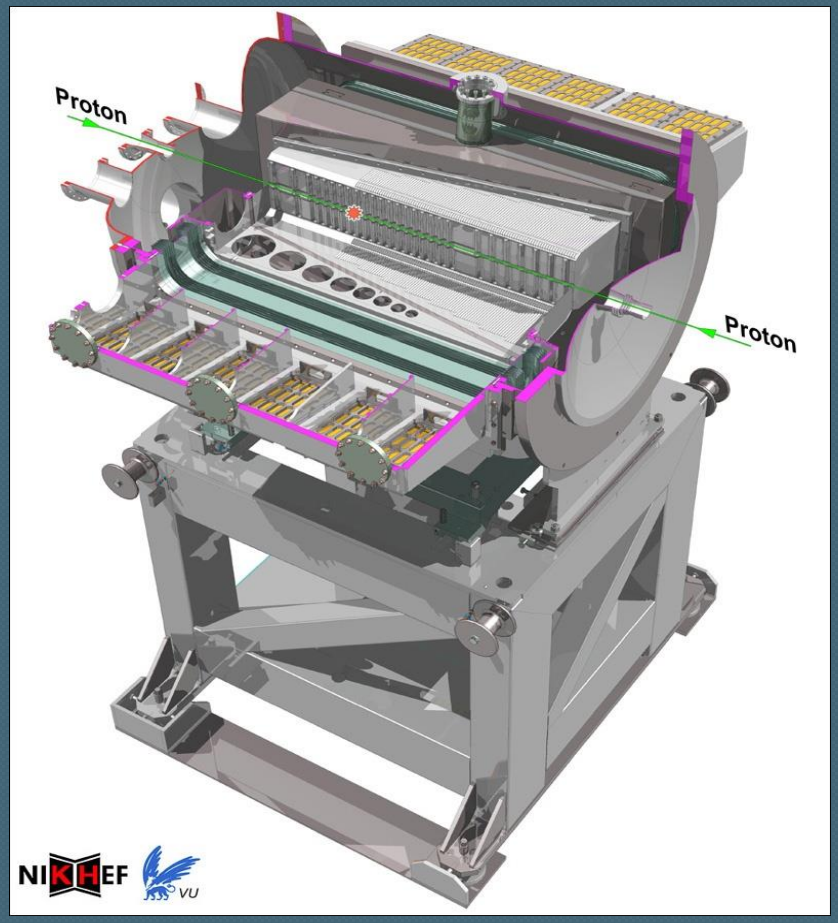
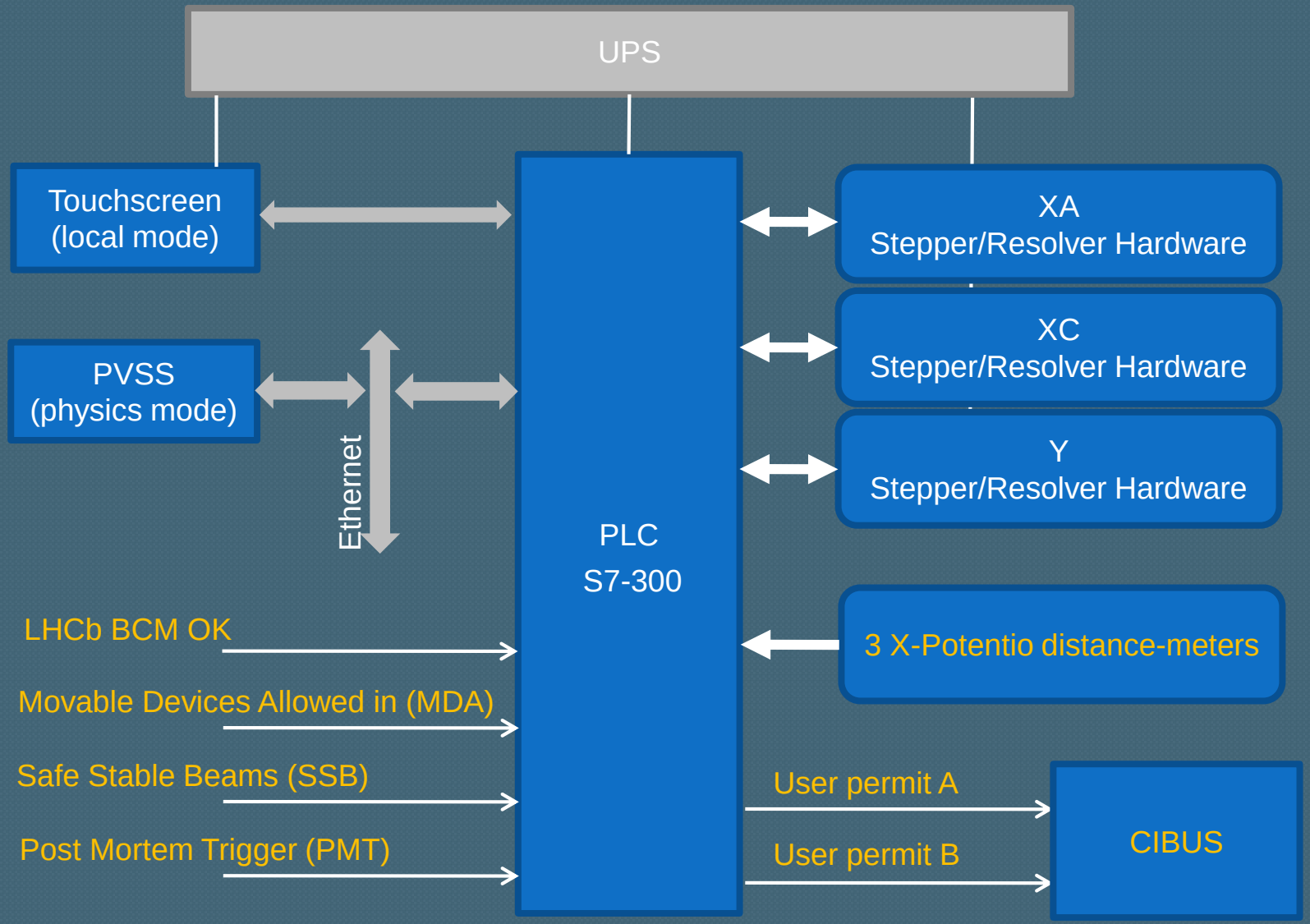
VELO Motion Interlock Issue



VELO Motion Interlock PLC



Issue and Solution

- Safety: VELO only allowed to leave garage at STABLE BEAM, UNSTABLE BEAM and BEAM DUMP as defined by SMP Movable Device Allowed flag

- Logic was only based on resolvers
  - Resolver position is not available during moving

  ➔ No interlock triggered until VELO stop!

  ➔ Discovered this at beam mode, handshake, interlock test on Friday March 9

➔ Proposed modification (M. van Beuzekom & E. Jans, NIKHEF):

user_permit =

OR ((stepper == resolver) AND (resolver>28mm) AND not_MDA AND not_moving)

this term is needed to allow beam injection (MDA not yet true)

if the VELO is moving, the user_permit is only true if MDA is true (below, 3rd OR), see also next slide

OR ((stepper != resolver) AND (potm>28) AND (potm<30) AND not_MDA)

this term is needed to allow beam injection in case of problems with stepper/resolver

OR (MDA)

if MDA is true, the position of the VELO does not matter

OR (force_user_permit_true)

only for test purposes or motion failure situation

- Note: “Potm” based on 2 out of 3

Consequences

Adding the “not_moving” term implies the following changes in behavior:

- When moving in, the user_permit will disappear immediately if MDA goes false
  → this is a wanted feature
- We can no longer “freely” move the VELO in the range 28<x<30
  - → not a real loss, this “freedom” was never used