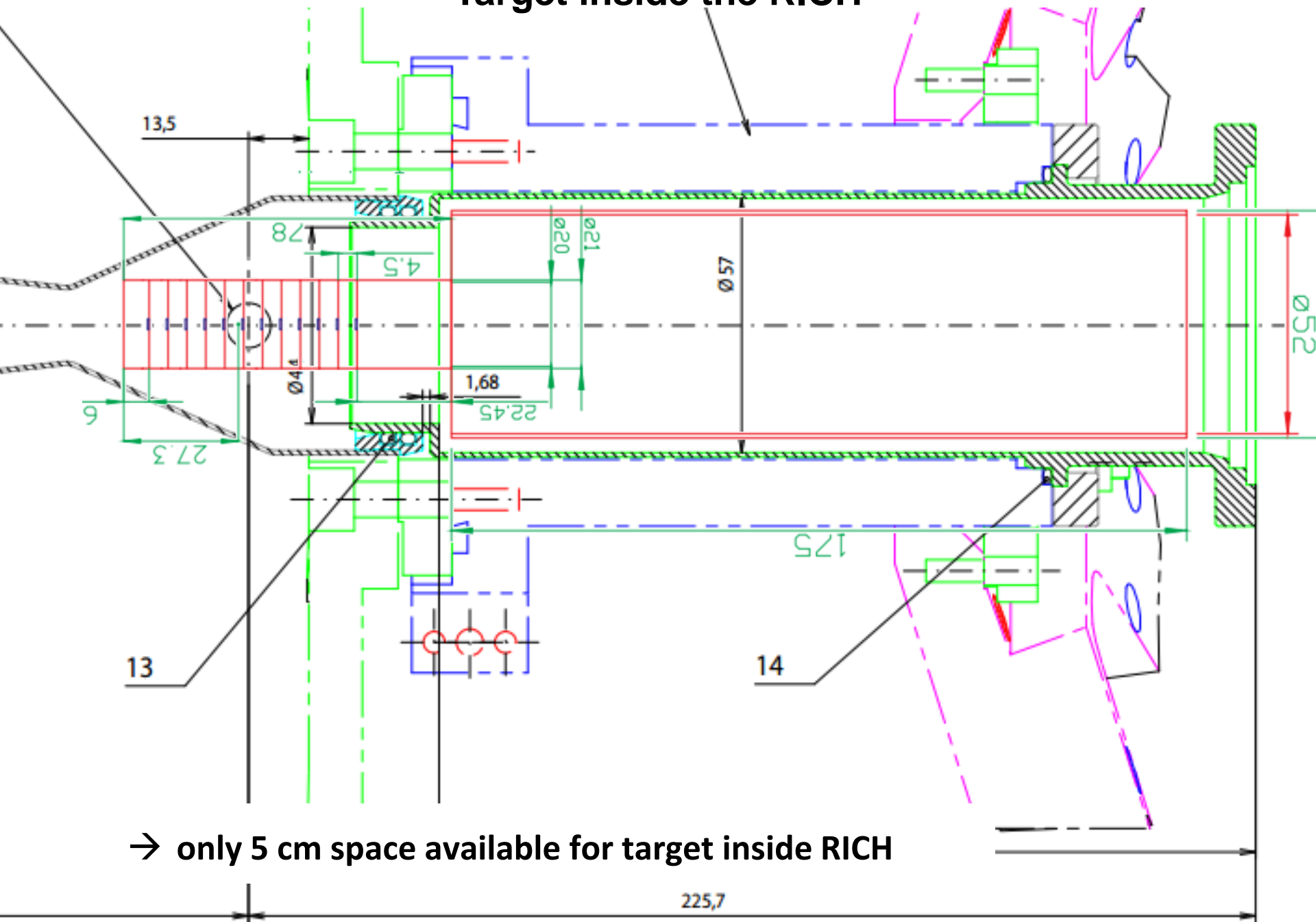
Available space in target region RICH inner part



Target with Target holder (red)



Target inside the RICH



Beam quality measured with Au beam

Quality of slow extraction at SIS18

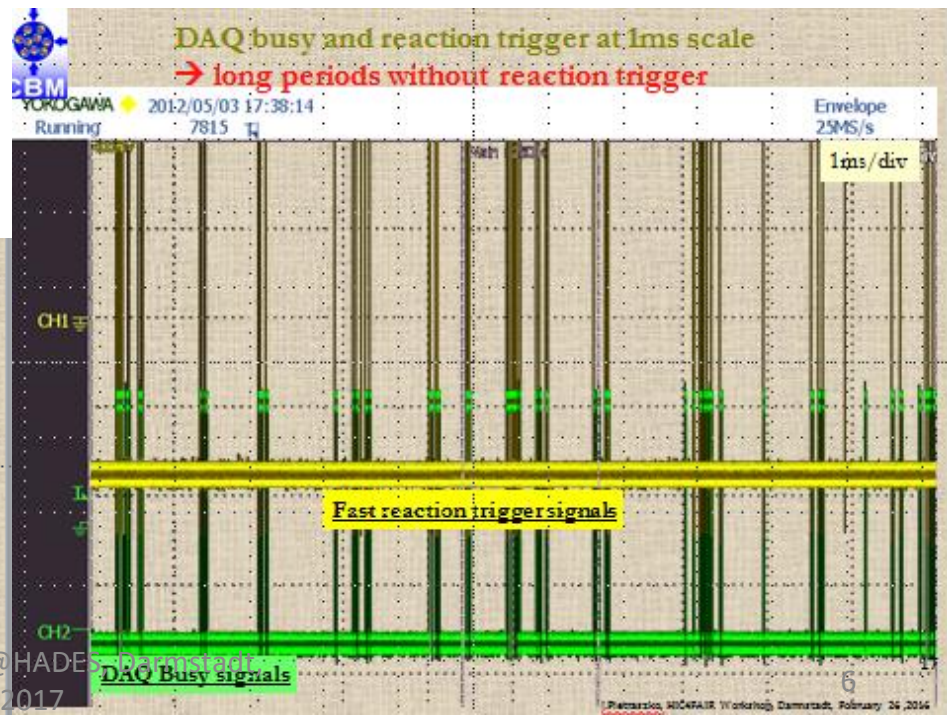
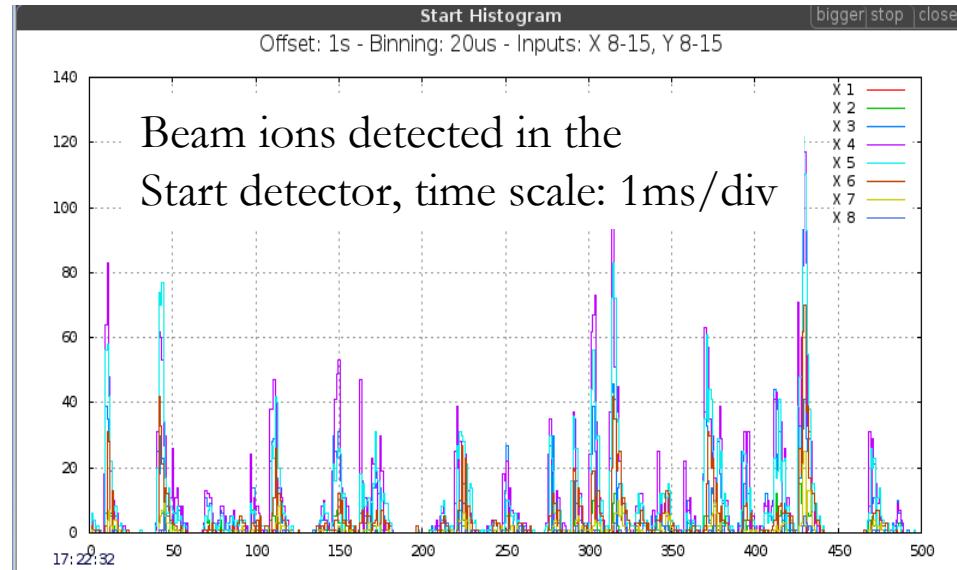
- Micro beam structure at SIS18
- Beam stability in spill

→ Never measured for p beam !

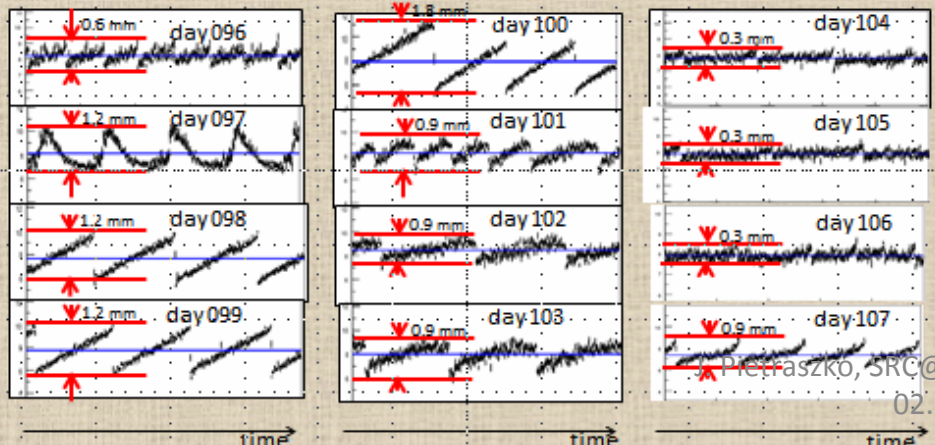
→ p@3.5 GeV slow extraction - OK

→ p@4.5 GeV fast extraction OK – but we need slow extraction -

→ accelerator test needed !



Beam position stability – day-wise



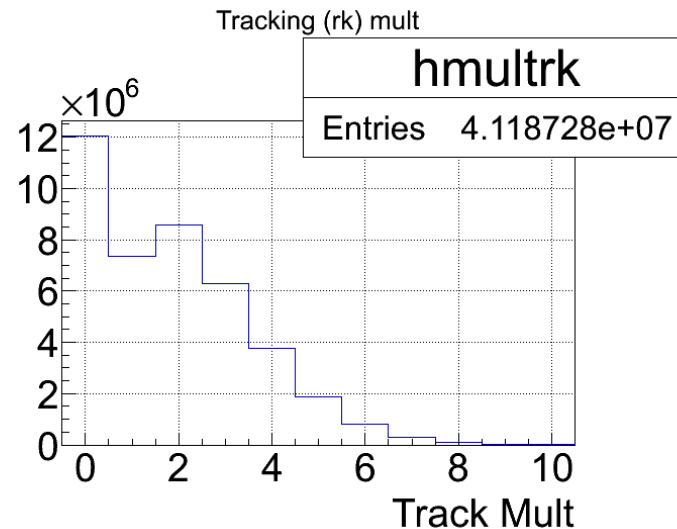
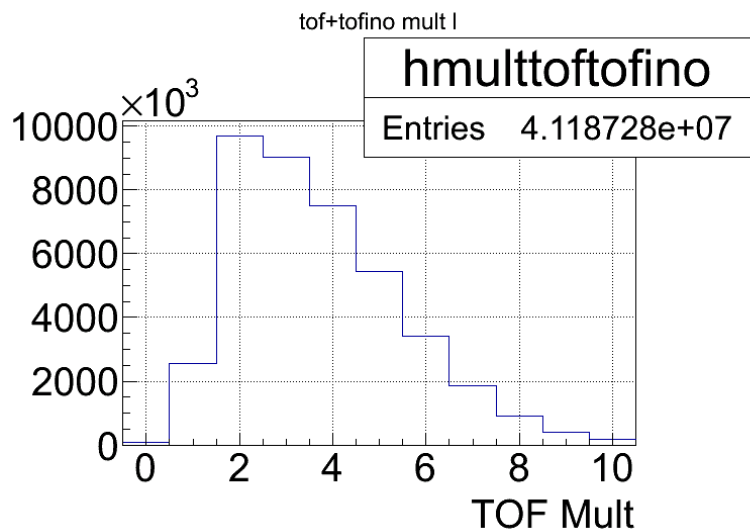
“Empty” events – p+Nb data

Trigger: Meta Mult ≥ 2

Tracking Mult.

28 % empty events

20 % Mult == 2 events



With bad beam quality we will be dominated by “empty” events

Detector load - MDC

- Au+Au@1.23 AGeV - reference load on chambers
- X-ray shows that we can go factor of 2 higher (MDC team ...)
- p+Nb – measured and used as reference

Summary (Ch. W)

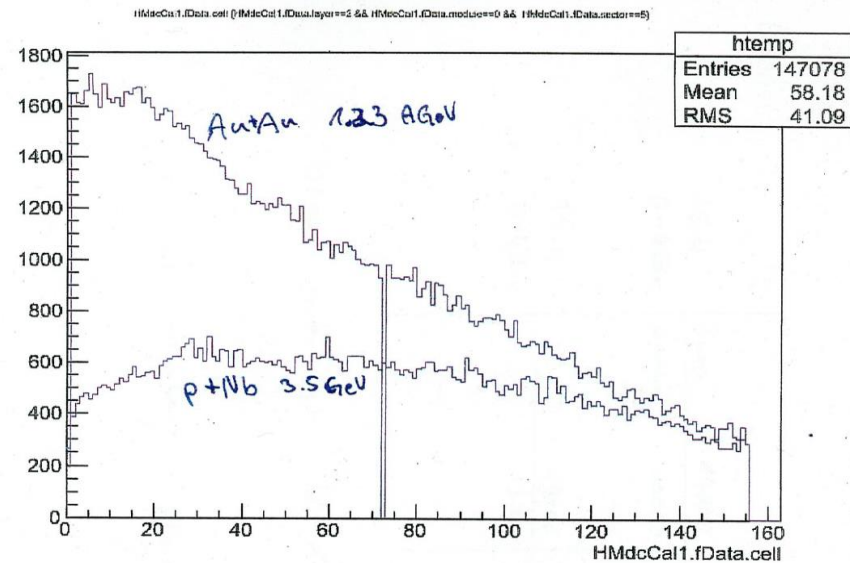
- Inner MDC (Au beam) 100 x higher current than in p+Nb
- Outer MDC factor of 10 only !!
- p+Nb: $1.3 \times 10^6/s \times 10 \times 2$
 - new limit would be $3 \times 10^7/s$ with additional challenge x 2
 - **$6 \times 10^7/s$ in spill (p+Nb)**

High risk for outer MDC going above Au+Au load

→ for a dedicated SRC@HADES run one can use KickPlane method (momenta based of TOF/RPC position measurement)

→ **Simulation needed**

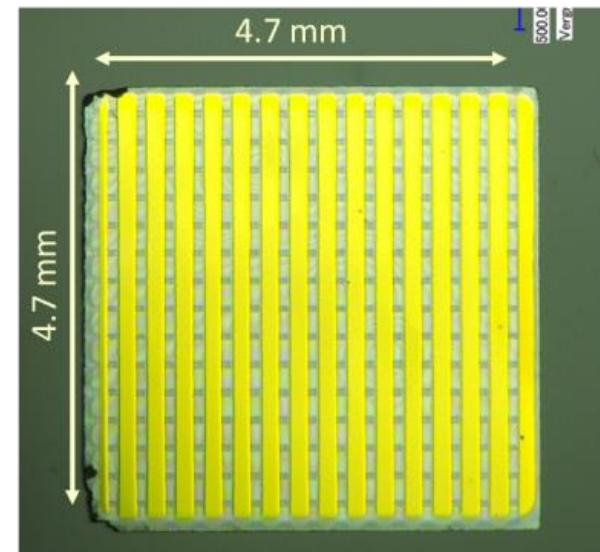
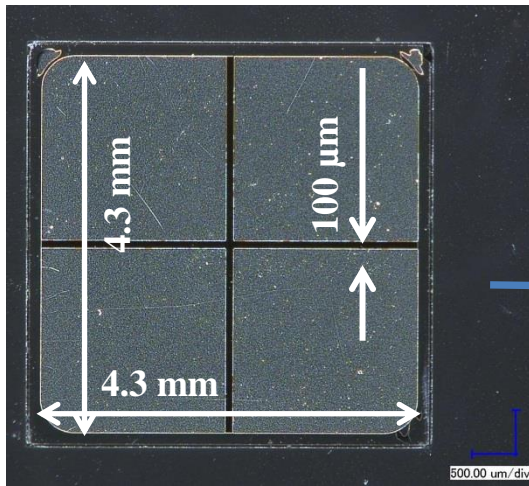
Ch. Wendisch



inner chambers Au+Au ~ 400
 outer chambers p+Nb ~ 10 !

Expected / measured diamond detector performance for MIPs (above $10^7/s$)

- To handle 10^7 p/s higher segmentation is needed, 16 + 16 strips:
 - time precision below 100ps needs to be demonstrated.
 - in preparation



Thank you