DCS Status of the Hypernuclei /-atoms Setup

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Production of hypernuclei /-atoms

Ξ^- production:
$pN \rightarrow \Xi^- \bar{\Xi}$

rescattering in
primary target
nucleus

deceleration in
secondary target

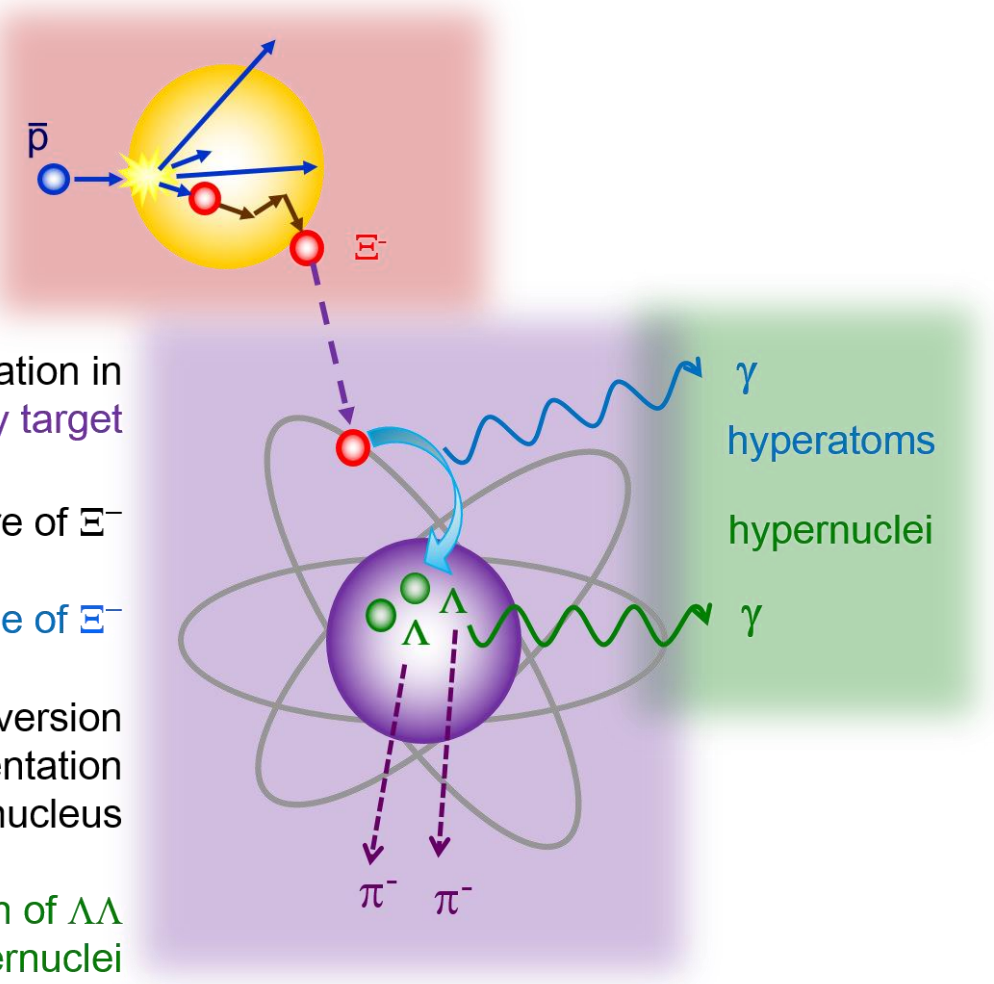
capture of Ξ^-

atomic cascade of Ξ^-

$\Xi^- p \rightarrow \Lambda\Lambda$ conversion
fragmentation
$\rightarrow$ excited $\Lambda\Lambda$-nucleus

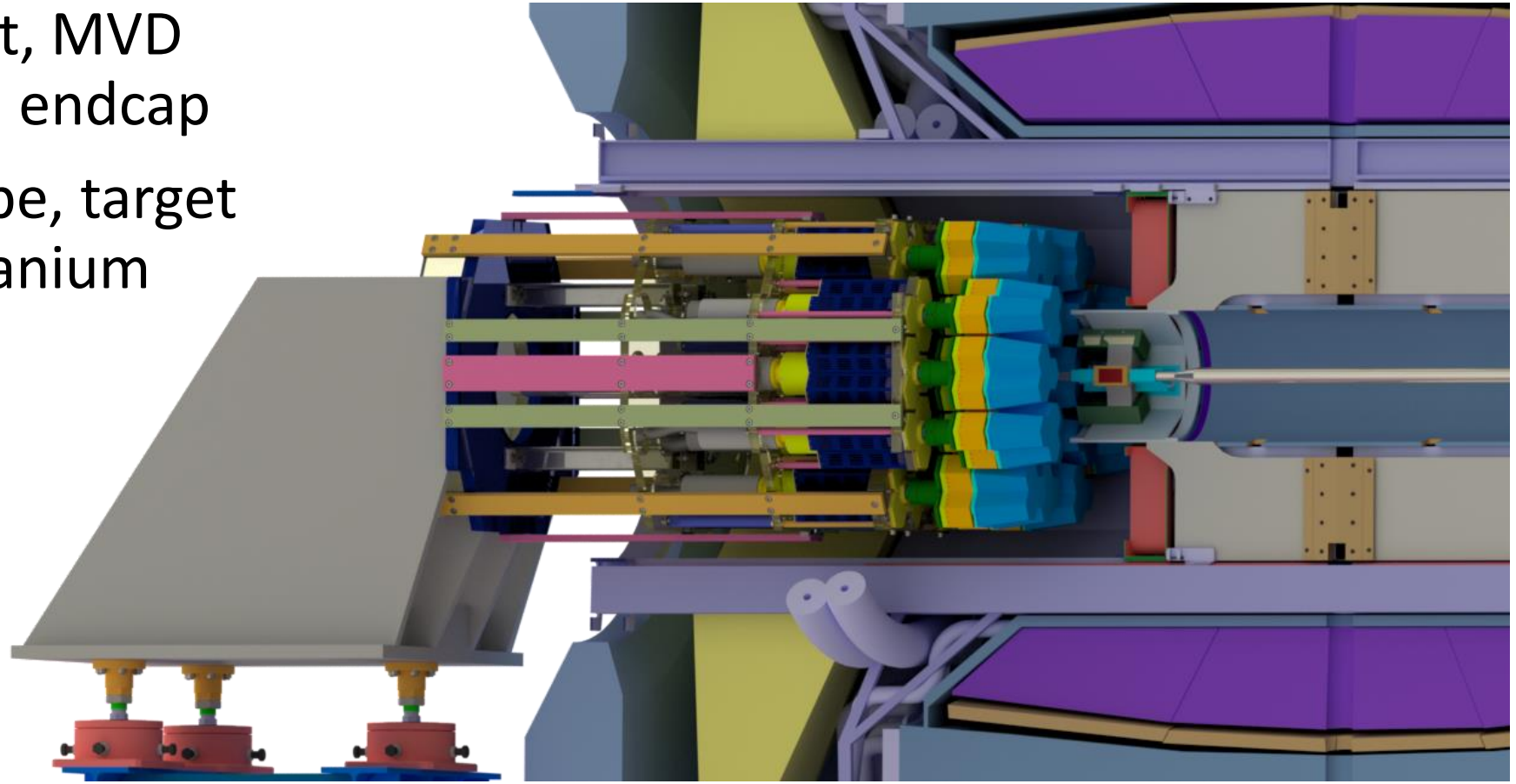
γ-deexcitation of $\Lambda\Lambda$
hypernuclei

weak pionic decay

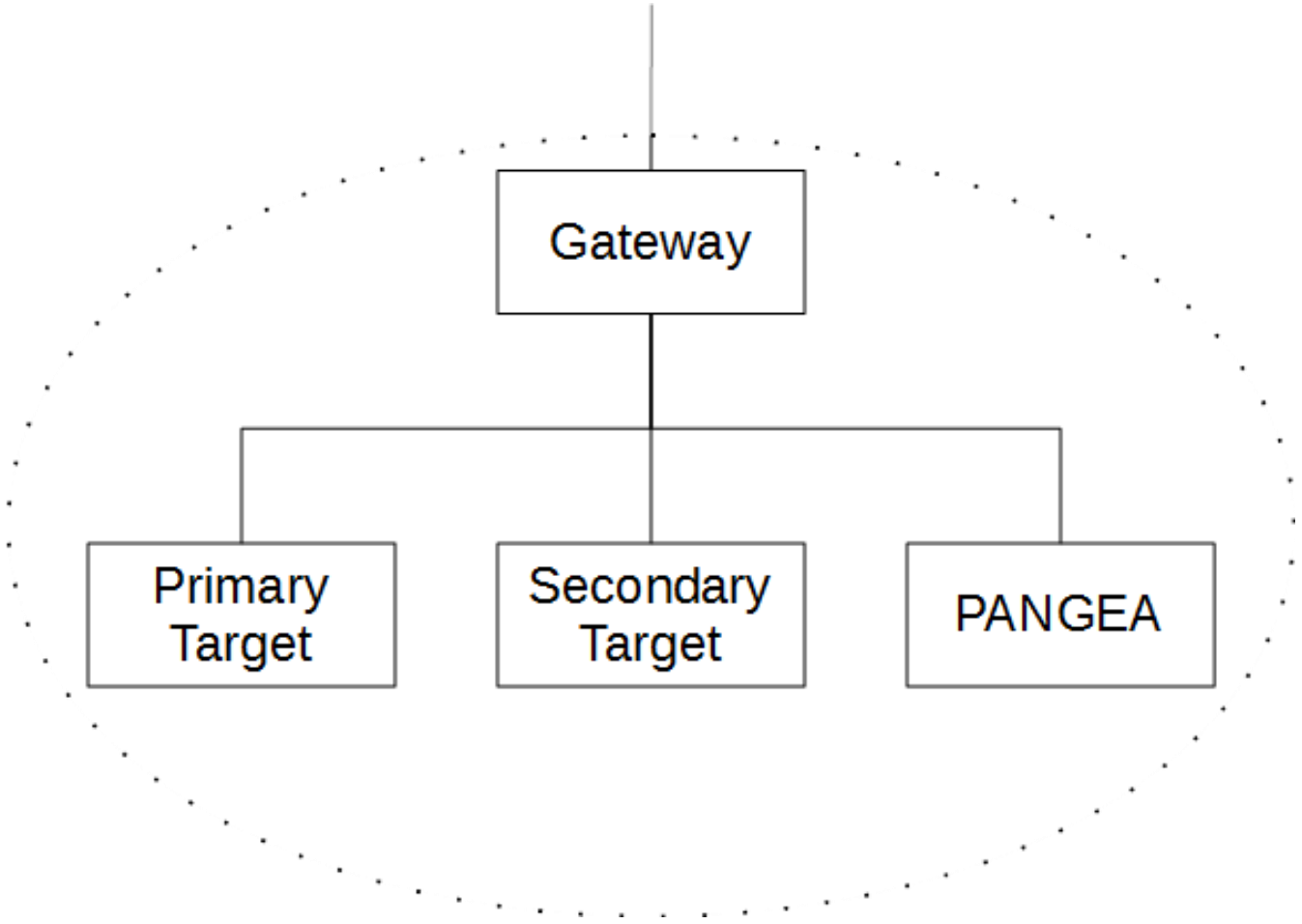


Setup for the experiment

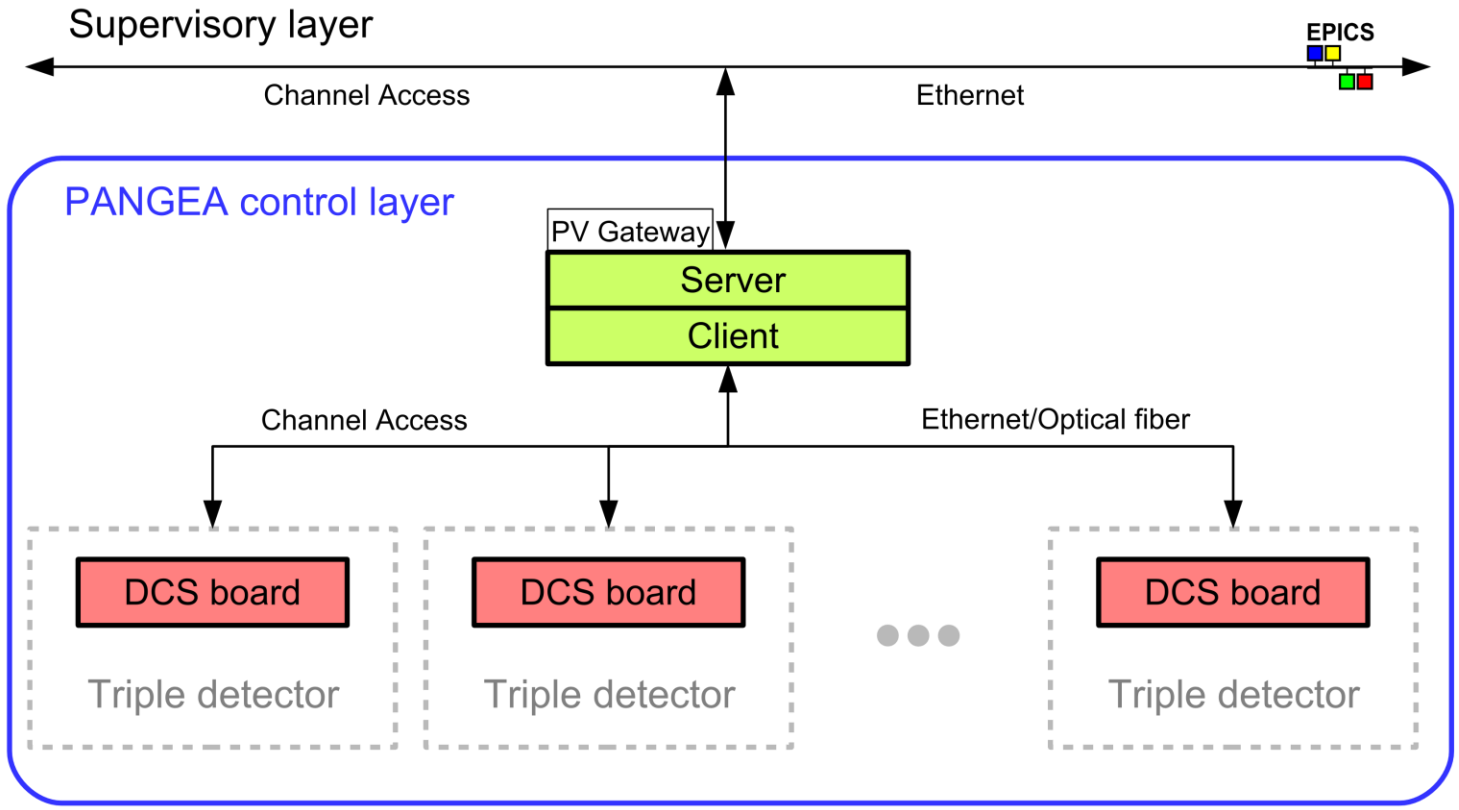
- Remove target, MVD and backward endcap
- New beam pipe, target system, germanium array



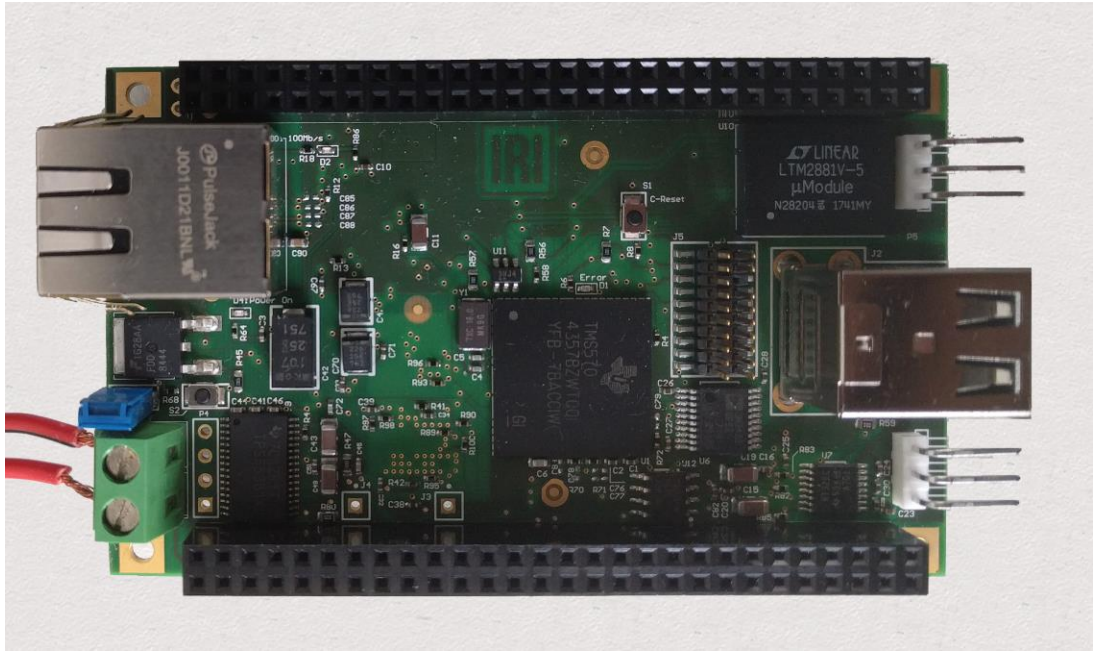
DCS Overview



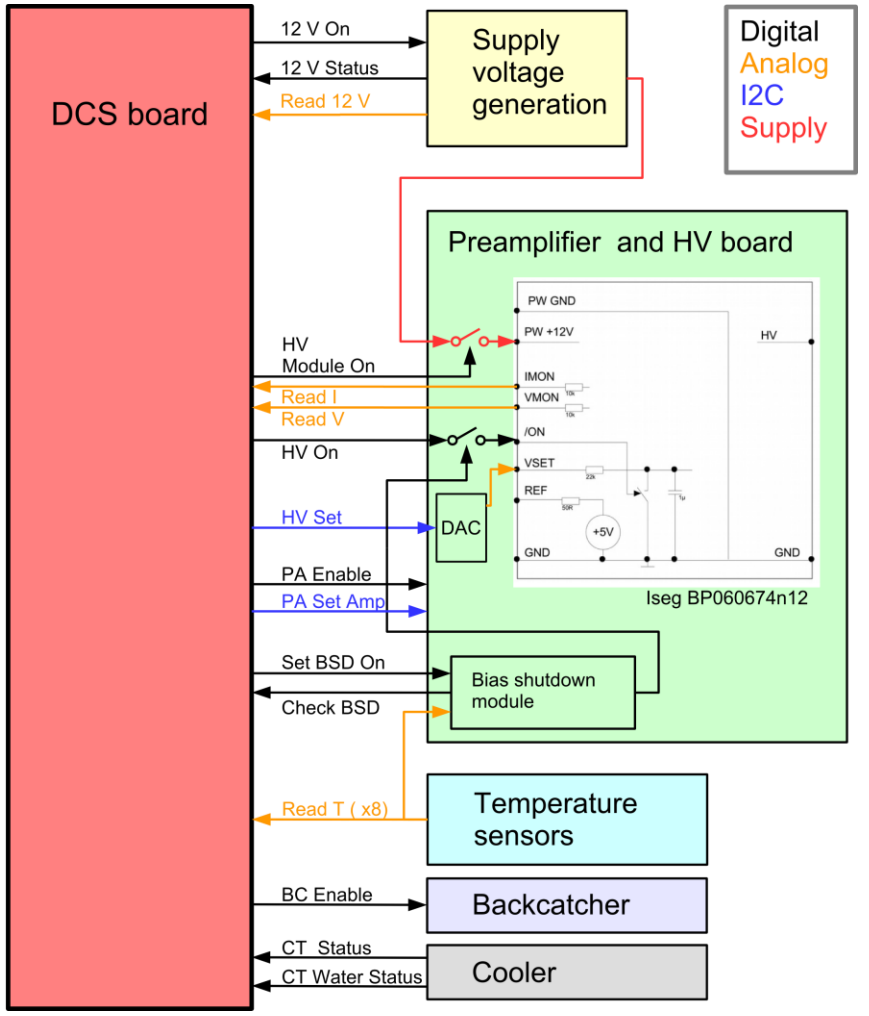
PANGEA


Supervisory layer
EPICS
Channel Access
Ethernet
PANGEA control layer
PV Gateway
Server
Client
Channel Access
Ethernet/Optical fiber
DCS board
DCS board
DCS board
Triple detector
Triple detector
Triple detector

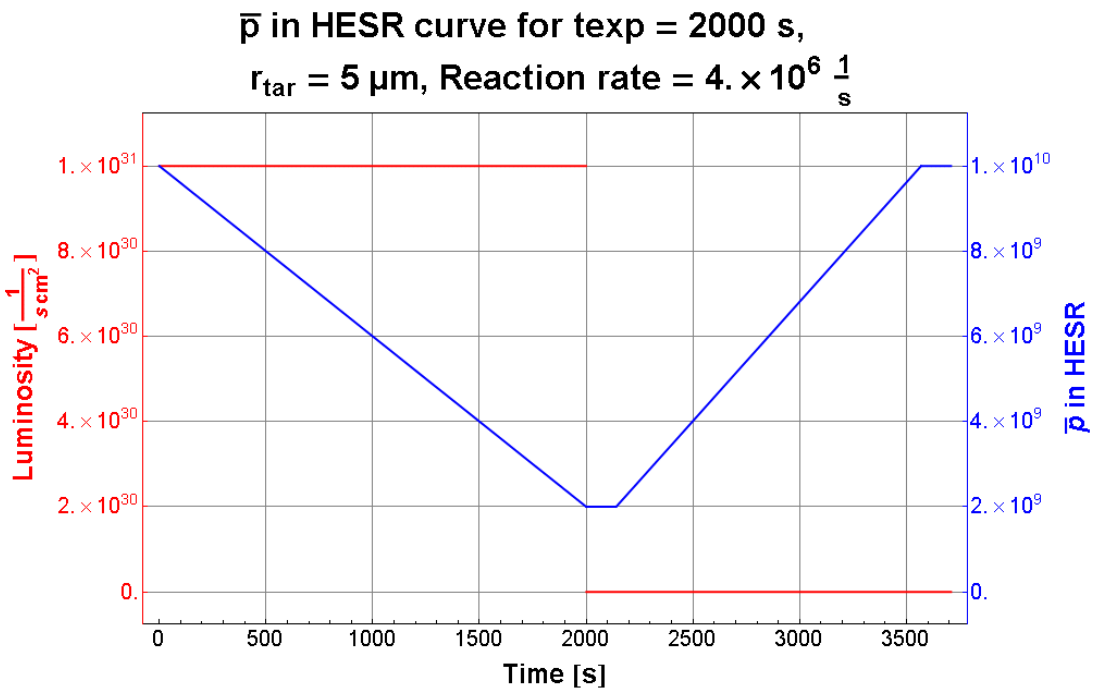
PANGEA DCS

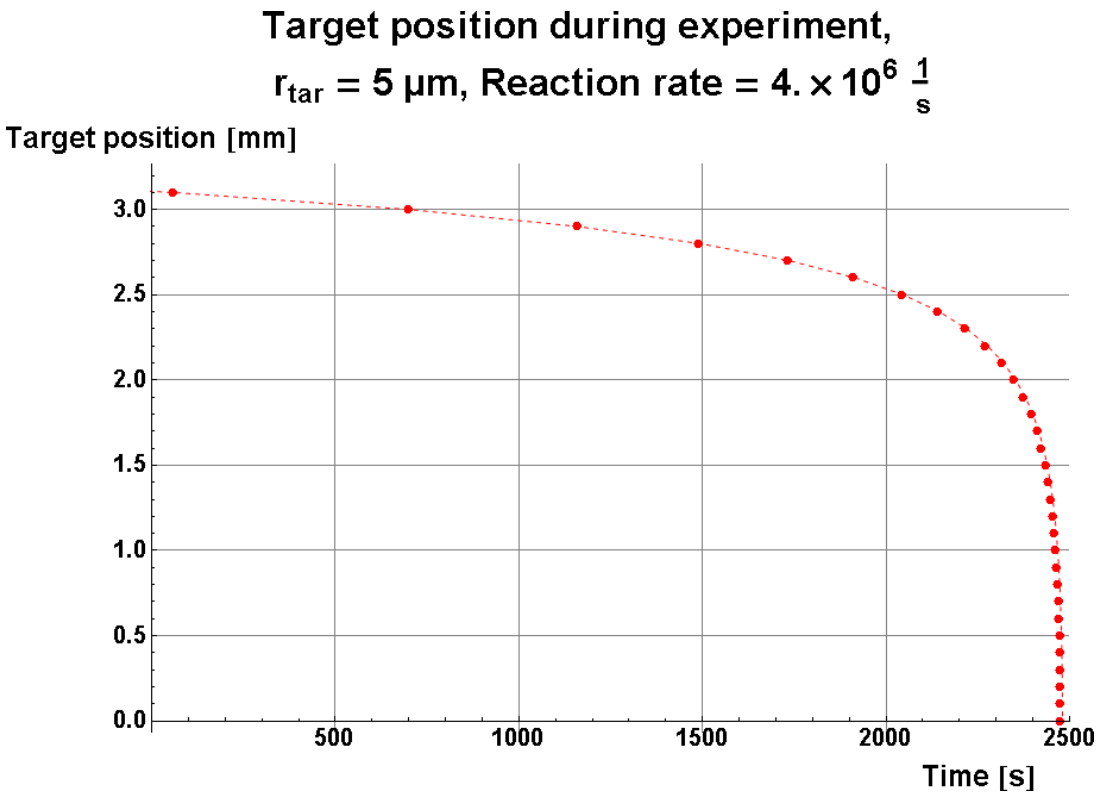


- DCS Board – common to FAIR
- Developed in Frankfurt
- Triple Detector needs 48 V

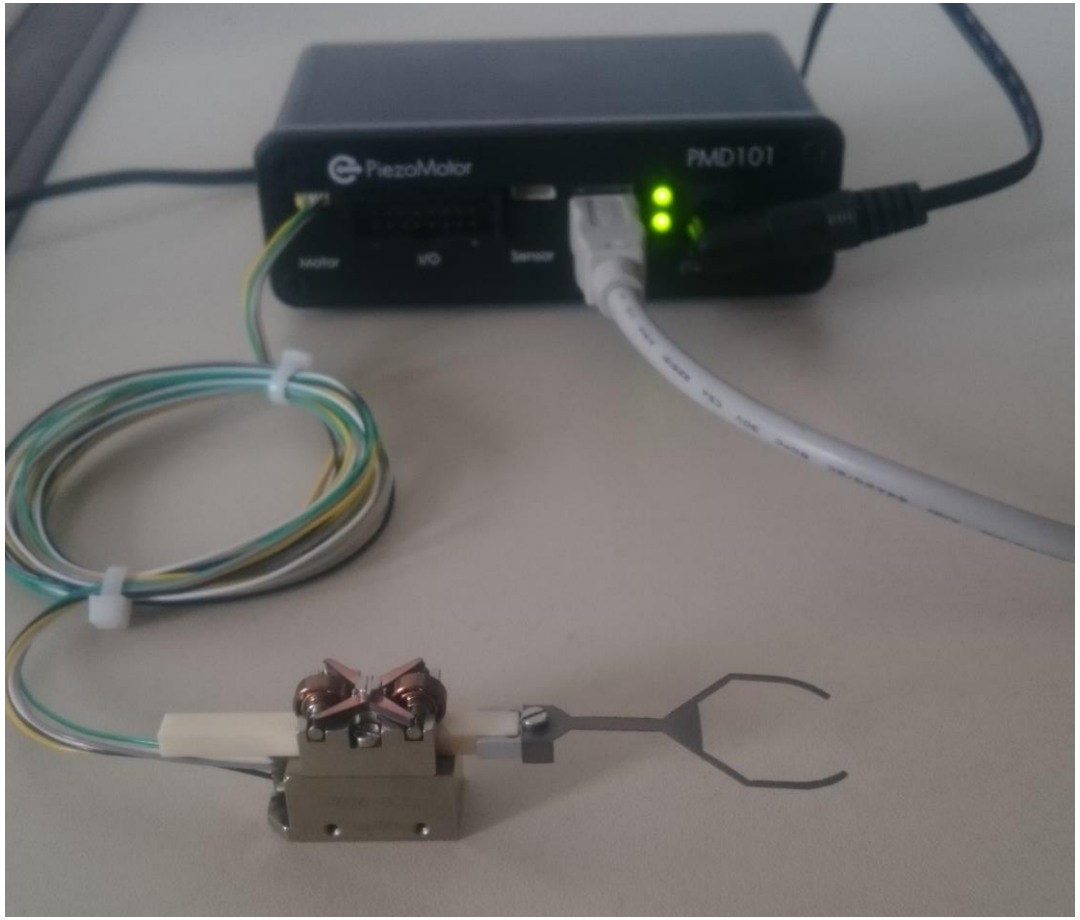


DCS of Primary Target?



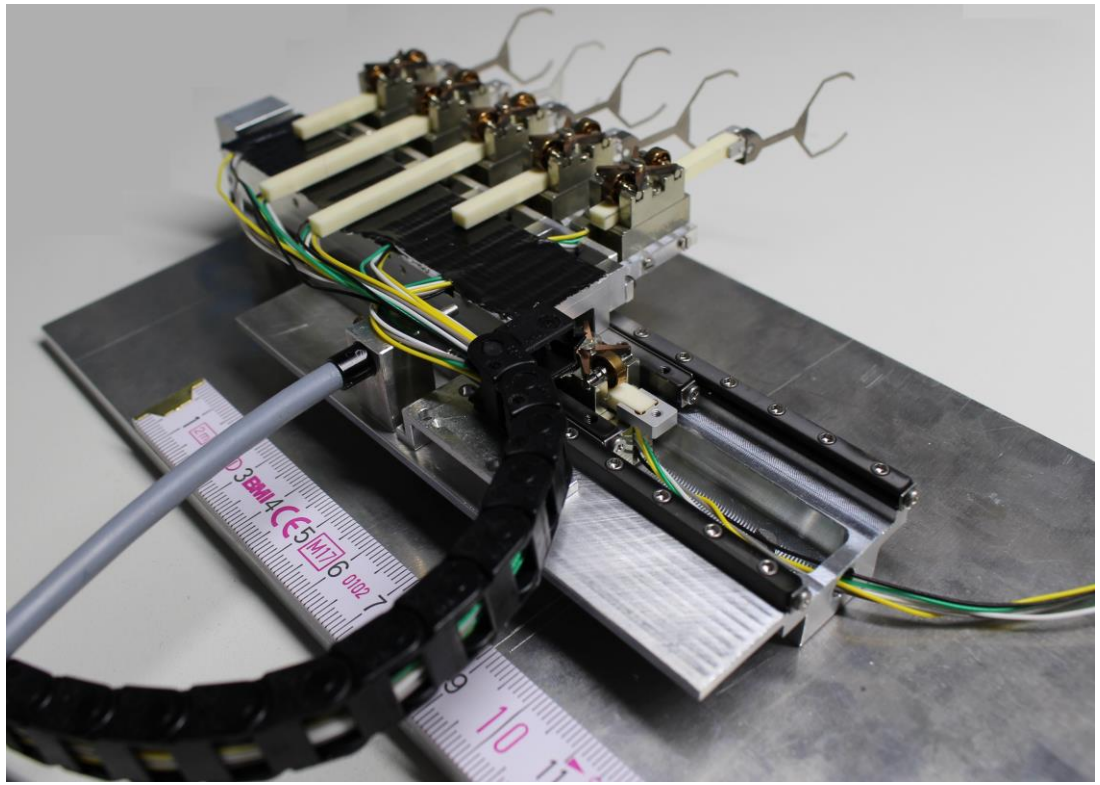


Primary Target



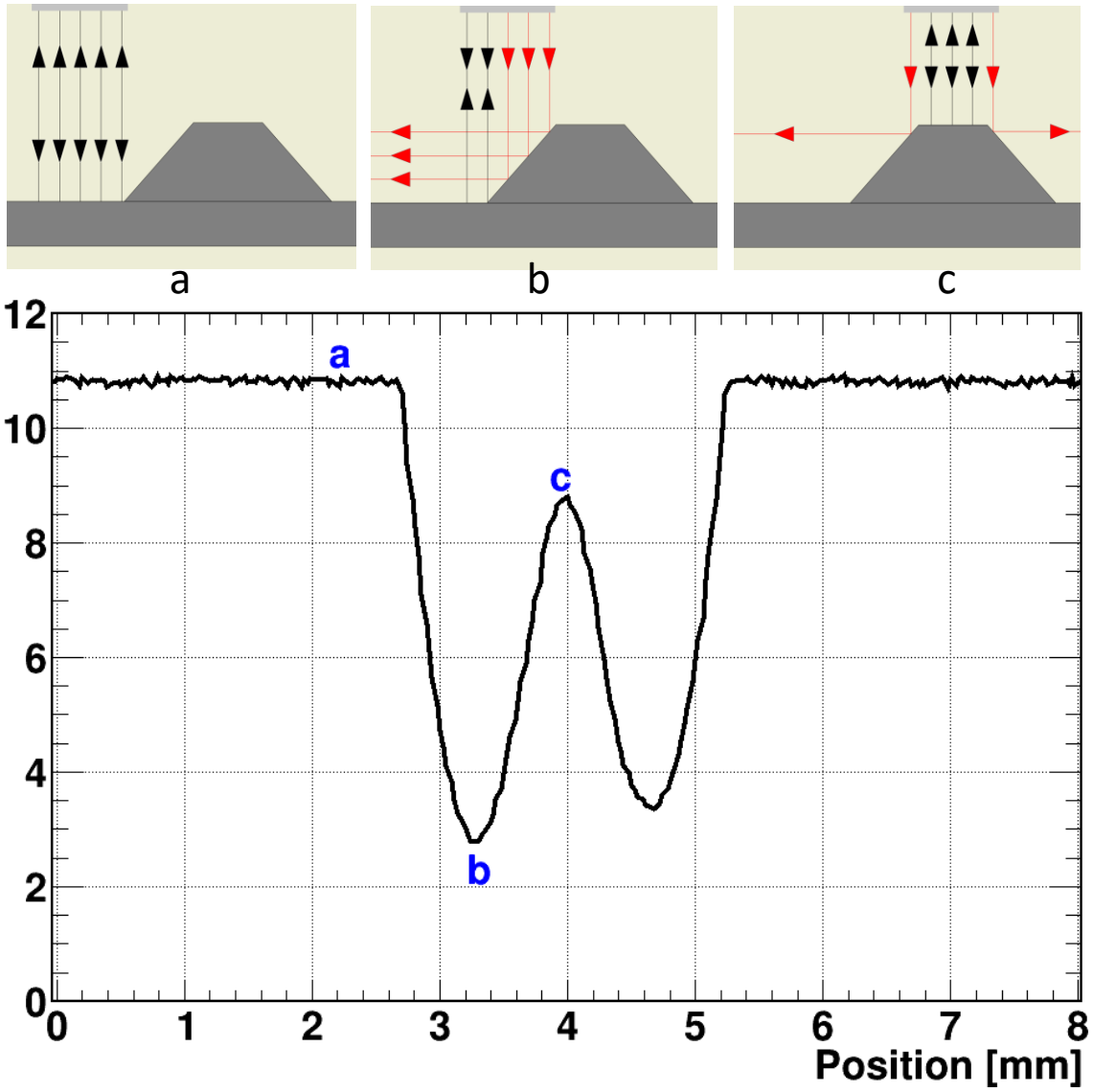
- Carbon fibre mounted on Piezo motors
- USB or analogue communication
- Host computer: Raspberry Pi 3

Primary Target System



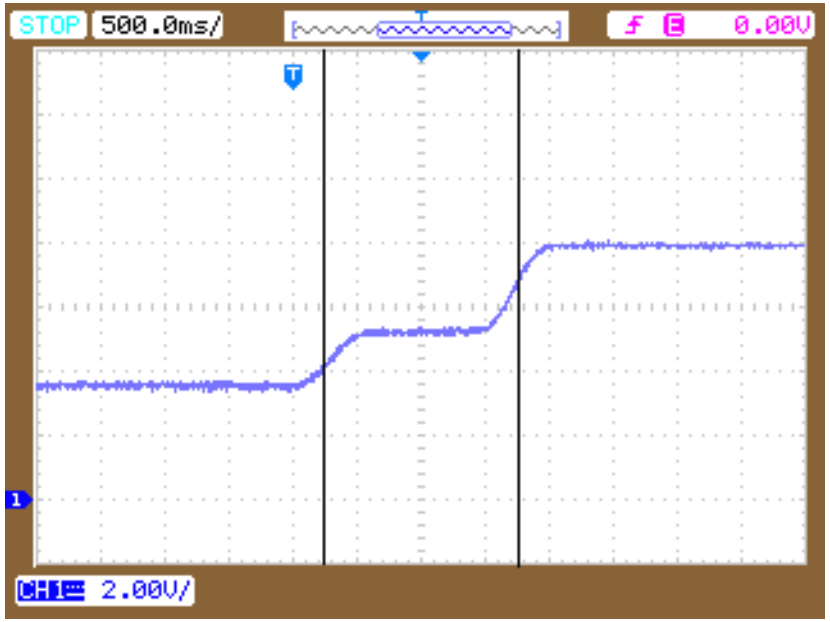
- X Positioning requires Luminosity feedback
- Z Position Control via Light Guide optical encoding system

Z Position Control



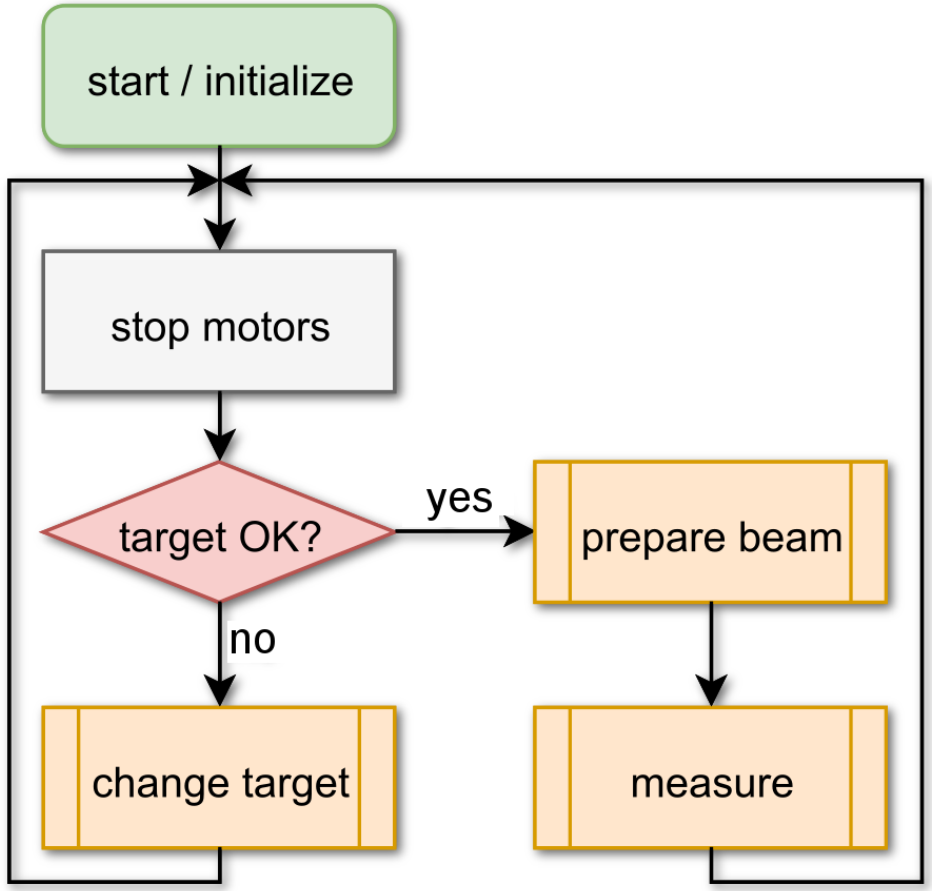
- c position: ± 50 µm
- Precision of approach unknown
- Up to 15 m light guide

Z Movement Hardware Interlock



- Distinguishable Position using BeagleBone Black ADC
- Read via devgpio
- Hardware Interlock possible

Primary Target DCS



- Target exchange
- Luminosity controlled Movement (simulated)
- Integrated z Position control

- Essentially working

Secondary Target

- Active components based on MVD Silicon Strip
- NO development by Hypernuclei group